TRADITIONAL FOOD INTERNATIONAL 2012 (TFI-2012)

Traditional foods: from culture, ecology and diversity, to human health and potential for exploitation

including

THE STREET FOOD SEMINAR

An international forum on street food – aspects and perspectives

Cesena, Italy

OCTOBER 4-5, 2012

Abstract Book & List of Participants

Editors: Federico Ferioli, Elisa Giambanelli, Federica Pasini, Luigi Filippo D'Antuono
Alma Mater Studiorum
University of Bologna

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Preface
TRADITIONAL FOOD INTERNATIONAL – TFI2012

Traditional foods are increasingly attracting the interest of consumers and manufacturers. Recently, an effort has been made for an objective definition of “traditional foods”, aimed at setting a scientific and regulatory approach to their study and management. From a semantic point of view, however, tradition is a complex of uses, habits and ways of life that are transmitted across generations, often through oral communication. Traditional facts are therefore intrinsically local and diverse, escaping deterministic classification; sometimes they reveal striking converging features, depending on common environmental and cultural constraints. Dealing with traditional foods from a scientific point of view is therefore a challenge: it is dealing with a subject related not only to nutrition and health, but also to environmental, human ecology and cultural issues.

A number of EU funded projects in some respect related to traditional foods have been funded and developed during the last years. BaSeFood (Sustainable exploitation of bioactive components from the Black Sea area traditional foods) is a EU FP7 funded project, started in April 2009 and ending in October 2012. Coordinated by the University of Bologna, Italy, the project aims at investigating several aspects of plant origin Black Sea Area traditional foods.

In correspondence to the end of the BaSeFood project, it was decided to organise a Congress aimed at putting together different approaches and disciplines for the study of all aspects of traditional foods.

Traditional Food International (TFI-2012) is a first appointment, generated from this effort.

The contribution of internationally recognised invited speakers, the coordinators of recently funded European projects, the illustration of BaSeFood highlights and about 100 posters from BaSeFood partners and external contributors are a promise of making the meeting a very fruitful forum of discussion.

Within the meeting, a dedicated two hour seminar, is devoted to street foods, that, besides being a growing phenomenon in many parts of the world, are also attracting the attention of researchers, from social sciences to food safety. The Street Food Seminar will therefore try to link traditional and street foods, within the same scientific perspective of TFI-2012, linking with the initiatives of the 7th International street food festival, that will be held in the Cesena city centre during the week end.

L. Filippo D’Antuono
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TFI-2012
Invited speakers’ communications
Traditional and local food systems: a nutritional, social and sustainable balance to global supply chains

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Introduction. Indigenous and local communities who retain knowledge of and access food resources within their local environment through farming or wild harvesting offer continuity with the past. While food systems historically have congruent biological, environmental, socio-cultural and economic components, contemporary market-controlled and globalized “food” systems are dominated by economic principles. Moreover, food production and consumption threaten the environmental sustainability of the global food system concurrent with growing concerns for food and nutrition insecurity.

Results. Based on examples of indigenous and smallholders agriculture in different contexts this paper considers how the heritage of traditional food systems can be channelled for mutual economic, nutritional and social well-being of contemporary food producers and consumers.

Conclusions. Both global intensive and local (smallholder) agricultural systems are essential and complementary for providing sustainable food and nutrition security. However, global value chains and trade can (and often do) exclude local foods, traditional foods, and the products of biodiversity. The trans-national food industry thus can limit the availability and choice of food for consumers. Traditional and local food systems in both developed and developing countries offer transformative models based on defining values related to environmental integrity, food quality and health, and social concerns. These can inform public policy and investment directed at market and value chain oversight, as well as target subsidies for environmentally sustainable local production offering health, nutrition and social services. Market integration of biodiverse smallholder agriculture supported by technology adoption and market access offers positive benefits in productivity, environmental conservation, dietary diversity and health of consumers, but can present risks for smallholder farmers particularly in developing countries.
Agricultural biodiversity and traditional foods

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Agricultural biodiversity describes the variety and variability of animals, plants and microorganisms that are used directly or indirectly for food and agriculture, including crops, livestock, forestry and fisheries (FAO 1999). Agricultural biodiversity is important at each of three levels: within species, among species and within agro-ecosystems. The components present at each of these levels interact in complex synergies within farmer-managed systems, contributing to the delivery of products and services for our well-being—from food, nutrition and income generation options to the development of resilient production systems and the strengthening of countries’ food self-reliance. At the heart of realizing these benefits are the farmers (and other agricultural biodiversity users) whose indigenous knowledge is the root of best practices for simultaneously using and conserving agricultural biodiversity. Men and women play complementary, and equally important, roles in conserving, cultivating, processing and celebrating agricultural biodiversity, although men’s roles have historically been better recognized and supported. One of the key benefits of agricultural biodiversity is in the preparation of traditional foods, where it provides both the raw materials and the associated traditional knowledge for food development processes. For safeguarding agricultural biodiversity, two complementary conservation strategies are deployed: ex situ and in situ or on-farm conservation. So far, on-farm conservation has received much less attention from formal R&D. And yet, the future of the vast majority of traditional crops, needed for the preparation of traditional foods, is linked to the fate of on-farm conservation for multiple—biological, economic, cultural, ecological and social—reasons (Padulosi and Dulloo 2012). Advancing on-farm conservation calls for research efforts into a variety of issues of key relevance also to traditional foods, including: assessing the extent, distribution and use of agricultural biodiversity and its relevance to people’s livelihoods; monitoring genetic and cultural erosion of biodiversity; surveying custodian farmers and community genebanks; and developing policy and legal frameworks for on-farm conservation. The development of ‘Red Listing’ methods for cultivated species is highly strategic for safeguarding food security options as well as protecting and celebrating food cultures and traditions which lie at the heart of the identity of millions of people around the world. A global collaborative platform dedicated to promoting on-farm conservation at national and international levels, and involving formal and informal stakeholders, is also strongly advocated.

References.
Traditional foods, nutrition and health

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Globalization, industrial development, population increases, urbanization, high-input industrial agriculture and long-distance transport have changed patterns of food production and consumption leading to a simplification of diets and an increased consumption of processed and commercial foods. Diets low in variety but high in energy have a negative impact on the quality of the diet and thus contribute to the escalating problems of obesity and chronic disease, which are increasingly accompanied by micronutrient deficiencies. The causes and consequences of the dramatic reduction in food diversity and the simplification of diets are complex and are not limited to any specific region or culture.

The food systems of indigenous peoples show the important role that a diversified diet based on local plant and animal species and traditional foods can play to support health and well-being. Countries, communities and cultures that maintain traditional food systems are better able to conserve and access local food specialties based on a corresponding diversity of crops and animal breeds. As a result, they will be less likely to fall prey to diet-related diseases.

Food biodiversity and traditional foods are seldom included in nutrition and/or health programmes or interventions. This is largely due to the lack of compositional and consumption data at food biodiversity level and because farmers, consumers and health/nutrition professionals are not aware of the higher nutrient content of certain varieties or cultivars compared to others and therefore do not grow or consume them, or do not demand them. Therefore, the first step in promoting biodiversity and traditional foods in nutrition, health and agriculture is to expand the knowledge base on the nutritional benefits derived from agricultural biodiversity and traditional foods.

The potential role that agricultural biodiversity can play in moderating nutritional problems is receiving increased attention. While good nutrition should be a goal of agriculture, it is imperative that concerns about sustainability are not lost in the process of meeting that goal. Many dietary patterns can be healthy but they can vary substantially in terms of their cost to resources. The notion of sustainable diets promotes the use of traditional and local biodiversity as a source of foods with high nutritional value. FAO’s multi-partner initiative on sustainable diets addresses the sustainability of the whole food chain, while acknowledging the interdependencies of food production, food consumption, and nutrient requirements. Ensuring sustainable diets requires the development of programme activities and policies towards sustainable food production and consumption, with traditional foods, biodiversity and nutrition-sensitive agriculture at its core. This is in-line and a pre-requisite of FAO’s food-based approach to combat malnutrition which would decrease the need for fortification and supplementation and make the food system more sustainable.
Traditional foods and the EU Regulation on nutrition and health claims

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The European Union has put in place several instruments aimed at protecting and promoting traditional foods. The promotion of origin and geographical indications, foreseen by both vertical and horizontal legislation, is key for many traditional foods as they are normally associated by consumers with a local area, region or country. EU quality logos promote and protect names of traditional agricultural products and foodstuffs which are closely linked to a geographical area or which are made using traditional methods and ingredients.

Regulation (EU) No. 1924/2006 on nutrition and health claims made on foods is often not considered as a tool aimed at protecting and promoting traditional foods. But are nutrition and health claims really in contraction with traditional foods? As foods providing nutritional and health beneficial effects to consumers, many traditional foods (have the potential to) fulfil the requirements for bearing claims. This is for example the case for olive oil, rich in polyphenols, substances able to protect blood lipids from oxidative stress, while for example the calcium present in several kinds of traditional cheeses contributes, among many other beneficial effects, to normal muscle function.

Indeed, far from being a threat to traditional foods, health and nutrition claims allow food business operators to communicate about their health 'value added'. In this way, they play a role in boosting the market for traditional foods, helping in maintaining the local and regional traditions.
Traditional foods and industry

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Introduction. One of the main challenges in traditional food production is to identify innovations which are complying with EU safety policies and regulations and guarantee the quality and safety of Traditional Food Products (TFPs), while at the same time meet general consumer demands and specific consumers expectations and attitudes to innovation in TFPs. This is a particular challenging task for small to medium size enterprises which constitute the majority of European traditional food producers and processors.

Results. All the operators involved in the production and distribution of traditional food products (TFP), such as farmers, raw material suppliers, food and feed processors, traders and retailers, must comply with the current EU food safety policies.

In addition, traditional food producers and processors have to satisfy the demands and sometimes contradictory expectations of consumers. For example, traditional food consumers demand,

- products which are completely safe with respect to microbiological hazards but are also minimally processed, free or low in preservative content and of high nutritional and sensory value,
- products which are produced with minimum or no pesticides, but are also free of pest of disease lesions and mycotoxins,
- minimisation of antibiotic use in livestock production, but also high animal welfare standards.

TFPs are often marketed and readily recognized by consumers for their “regional identity”, their “culinary” and sensory qualities, and as providing nutritional and/or health benefits. There is also recognition of potential environmental benefits of the “low input” focused primary production systems used for many traditional foods. However, recent studies have indicated that many sectors of the traditional food industries have done little to identify and introduce innovations in primary production or processing that can:

- (i) Increase nutritionally desirable compounds (e.g. antioxidants, vitamins and certain unsaturated fatty acids, bioactive peptides and minerals)
- (ii) Reduce nutritionally undesirable compounds (e.g. salt, sugar, pesticides, saturated fatty acids), while
- (iii) Maintaining or improving their sensory qualities.

Consequently, to improve nutritional qualities of traditional foods it seems important to include (i) lower input primary production strategies, which improve the nutritional composition of traditional foods, and (ii) minimum processing strategies, which improve the nutritional composition of processed traditional foods. The improvement of quality characteristics of TFP “in line” with consumer expectations is considered also an essential item to maintain the competitiveness of the TFPs in the future. Actually consumers’ demand regarding food products that have an overall positive
effect on human health is increasing. However, this desire has to be balanced with the contradictory demands of consumers such as the one for more ready-to-use traditional food products. An increasing proportion of consumers is in fact willing to pay more for products, which are perceived as providing nutritional and/or health benefits. To satisfy this consumer demand, the application of agronomic and processing technical innovations that allow optimization of nutritional quality has become a major target for the TFP both industry and research. Any intervention aimed at changing nutritional or dietary profiles, especially if addressed through increased TFP consumption, might be based on scientific knowledge on the effect of specific nutrients, nutrient compositions and/or other substances with a physiological effect on chronic disease development. It is therefore important to assess the overall effects of nutritional quality focused TFP innovation on human health indicators in the geographic areas where the TFP consumption is part of the cultural heritage. This might be done before starting production and marketing of “added nutritional value” TFPs.

**Conclusions.** Innovations in TFP impacting positively on the intrinsic product quality (e.g. improving healthiness and safety) are found to be well accepted by consumers, whereas innovations pertaining to new distribution systems and formats (e.g. vending machines, home delivery) or ready-meals seem to be less accepted and affected the traditional image of the product. Also new combinations of ingredients and diversifications into different shapes and textures are perceived as damaging the traditional character. However, sensory innovations do not necessarily impact on lower product acceptance rates.

**References.**
European consumers’ attitudes to traditional food

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Traditional food products (TFP) have always been an important part of European culture, identity and economy. In order to increase safety and competitiveness in TFP without losing the well-appreciated traditional image that these products have for most consumers, producers and manufacturers need to incorporate different product and process innovations. Accordingly, the overall objective in Truefood WP1 was to determine consumers’ perception, expectations and attitudes towards TFP and innovation acceptance related to such products. This presentation will give an overview of main findings in TRUEFOOD WP1.

Based on qualitative and quantitative consumer information gained in six European countries (Belgium, France, Italy, Norway, Poland and Spain), the following definition of TFP have been published (Vanhonacker et al, 2010): “A traditional food product is a product frequently consumed or associated to specific celebrations and/or seasons, transmitted from one generation to another, made in a specific way according to gastronomic heritage, naturally processed, and distinguished and known because of its sensory properties and associated to a certain local area, region or country.”

Further results from a cross-cultural survey showed that TFP receives highly positive opinions and feelings across Europe as represented by the six countries. Traditional foods are characterized by high and constant quality, special taste and good appearance, high safety and healthiness, high nutritional value, low availability, a relatively high price and time-consuming preparation (Almli et al, 2011). Moreover, traditional food consumers across Europe are profiled as typically middle-aged to elderly, health-conscious, ethnocentric, food connoisseurs, who are attached to familiarity in their food choices and who very much enjoy cooking (Vanhonacker et al, 2010).

Several experimental studies have been performed in TRUEFOOD WP1 to investigate the relationship between consumer expectations, consumers’ attitudes to innovation and product acceptance. Studies on consumers’ responses (acceptance and willingness to buy/pay) to innovations in traditional cheeses, dry cured ham, smoked salmon and sausages have shown a large diversity in results (Hersleth et al, 2011, Almli et al, 2011). Generally speaking it has been found that consumers’ acceptance of innovations in TFP is strongly dependent on type of product and type of innovation. Innovations that provide consumers with relevant benefits without producing substantial changes in the products sensory quality are generally well accepted. Further, different consumers segments were revealed, some of these responded generally more positively to the presented innovations. Thus, it is important for the industry to customise specific products for specific consumer segments, and to communicate and market these products accordingly.
Acknowledgements.
TRUEFOOD – “Traditional United Europe Food”: an integrated Project financed by the European Commission under the Sixth Framework Programme for RTD (Contract no. FOOD-CT-2006-016264).

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Traditional foods and denominations of origin: between consumer interests and agricultural policy – a general perspective with focus on Northern and Southern Europe

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Introduction. Food quality was one of several strategies chosen by the Norwegian Ministry for Agriculture and Food in the 1990s to answer international competition and a potential Norwegian membership of EU. This new policy was related to the use of the localness and traditional aspects of food products as a resource or added value and was concerned with product differentiation, product quality and product origin, as well as stimulating consumers to buy more traditional products.

This paper, based on previous articles1, explores traditional foods and denominations of origin in Norway, as situated between consumer interests and agricultural policy. Our aim is to give a general perspective with focus on the Norwegian market and differences/similarities between Northern and Southern European mentalities. A first part gives a general view of the Norwegian context to better understand the image, and the impact, of those products for Norwegian consumers. In a second part we focus on quality food products with denominations of origin, their cultural meaning and origin and the gastronomy discourse they are baked in. In a third part we observe their reputation and existence in the Norwegian market and aim to identify consumer attitudes towards those traditional products. This paper is descriptive and mainly based on data collected between 2004 and 2008 during a project about consumers’ perception of local food, as well as a discourse analysis of the concept of “traditional food” in official and public texts in 2006. A quantitative survey, representative of the Norwegian population, was made in 2007 and is here combined with results from focus groups with “connoisseurs” and “ordinary” people.

Results. While most of Norwegian agriculture is mass-produced and standardized, the central government administration and the county councils have used a lot of resources, both human and economic, the last 20 years to promote and support local and traditional food production. The present goal is to increase the market share for “such products” to 20 % of total market in 2020. This underlines the importance of the historical framework relevant for consumers’ perceptions for local food, and we then suggest here a taxonomy of local and traditional food products in Norway building on the four main concepts of: local food products, localised food products and “terroir” food products, as well as traditional food. The relationship between nature and culture appears to be related to taste expectations, local customs and

local identity. A connection to a place and tradition are the two first dimension consumers associate with local and traditional food products. The concept of traditional food is often having a rhetorical function, and associated with something positive, either through explicit ties to other positive values (local community, healthy food etc. Finally we attempted to organize discourses surrounding traditional food along four main axes linked to 1) time, 2) place, 3) form of knowledge and 4) depth of meaning. The four axis must be seen in connection with the description of preserving, moderating and innovating discourses.

The concept of terroir is present in the Norwegian gastronomic discourse. The idea was officially adopted in Norway on 5 July 2002 in the context of a national directive on the protection of appellations of origin\(^2\). Based on council regulations (ec) of 14 July 1992 (2081 and 2082/92, replaced by regulations 509 and 510/2006), the norwegian directive covers the protection of geographical indications, designations of origin and traditional speciality guaranteed. By March 2011 Norway had 18 origin-labelled products to its credit. If we look at a map showing the distribution of PDO in Europe, we find that the pattern is highly uneven, with hundreds of recognized appellations in the south but only about ten in the north.

In a nationwide quantitative analysis we interviewed people responsible for the buying of household food about denominations of origin and what they looked for when buying local products. Most answers opted for tradition, taste and recipes. By contrast, ‘characteristics linked to the soil and nature’ scored the lowest average response rate, suggesting that respondents had little or no concept of local products as terroir products – and even less interest. What these quantitative data reveal is that place was a key factor in respondents’ perceptions of regional culture and local products, but the attributes of place – the relationship with nature, soil characteristics, geographical area and savoir-faire – were of minor importance when reflecting on local products per se. We found a basic ignorance of terroir – both as a concept and as a cultural signifier and the poor demand for local products may therefore be explained by lack of consumer awareness and not only the absence of the products themselves from supermarket shelves. This contradicts official discourse and white paper strategies.

**Conclusions.** Traditional foods is a well known concept but is complex as those products constantly evolve in a dynamic frame composed of different degrees of references to place, time and culture. Designations of origin are little used and poorly understood, their specifications are not well known by consumers and the origin products are almost not visible on the market. Norwegian food culture exists within a socioeconomic framework built around price, standardisation, simplicity and speed. Notions of origin or terroir seem to lie somewhere between the product, nature and culture – but they are implicit, never stated out loud, sensed more than felt.

**Acknowledgements.** Thanks to Sociologisk årbok journal and “La mode du terroir” book for the possibility to use parts of previously published texts.

\(^2\) Directive on the protection of geographical indications, designations of origin and traditional speciality guaranteed, for agricultural products and foodstuffs. Subsequently revised to include seafood products (Lovadta 2002).
Traditional food and tourism. Tourist experience and food heritage in rural spaces: contribution for the definition of the “tourist-eater”

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Tourist interest in different food cultures is a factor for local development in the fields of agro-food and crafts, whilst also contributing to the enhancement of food culture and heritage. As part of the tourist experience, eating local cuisine is a way of breaking with standardized, everyday routine by taking the tourist off into unknown culinary realms. This distancing from daily life is already possible in the home country through eating exotic food at home, or in so-called “ethnic” restaurants. It takes on another dimension when travelling. This paper therefore aims to examine the role of food and eating in the tourist experience. To be more precise, we shall first attempt to assess its importance in visitors’ representations, notably as a motive for travel, or in the images deployed regarding eating and drinking during their stay, as they relate to perceptions of the place visited. Our analysis rests on the hypothesis that tourists act in accordance with their “environmental bubble” (Cohen E., Avielli N., 2004). This is the set of more or less conscious social, cultural but also individual determinants that affect food tastes, preferences and representations, together with attitudes of “neophobia” or “neophilia” amongst tourists. The degree of permeability of this “environmental bubble” influences adventurousness in eating: the more permeable the bubble is, the more “other people’s food” seems attractive; the less permeable it is, the more likely it will be to observe situations of rejection and incomprehension. As well as studying tourist food perceptions, we shall also examine tourist behaviour as regards food purchase and consumption, together with behaviour relating to food souvenirs.

Our contribution is based on the findings from research carried out during the summer of 2011 in 4 rural areas in South-West France: the Haut Rouergue country (Nord Aveyron), the PNR3 des Grands Causses (Sud Aveyron), the PNR des Causses du Quercy (Lot) and the Armagnac country (Gers). These 4 highly attractive rural areas were chosen for their gastronomic and tourist potential. Data collection involved two main approaches:

- A quantitative approach: a survey questionnaire was carried out on 480 tourists, covering the 4 areas under study. These questionnaires involved random sampling, were self-administered and their main aim was to reveal the representations and practices of “tourist-eaters” with regard to the local food heritage.
- A qualitative approach: observation of the principal points of “tourist/food heritage” contact (markets, shops, restaurants…) and thirty or so semi-directive interviews with professionals involved in supplying tourist food aimed to bring to light actors’ perceptions and representations as to the influence and role of the tourist

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3 PNR: National Regional Park.
phenomenon in their enhancement activities. The qualitative approach also makes it possible to complement the analysis of the tourist-eaters’ profile, their individual features, food behaviour on holiday and “environmental bubble”.

Our presentation is organised around two main points. The first one deals with how we were led to qualify our position on the relative importance and attractiveness of food and eating in tourists’ eyes. We shall see that although discovering local food heritages may be a strong motivation generally for tourist travel, it sometimes plays a secondary role, coming after environmental and architectural attractions. We will then look more closely at the representations and practices of tourists for whom local cuisine remains a motive for travel. Addressing the question of “eating good food on vacation” we will deal with the eating norms associated with the holiday setting and the situations of change and continuity it gives rise to. Finally, our second point consists in following the tourist step by step throughout his/her stay, attempting to identify the ways in which food and eating are integrated, and fit into the holiday experience, going from preparations for the trip to food souvenirs brought home afterwards.
TFI-2012
EU funded projects about traditional foods
Traditional and ethnic foods in Europe – achievements through EuroFIR NoE and Nexus projects

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Introduction. There are many different cultures, within Europe, each with their own, distinct dietary habits. Traditional foods (TF) are key elements for the dietary patterns of each country, but unfortunately in most countries there is little information on the nutritional composition of such foods. Therefore, there is a real need to study traditional foods to preserve these elements of European culture and, if possible, enrich and improve dietary habits across the whole continent. In addition, there is currently incomplete and fragmentary information on the composition of ethnic foods (EF) in Europe consumed by both mainstream and ethnic populations in Europe. For the first time methodology was developed during the EuroFIR project (2005-10) aimed at identifying, prioritising, collecting and analysing traditional and ethnic foods across Europe in order to obtain new food composition data and supporting information for inclusion in national food composition databases.

Methods and Materials. New data on 55 traditional foods for 13 countries and 128 ethnic foods for 8 countries have been generated together with full documentation on the character and recording of the preparation of traditional recipes, and consumption of both mainstream and ethnic foods, using harmonised procedures for TF (1-3) and EF (4). Chemical analyses using validated methods and accredited laboratories were employed to determine the nutritional composition of the prioritised traditional and ethnic foods per country.

Results. The data were obtained for energy, moisture, ash, total protein, total fat and fatty acids, cholesterol, total starch and sugars, total dietary fibre and selected minerals, and were documented and evaluated according to EuroFIR guidelines with information recorded on food description, recipe information, component identification, sampling plan, sample handling, analytical method and laboratory performance (3-4). The methods for recipe calculation were harmonised by considering EuroFIR standard, yield factor at recipe level and nutrient retention factor at ingredient level.

Conclusions. This common methodology for the study of ethnic and traditional foods will enable countries to further investigate and promote sustainable diets and raise awareness of the positive health effects of these foods including provision of dietary advice to all consumers. The new data should be useful in updating national food databases and transfer of scientific and technical knowledge to SMEs will support new market opportunities and healthy food production.
Acknowledgements. This work was funded under the EuroFIR NoE (EU FP6 Food Quality & Safety Programme: Contract No 513944; 2005-10) and is being further exploited under EuroFIR Nexus (EU FP7 KBBE; Grant Agreement No. 265967; 2011-13).

References.
The AFTER project: sharing the European and African knowledge to revisit African traditional products and the know-how associated

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Introduction. AFTER aims to revisit traditional African products, knowledge and know-how in the light of new technologies for the benefit of consumers, producers and processors in both Africa and Europe. By applying European science and technology to traditional African food products, AFTER seeks to turn research into quantifiable and innovative technologies and products that are commercially viable in both European and African markets. The ten selected products, representing three families of foods (fermented cereal-based, fermented salted fish and meat, and vegetable and fruit based functional foods), fit into a matrix of technologies and processes shared between Europe and Africa that will be jointly developed within the framework of AFTER. The ten products will be characterised according to existing knowledge on technologies and processes. The project also hopes to apply traditional African processes to European raw materials to develop new alternatives of foodstuffs thus providing new outlets for European raw materials.

The main overall objectives of this project are:
• to obtain comprehensive scientific knowledge of the existing know-how on technologies, processes and products;
• to propose improved traditional processes through a re-engineering of the unit operations with the aim of improving the safety and nutritional quality, while keeping or improving the organoleptic characteristics of traditional products;
• to use objective criteria for acceptability of the traditional products by the consumers, and to ensure that the products can effectively access the EU markets in view of regulatory and ethical issues, while also protecting the intellectual rights of the people in Africa;
• to present the results into ready-to-use information for food companies including SMEs via guidelines on quality management, food law and regulation and consumer protection, and to transfer the results to the stakeholders from Africa and from the EU.

Expected impacts. In a bid to enhance the quality and the potential widespread distribution of traditional African food products, the AFTER consortium have launched a project to encourage knowledge sharing between African and European partners. AFTER intends to fill this research gap by generating and sharing knowledge on food technology and implement innovations on a range of traditional African products in new markets, both within Africa but also between Africa and the EU.

Expected results. The improved products, produced through re-engineering and new processing technologies, will be tested for consumer acceptance, safety and nutritional quality. The market and entry requirements for new products will be
assessed. Involving EU and African companies in production trials for the improved products provides the food companies with ready-to-use information. New technologies originating in Europe will be applied to traditional African production. The new products manufactured will then be imported back to Europe. The final strategy will be to implement the sharing of the African traditional know-how with Europe to develop new technologies and/or new products both in Africa and in Europe. These products will seek to meet the increased demand of European and African consumers for products that are easy to consume, with enhanced nutritional value and an extended shelf life. In addition, they may offer opportunities for novel non-food industrial applications.

**Acknowledgements.** This presentation is an output from a research project funded by the European Union (FP7 245 – 025) called African Food Tradition Revisited by Research (AFTER - http://www.after-fp7.eu/). The authors are grateful for the funding provided for this work. The views expressed are not necessarily those of the European Union.

**Partners involved.** UAC (Benin), CSIR (South Africa), FAAU (Egypt), ACTIA (Fr), UT (Madagascar), UCAD – ESP (Senegal), ENSAI (Cameroon), ESB (Portugal), NRI (UK), AAFEX (Senegal), SPES (Italy), INRA (Fr), FRI(Ghana), Racines (Fr), NRC (Egypt).

FoodUnique - ‘Back to the future for traditional food’ a European interdisciplinary network approach

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Vision. ‘FOODUNIQUE - defining food identity' is an interdisciplinary Network of European research groups, encompassing Genetics, Location, Identity, Perception, Marketing and Health researchers, branch organizations, tourist boards and governmental bodies aimed at ‘researching, understanding, defining and promoting the benefits of food uniqueness in the European Union’ (see www.foodunique.eu).

Context. The European Union’s Common Agricultural Policy (CAP) expires in 2013 and the large subsidies given to large scale food production as exist now will be under threat. In the future, EU subsidies in the agricultural sector will be linked to greener, sustainable farming practices and wider rural development rather than to generic bulk production, which focuses on volume and monocultures. As a result, large parts of the EU agro-sector are expected to scale down in production, while focusing on diversification and developing new niche production practices, e.g. making use of regional traditions or utilizing local soil conditions and mesoclimates for unique food production. This transition is hoped to contribute to a larger workforce locally supporting a more sustainable regional urbanization (e.g. Commission of Regions, 1996). The links between the agro-production, regional development and tourism are already visible in several European countries, but this development will be more marked in the coming years. It is expected that volume production will continue to move to eastern European countries, while transition from large scale production to diversified, integrated, smaller scale and on-location food production will develop in the western European countries (see Commission HLG, 2009).

The driving force for a successful transition will be enhanced sensory and nutritional qualities of regional products, higher prices for the producers and successful distribution and the willingness of consumers to pay for such high quality foods. In support of this development it is of critical importance that new and innovative food research is linked to the needs of existing and emerging smaller producers, who do not have capabilities to perform systematic studies to define nor develop new products that will be critical to meet this fundamental shift in EU agricultural focus and ensure success in the longer term.

Scope. The Foodunique partnerships objective in this context is to optimize innovation of unique food products in Europe through the integration of advanced research technologies. The networks strategy is to bridge the research knowledge deficit in determination and specification of European food uniqueness, via a holistic integrated interdisciplinary strategy re geological, environmental and genetic uniqueness in relation to sensory identity, consumer perception, and consumer health, via application of state of the art data analytical techniques. This interdisciplinary approach is carried out in the context of cultural, economic and climate benefits, with a view to promoting sustainable agriculture and rural
development, particularly in territories across the European Union in particular where unique food is strategically and scientifically under-defined.

To enable delimiting of unique European food it is fundamental to know the importance of genetic and environmental factors on the phenotypes of the products that reach consumers. This can help producers choose the optimal combinations of varieties and locations to obtain products that will satisfy the sensory, consumer and health demands of the market. This is of particular relevance in relation to regional designation in EU regions where PDO/PGI labelling is under-utilized (see Euro Commission, 2006).

Unique food products constitute a very important element of European culture, identity, and heritage. Understanding the uniqueness of culturally unique food in Europe from a research based interdisciplinary perspective will be a critical factor in promoting the competitiveness of artisanal food industries both locally and internationally in particular in relation to under-designated European regions. Additionally, exposure of regional foods to broader markets can expand the consumer and sales bases for these products thus ensuring the continuation and expansion of these products.

**Impact.** Success will support the competitiveness of the European food industry, in particular SME’s, by entailing substantial product differentiation potential for producers and providing ample variety in food choice for the consumer. Scientific input from the consortiums knowledge providers can also assist regional product producers in optimizing their products from a sensory consumer perspective while incorporating current health promoting initiatives such as salt and fat reduction. The importance of ‘food miles’ and traceability with respect to ethical consumer attitudes to regional foods can also be utilized in promoting such products. In addition it will contribute to sustainable agriculture and development of rural areas, protecting them from depopulation. It is viewed that the participation of relevant industrial partners, in particular a wide range and large number of European artisanal traditional food producing SME’s, and other end-users is essential to achieve the expected impact of the research to be undertaken.

**Network.** The consortium includes 21 key research groups from 12 EU member states where designation of regional food identity is in sharp focus at a National research level from the perspective of a need for definition of food uniqueness, namely under-defined regions across the EU. WHO and FAO are also associated in terms of agriculture and health contexts.

**References.**
Innovation on traditional food: the TRUEFOOD integrated project

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Introduction. TRUEFOOD was an Integrated project, co-financed under Sixth Framework Programme, aimed to improve quality and safety and introduce innovation into Traditional European Food (TF) production systems through research, demonstration, dissemination and training activities.
It focused on increasing value to both consumers and producers and on supporting the development of realistic business plans for all components of the food chain, using a fork to farm approach.
5 main objectives were pursued during the 4 year implementation (2007-2010):
(i) To identify and quantify consumer perceptions, expectations and attitudes with respect to (a) safety and quality of traditional foods and (b) innovations that could be introduced into the traditional food industry. (5 % of project effort);
(ii) To identify, evaluate and transfer to the industry innovations which guarantee food safety, with special respect to microbiological and chemical hazards (20% of effort);
(iii) To identify, evaluate and transfer to the industry innovations improving nutritional quality, at the same time maintaining or improving other quality traits (e.g. sensory, environmental, ethical) and recognised by traditional food consumers (35% of effort);
(iv) To support the marketing and supply chain development of TFs (10% of effort);
(v) To facilitate innovation technology transfer to TF industry (30% of effort).

Results. OVERVIEW (www.truefood.eu)
Definition of traditional food product. A product frequently consumed or associated with specific celebrations and/or seasons, transmitted from one generation to another, made in a specific way according to the gastronomic heritage, distinguished and known thanks to its sensory properties and associated to a certain local area, region or country.
Control of biologically derived and process induced chemical hazards in TFPs.
Efficiency of active packaging systems tested in semi industrial cheese production
Use of Nuclear Magnetic Resonance techniques for:
- assessment of changes in packaging materials during food contact
- study of food degradation in packaging materials
- migration test on active packaging films
The use of active films which contains at the surface special substances acting as protecting agent may help to increase food quality and shelf life.
Monitoring of the Time-temperature profile. Time- temperature profile monitoring (performed in supermarket refrigerators, transportation vehicles, home refrigerators, home leaders) showed some significant temperature abuses in the chill supply chain. Consumer practices are not ideal, perishable foods are kept frequently at wrong places in refrigerators.
Physicochemical data (pH, water activity, moisture content) collected during the shelf life of selected TFPs showed great variability: certain level could suppress the growth of pathogenic micro organism but in other cases no inhibitory action was observed.
**Effects on cows diet and milking.** Long term effect of cows diet supplementation based on different sources of rapeseeds or extruded linseeds on cows performances:
- No reduction in dry matter intake, milk yield and milk fat content
- Animal weight and milk protein content were depressed
Reduction of daily milking from twice to once (ODM) in early lactation to increase nutritional quality of milk:
- increase of milk fat (20%) and protein (7%) contents
- no increase in vitamins A or E contents in milk
- increase of milk losses (about 36% during the first 18 weeks of lactation) ODM does not seem to be an interesting alternative to obtain milk of better nutritional quality

**Dairy-cured hams & smoked salted salmon.** Technological innovation to improve the salt distribution and reduce the overall salt content in dry-cured hams:
- A method was developed for restructured hams (RH), which accelerated the salt distribution and drying
- K-lactate improve microbiological stability in RH with reduced salt content
- Computed tomography was useful for the process characterization

**Improved marketing and supply chain organization methods for TFPs.** Analysis and comparison of the results of the survey with 271 companies belonging to 91 traditional food chains in 3 European countries (Belgium, Italy and Hungary) and of the survey with 47 support organizations in 10 European countries (Italy, Hungary, Belgium, Austria, Switzerland, Greece, Spain, Czech Republic, Romania, France).
The results from the first survey show that there are cultural differences influencing the innovation capacity of traditional food chains, but that in general collaboration has a significant effect. However, also the level of innovation capacity has a positive correlation with the geographical distance of external knowledge.

**Effect of the diet and the storage of fruits on human health.** Consumption of cheese with reduced SFAs can limit the increased blood concentration of atherogenic fatty acids (myristic acid, C14:0)
Bioactive compounds are affected by storage. Domestic storage affects food nutritional value i.e. determinants of the global quality of strawberry as well as of all fruits and vegetables are related to both the native quantity of bioactive compounds in food and the storage treatments.

**Training and dissemination results.** Technology transfer activities reaching 23,500 SMEs were implemented by TDUs and research centres and universities in 15 countries: France, Italy, Belgium, Greece, Spain, Portugal, Denmark, Czech Republic, Hungary, Austria, Turkey, Germany, Poland, Slovenia and Great Britain. 233 training activities targeting more than 6,226 participants.

**Conclusions.** The Truefood project has contributed to strengthening the link between science/research and industry especially for SMEs. In particular, the communication effort in the area of food quality and safety, targeting the European “Traditional Food” industry, are still delivering results: in this project, 11 National Federations, 280 Branch Associations and ca. 6,800 SMEs were targeted. 233 published works, among Scientific publications, Posters and Article; 28,000 SMEs & Food producers & Stakeholders contacted in 15 countries; 23,500 SMEs & Food producers involved in Technology and Knowledge Transfer Activities; 6,078 Training attendances Network and 1.575 SMEs of the TDU stable Network.

**References.** TRUEFOOD – traditional United Europe Food - Publishable final activity report
The FOCUS BALKANS project

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Introduction. The importance of consumer food science lies in the fact that eating is a vital activity and that the relationship between food and health, food security, and food quality are major political concerns. In any country organized as a free market economy, consumers should be the main driver of the food industry. But in some cases, obstacles can hinder the information processes between producers and consumers, hampering the market functioning. In the Western Balkans, giving the consumers a place in the market functioning is of particular importance. After the political turn in the mid-90ies, the socio-economic changes have been and still are fast and radical. This is a period where the consumers establish their rights vis-à-vis the industry and the retailers. In this context, research plays a very important role.

Results. The general objective of FOCUS-BALKANS was to improve competencies and understanding in the field of food consumer science in the Western Balkan countries (WBC). The spirit of the project FOCUS-BALKANS encompassing six Western Balkan countries (WBC) [Bosnia-Herzegovina, Croatia, Macedonia, Montenegro, Serbia, Slovenia] was to interlink research, training and networking activities regarding food consumer science, so as to boost research in a sustainable way: all six countries conducted individual research studies on niche markets and a quantitative consumer survey, participated in and/or organized trainings (6), networking meetings (32) and open seminars (2).

The most important findings were that in general, more promotion for food in relation to health promotion (improvement of the diet) must be undertaken by the governments and that supply chains (from producers over processors to small retailers) must be fostered and better structured. Food voluntary standards must be better communicated to the consumers and more clearly tagged and positioned.

The quantitative survey provided substantial empirical evidences regarding the importance of different factors underlying the food choices in WBC (1). A Food Choice Questionnaire (FCQ), an instrument that measures the reported importance of nine factors underlying food choices, was administered to a representative sample of 3085 adult respondents in the six WBC (about 500 respondents in each country). This research contributed to the literature on three levels: providing a systematic cross-national comparison of food choice motivations in the WBCs, assessing the generalizability of the FCQ factorial structure to a markedly different environment from the original UK sample (2) and other Western European countries (accounting for the majority FCQ applications), and assessing the usefulness of the FCQ in identifying subpopulations with a similar food choice behavior.

The most important factors reported as motive guiding the food choices in the Balkan are ‘sensory appeal’, ‘purchase convenience’, and ‘health and natural content’; the least important are ‘ethical concern’ and ‘familiarity’. The ranking of food choice motives across the six countries was strikingly similar. Factor analysis revealed eight factors compared to nine in the original FCQ model: ‘health and natural content’ scales loaded on to one factor as did ‘familiarity’ and ‘ethical concern’; the
‘convenience’ scale items generated two factors, one related to ‘purchase convenience’ and the other to ‘preparation convenience’. In all countries, except Slovenia, ‘sensory appeal’ is rated as the most important factor on average. ‘Purchase convenience’, ‘price’ and ‘health and natural content’ are consistently rated as very important across the country samples. In all countries, ‘familiarity and ethical concern’ is rated the least important. Taken together, these results indicate a high degree of consistency in the WBCs regarding factors that influence food choice.

The market of traditional food in the WBC was also studied. It was found that the drivers for the consumption of traditional food are the desire to eat food high in natural content, the promotion of local or national origin of the food, and the favoritism of on-farm and small dairy production. In WBC, towns and rural areas still are strongly linked and most people are able to get traditional food products thanks to their family. In parallel, many products referring to tradition (“Protected Designation of Origin” – PDO- or “Protected Geographical Indication” –PGI- (referring to European regulation 510/06) products or equivalent, and “home-made” products) are available in different outlets, including retail chains. Several traditional products are also processed by the agro food industry in a more standardized way. Nevertheless, the importance and wide use of traditional food products are likely to lessen in the mid- and long-term due to agricultural professionalization and the enforcement of regulations related to food safety.

The conjoint analysis showed that traditional dishes are usually homemade and thus rarely bought as ready to eat products. The time consuming preparation of traditional dishes is at the same time, however, a barrier for the consumption. Targeting urban active people with ready to eat traditional dishes could increase their consumption. The preferences also showed that when buying a traditional product, there is a strong aversion against industrial production and no specification of origin. Traditional attributes are important for Balkan consumers but the preference for pre-packed product and purchases in supermarkets may invert the tendency in the future.

The analysis also focused on a segmentation of the consumers in order to identify specific behaviours when choosing traditional food products. The following four clusters have been identified: (1) A cluster focused on local origin; (2) A cluster focused on the scale of production (on-farm and small dairy); (3) A cluster which strongly rejected high prices despite the quality of the product (4) A cluster preferring high prices and industrial products.

Conclusions. The food industry, the policy-makers and the researchers desire to be active in the scientific and professional networks in order to continue conducting actively such research.

Acknowledgements. This summary is the result of a 3-years European Research project, funded by the European Commission and the Associated countries. FOCUS BALKANS project was granted from 1.10.2008 until 30.09.2012 (Grant Number: 212 579), and made working together more than 80 researchers in 14 countries, from which Bosnia and Herzegovina, Croatia, FYRO Macedonia, Montenegro, Serbia and Slovenia.

TFI-2012
BaSeFood general presentations
BaSeFood presentation and concepts emerged from on site surveys of traditional foods and food systems

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On behalf of the representatives of the beneficiaries of the BaSeFood project and their colleagues who conducted this collaborative research

**Introduction.** BaSeFood investigates traditional foods of the Black Sea area, in relation to their content of bioactive components and potential health promoting properties. A part of the project's activities were addressed at specific foods, with their documentation and flow chart description, preparation and nutritional analysis, bioactive characterisation by means of laboratory, in vivo and intervention studies, industrial flow chart revision and improvement.

However, in the background of the project it was clear how the health promoting and the traditional message belong to different perception levels: the first is a typical communicable “credence” attribute, whereas the second, directly perceived by local communities, became another credence attribute in western urban societies.

Other two well established facts in the conceptual background of the project were that plant an animals: a) were domesticated in definite places; b) migrated with man, in successive waves, and were adopted outside the areas of origin.

The real background for a stable and sustainable traditional food appreciation was therefore individuated in a recovery of a substantial dose of self awareness among consumers. From previous experiences and the course of social trends in Eastern Europe during the last decades, it was also clear how the perception of the nature and status of traditional foods may have been different in W Europe and the Black sea region. Finally, traditional foods are intrinsically linked to local raw materials and foods systems, thus generating issues of their sustainable long term preservation.

A substantial part of BaSeFood was devoted to qualitative on-place surveys, aimed at: a) documenting all aspects of knowledge related to local foods. b) investigating facts in natural, rather than in experimental settings; c) retrieve evidence-based information, latent in diffuse knowledge but often absent in official, formal scientific knowledge; d) help in generating, besides testing hypotheses; e) allow cross cultural comparison of the present status and perspective of traditional food systems; f) help in programming and tuning possible future quantitative and experimental research.

**Materials and methods.** On-site surveys were carried out by documenting the local foods systems of preliminarily individuated groups of plant origin foods: kales, corn, primitive wheats, herbs, fruits and oilseeds (with selected groups within them), fermented foods of plant origin. The surveys were carried out in parallel in Italy, Black Sea area countries and Portugal, for kales. The investigation areas were individuated on the basis of previous experience, references and preliminary informant indications. The interviews started from preliminarily drawn “checklist of concepts”, complete lists of questions to be asked to informants, and were then developed interactively during the whole course of the research.
**Results.** Several local food systems case-studies were described at different detail level, and over 150 traditional recipes were recorded. The data were compared between countries and local contexts, and with official and grey literature references. The following features emerged.

**Variability.** Local food systems use available ingredients, that can be often interchanged in nature and amounts according to availability; therefore traditional foods are intrinsically variable and very difficult to codify in an unique recipe. The food strategy clearly aimed at having a staple energetic base, mostly from cereal products, accompanied by other ingredients, including vegetables, legumes, fruits, and animal products, combined to give a main course dish; the concepts of side dish or dessert are more rarely detected.

**Evolution.** Migration of crops and products generated a constant evolution of foods, that was further checked during surveys. The same applies for home available technologies. As an example fruit and vegetable preservation for out of season consumption gave rise to a range of strongly characterised, and nowadays lesser known foods.

**Trends.** Traditional food systems, foods and ingredients were detected both as a still viable component of everyday way of life or as a way to produce foods for the targeted market of local specialities. A transect from west to east was clear, with the second trend prevailing in the West Europe and the first still present, although regressing, in the Black sea area countries. In these countries, interesting examples of commercially oriented traditional food production are already in course. The adoption of modern technology for local food production, also complying with strict food safety issues, is still lower in most of the Black sea area countries and contexts. Local production systems in the West are very often, if not always, connected also to issues of local plant types recovery and valorisation, with positive effects on the preservation of plant genetic resources. However, organised, more market oriented traditional food production schemes require a substantial uniformity and consistency of raw material characteristics that can hardly be guaranteed by local, unselected plant types. The approach to the need of protection of local food by means of regulatory or proprietary labels is extremely variable, ranging from enthusiastic agreement, substantial scepticism, to refusal.

**Health promotion.** The perception of health promoting value of traditional foods, although varying according to the basic raw material considered, does not seem to be the main issue in local communities.

**Conclusions.** The hypothesis that the traditional character and health promoting properties are differently perceived depending on context was further supported. This fact must be well taken into account when planning to couple the two concepts in a same product. The intrinsic variability of traditional foods should also be considered, to avoid hampering one of the background positive cues of traditional foods systems, that is diversity and stability, both at the ecosystem and social level, particularly when speaking of proprietary or top down approaches to regulatory label introduction. Knowledge transfer at small or even micro production scale is essential for local food systems. Extensive documentation of traditional systems in Europe, aimed at enhancing independent consumers knowledge and choices, seems to be a priority for future research agendas about sustainable food production systems.

**Acknowledgements.** Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
Introduction.
A clear definition of “traditional” foods is a first step against the misuse of the term. According to the EuroFIR definition, “traditional” means conforming to established practice or specifications prior to the Second World War.

Materials and methods.
Following EuroFIR guidelines, a first attempt was made to register and prioritise the Black Sea Area traditional foods in a standardised way.

Results.
National documented traditional food files were developed and 33 traditional foods were selected for further investigation. The “traditional” preparation procedure of these foods was thoroughly recorded and depicted in a flow chart, for potential semi-industrial production of the foods. Based on their nutritional composition, potential nutrition claims for the foods were identified.

Conclusions.
The integrated reports of the 33 BSAC traditional foods may serve as the basis for proprietary claims of the specific food at a national or European level (e.g. PDO, PGI, TSG) or health and nutritional claims. About half of the 33 foods were found eligible to bear at least one nutrition claim on their vitamin or mineral content.

Acknowledgements.
The present work received support from the European Community’s Seventh Framework Program (FP7 2007-2013) under grant agreement n° 227118.
**Introduction.** The Sustainable exploitation of bioactive components from the Black Sea Area traditional foods (BaSeFood) consists of a research consortium of 13 partners [1]. A general objective is to contribute towards the establishment of a rationale for integrating the concept of health-promoting for traditional foods. The specific aim of this study was to produce analytical data detailing the nutritional and bioactive content of selected traditional foods from six Black Sea area countries, and to evaluate the diversity of bioactive compounds content of some plant raw materials.

**Results.** A total of 33 traditional foods from Bulgaria, Georgia, Romania, Russian Federation, Turkey and Ukraine were selected and prioritised in WP1. Within WP2, a list of components for the nutritional composition of each traditional food was prioritised on the basis of (a) inclusion of relevant data in national food composition databases; (b) the most relevant components to be analysed for each food and (c) their importance in relation to the increased risk of diet-related chronic diseases. The prioritised list of components to be quantified in the selected traditional foods was: water, ash, total protein, total fat, individual fatty acids, total starch, total sugars, total dietary fibre, vitamins, minerals and trace elements. Besides the nutritional composition and total polyphenols determination, additional analyses on carotenoids (\(\alpha\)-carotene, \(\beta\)-carotene, \(\beta\)-cryptoxanthin, zeaxanthin, neoxanthin, violaxanthin, lutein and lycopene) were performed. A common approach on sampling and sample handling of traditional foods using harmonised guidelines was established, for all countries, to ensure that representative food samples would be analysed in order to produce reliable and high quality data [2,3].

The following relevant results were obtained for raw materials. Kales confirmed to be an interesting source of glucobrassicin; variability of glucosinolate, carotenoids and phenolic content was detected. Among primitive wheats, einkorn wheat was the richest in carotenoids and phenolics content, with slightly different sterol composition from the others species. Among oilseeds, sesame was the richest source of sterols.
and tocols, whereas walnuts were by far the richest in phenolic compounds; the importance of the initial oxidative conditions of raw materials for further processing is stressed.

**Conclusions.** The use of a common methodology to study traditional foods will be essential to maintain the European cultural heritage, thus enabling future generations to experience and enjoy local specialities. Furthermore, this study provides new data on the nutritional composition and bioactive compounds content of the selected traditional foods from Black Sea Area countries in order to elucidate their role in the dietary pattern of each country. Moreover, knowledge base of traditional foods and related plant raw materials from Black Sea Area countries will contribute to promote local biodiversity and sustainable diets, by maintaining healthy dietary patterns within local cultures.

**Acknowledgements.** The research leading to these results has received funding from the European Community’s Seventh Framework Programme (FP7/2007-2013) under grant agreement n.º 227118.

**References.**
BaSeFood – Microbiological and immunological aspects of traditional foods

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Introduction. Delicious traditional foods of Black Sea region (BSAC) contain amassing variety of different local plant components. Biodiversity of national and cross-national recipes is result of long term geographical and historical relations between the populations of belonged countries. The main aim of microbiological investigation of Bulgarian, Georgian, Romanian, Russian, Turkish and Ukrainian ethical foods selected within BaSeFood project was to characterise their safety and quality issues.

Materials, approaches and methods. Beneficial, potentially pathogenic microorganisms of environmental origin, human contaminants and food borne pathogens had been revealed by biochemical and serological Latex-test (bioMérieux, France), MALDI and PGEF. Standard methodology had been modified and applied to monitor of all the samples. The interrelation of plants and composition of microorganisms had been detected via the four variations of co-cultivation techniques. The traditional foods as unique composition of biologically active plant components and associated microorganisms had been studied for their synergic influence on host immune system reacting in specific way on foreign antigens of different origin.

Results. The number of beneficial microorganisms are comparably less than amount of other tested groups. The most frequent organisms found were opportunistic pathogenic bacteria, followed by typical plant epiphytic bacteria. Foodborne pathogens are rarely found. Plant ingredients of the prioritised traditional foods collected from street markets were more contaminated with microorganisms than were the samples collected from city markets or taken from private yards/farms. The biological diversity of the microbial species was inherently characteristic of plants from street markets. The highest level of microorganisms was observed for the green parts of plants and in roots (parsley, sorrel, dill) and the lowest was measured in fresh fruits (apples, pears) and vegetables (tomatoes, peppers, beans). There are plants and fruits with endogenous antimicrobial properties which, as a result, are not contaminated because of the high content or high activity of these biological active substances. These include: wild plum, pomegranate, onion, garlic, rice, basil leaves dray, sage leaves, wheat (flour), sunflower seeds (city market), green plums, tomatoes (city market), red cabbage, and spices: poppy seeds, coriander, chili, fennel, mint, black sesame, saffron, bay leaf. Anaerobes were not detected in leaves (green parts of plants); B. ovatus was isolated from garlic and tomato samples purchased in city and street markets and was supplemented with Candida spp. C. butyricum was found in parsley (root) and carrot taken from street markets;
C. carnis contaminated beet, from street markets, as well as beans from city markets; E. lentum was detected as the only isolate from onion.

The most tested ready-to-eat foods were either not contaminated with any of the microorganisms (plum and rose jam, plum and pomegranate sauce, flax and mustard oil, tahini pasta and halva, churchhella, nettle with walnut, bulgur pilaf, black tea, kale soup, humus etc.) or were contaminated with very low amounts (up to 10² CFU/ml) of B. subtilis, S. epidermidis, S. aureus, E. cloacae, E. faecalis, P. agglomerans and Trichosporon spp.: borsch, sunflower roasted seeds. Only homemade original unfermented foods – corba, herbal dish, original okroshka, pomazanka, and melon juice were rich on beneficial microorganisms. The density of bacteria with potential beneficial properties in traditional fermented foods are as follows: L. fermentum, B. breve and L. acidophylus (in boza), B. dentinum (in fermented beans, Turkey), A. israeli, L. plantarum and casei (kvass, Russia). The dominating isolated species from millet ale (bosa, Bulgaria) were B. breve, B. longum, L. acidophilus, L. casei, L. fermentum, A. israeli, C. famata, C. pelliculosae, and C. buturicum. In kvass southern (from rye bread, Russia) L. delbrueckii, L. planatarum, L. case, B. longum, A. israeli, S. cerevisae TRE-positive but not TRE-negative had been detected. The species and their consortia isolated from fermented foods of local traditional places are cardinaly differing from those detected in industrially produced products.

Finally, it had been shown that L. salivarius was stimulated by the extracts of fresh white cabbage, pumpkin, melon and cumin tea. The traditional Georgian dressings (red and green sauces from plum) similarly affected on two of Bacillus strains: B. subtilis and B. licheniformis at the same time acting inhibitory for the L. salivarius, E. faecalis and M. morganii or demonstrating no effect on murine strain Schaedler’s E. coli and E. coli 058 of human origin. The lactobacilli were mainly inhibited by sauerkraut; whereas bacilli were sensitive to influence of fresh cucumber extract. Nettle was able to limit selectively the growth of Schaedler’s E. coli compare to fresh juices of carrot, onion and grape affecting only on E. coli 058. Strains of E. faecalis and M. morganii were susceptible to garlic. Beet did not influence on any of the tested strains of commensal gut flora representatives.

**Conclusion.** Microorganisms originated from fermented foods of homemade traditional dishes/beverages are a matter of great importance, since they can be potentially exploited in industrial food processing. Correspondingly the influence on gut homeostasis can be estimated as a sum of complex variety of microbial associations in these products and cannot be properly estimated in case the separate strains are tested in vivo.

Recognition of the molecular mechanisms of directed modulation of gut microbiome and correspondingly human/host mucosal cross-talk following to the traditional foods intake will lead to effective regulation of host metabolic balance. A complex analysis of the traditional foods of the BSAC would make possible to select the potential candidates with putative functional properties due to their interaction with specific micro-organisms and present as an examples of “healthy immune-nutrition diet”.

**Acknowledgements.** Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
BaSeFood – Biological activities and potential health benefits of plant bioactives in traditional foods of the Black Sea region

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On behalf of the representatives of the beneficiaries of the BaSeFood project and their colleagues who conducted this collaborative research.

Introduction. Many of the traditional foods consumed in the Black Sea region contain locally-grown fruits and vegetables that are rich in bioactive compounds. Although there are numerous reports of the use of these plants in traditional/folk medicine, little is known of their bioactive composition or potential to benefit human health as components of foods and diets. The aim of WP3 of the BaSeFood project was to investigate the potential health benefits of bioactive-rich food plants.

Materials, approaches and methods. Bioactive-rich extracts of all the prioritised foods and some of their plant components were prepared. A systematic approach was used to select six plants that are typically consumed in traditional foods of the Black Sea region and are rich sources of phenolic and/or glucosinolate bioactives for more extensive assessments of bioactivity. These were nettle (Urtica dioica), dill, kale, Sideritis scardica (mountain tea), persimmon and pomegranate. Aqueous-methanol extracts were prepared and their bioactive composition determined using HPLC with diode array and MS detection. The bioactivities of the plant extracts, some isolated bioactives, and human metabolites of selected bioactives were assessed in vitro, using cell-free, cultured cell and animal models, and focussing on effects on the gut (luminal microbiota and host immune system) and cardiovascular system (various CVD risk markers including flow-mediated dilatation (FMD), blood pressure, plasma lipoprotein profiles, and platelet function). In addition, nettle, dill, S. scardica and pomegranate were fed to volunteers and assessed for their ability to alter biomarkers of cardiovascular disease risk.

Results. LC-MS analysis confirmed that the selected extracts were rich in phenolic and glucosinolate (kale) bioactives and other phytochemicals. The phenolic and glucosinolate content and composition were determined (see poster by Saha et al.).

All of the food and plant extracts exhibited antioxidant activity (ABTS and DPPH), and the strength of activity correlated with the phenolic content. It was also shown that although a hot water infusion of S. scardica contained substantially lower levels of phenolic compounds, it was equally as effective as Camellia sinensis at inducing cellular antioxidant responses (measured by resistance of HepG2 cells to an oxidative insult). It was also shown that pomegranate extracts and the ellagitannin punicalagin could not inhibit 1-BOOH-induced cellular damage, although they did upregulate genes encoding several antioxidant enzymes including superoxide dismutases (SOD) 1, 2 and 3 and glutathione peroxidise-4 (GPX-4). Pomegranate extracts also induced favourable changes in the synthesis of the vasomodulatory factors nitric oxide (NO) and endothelin-1 (ET-1). Subsequently it was shown that the
procyanidins (but not the anthocyanins or ellagitannins) in the pomegranate extract were responsible for the activation (phosphorylation) of Akt and endothelial NO synthase (eNOS) and the mechanisms were explored. In contrast, none of the 6 selected extracts were able to inhibit TNFα-induced increases in the cell surface expression of cell adhesion molecules (ICAM-1, VCAM-1) involved in recruitment of macrophages to the endothelium during vascular inflammation. Although none of the 6 extracts or their bioactives / human metabolites were able to reduce agonist induced closure times in ex vivo-treated whole blood samples using the platelet function analyser-100 (PFA-100), significant improvements in platelet function were observed in blood samples collected in the acute phase following consumption of hot water infusions of S. scardica, dill and nettle. Beneficial changes in markers of platelet function (P-selectin, GPIIbIIa) were observed in blood of volunteers shortly after consumption of these beverages. The extracts were also tested for their ability to induce differentiation of human blood mononuclear cells into CD1a⁺ and CD1a⁻ dendritic cells, which are considered pro- and anti-inflammatory, respectively. The response to each extract was different. E.g. kale reduced CD1a⁺ and increased CD1a⁻ expressing moDC, pomegranate and persimmon reduced both CD1a⁺ and CD1a⁻ moDCs, while nettle induced a substantial increase in CD1a⁺ moDCs.

Based on the results of the in vitro studies and the acute human study data, pomegranate, Sideritis and nettle were selected for testing in randomised controlled trials to assess their ability to cause beneficial effects related to cardiovascular health in humans. Six weeks daily consumption of polyphenol-rich pomegranate juice (PJ) caused significant reductions in systolic and diastolic blood pressure compared to the control beverage (p<0.05). PJ consumption also induced significant improvements in platelet function (P-selectin and GPIIbIIa expression, platelet-monocyte aggregation) and significant reductions in body mass (p<0.05) and beneficially affected body fat mass and water content compared to controls. However, PJ consumption did not significantly affect several plasma inflammatory markers. In contrast, 6 weeks consumption of hot water infusions of Sideritis (mountain tea) or nettle leaves did not improve flow mediated dilatation of the brachial artery or blood pressure compared to the water fed control group (p>0.05). Total cholesterol and LDL-cholesterol were reduced quite substantially (4.5-14%) in the nettle and Sideritis groups compared to the control group, but the changes were not statistically significant.

In summary, these studies have demonstrated that a number of traditional foods consumed in the Black Sea area are rich sources of bioactive compounds. Further, it has been demonstrated that some of these plants and their inherent bioactives have the potential to favourably affect biomarkers related with human health and disease risk. Finally, a number of beneficial physiological changes have been demonstrated in randomised controlled proof-of-concept human intervention trials.

**Conclusions.** These findings provide the rationale for undertaking further research to demonstrate the health benefits of selected bioactive-rich plants and foods. Future studies should focus on demonstrating a cause and effect relationship between consumption of bioactive-rich traditional foods or novel food products and beneficial physiological effects related to cardiovascular health in humans.

**Acknowledgements.** Research funded by FP7 EU project BaSeFood (Grant Agreement n. 227118).
Technological aspects of traditional foods in BaSeFood

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On behalf of the representatives of the beneficiaries of the BaSeFood project and their colleagues who conducted this collaborative research

Introduction. An important part of the BaSeFood project has been stipulated by WP4 “Technological-chain effects on bioactives in traditional foods”. The main objectives of the studies were the process optimisation and improved retention of key bioactive components in several selected foods from different groups of plant foods in order to promote the production of traditional foods with attached health claims.

Materials and methods. The following foods have been selected after application of corresponding criteria related to presence of important bioactives: leafy kales and related foods, primitive wheats and related foods, rye bread, buckwheat, kvass, halva, and fruit juices. Among the studied bioactives and other important compounds were glucosinolates, phenolics, carotenoids, phytosterols, tocols, dietary fibers, vitamin C, lactic acid, tocopherols, phospholipids, fatty acids. Critical factors affecting retention of bioactives and dietary fibers have been estimated and analyzed. The most modern and efficient analytical methods have been applied to study yield and retention factors during processing of the selected foods and raw materials. Traditional processing flow charts were assessed with special respect to the individuation of critical points for bioactives retention.

Results. Experiments for yield and retention factors determination of bioactives and dietary fibers or nutrients during traditional production of selected foods have been carried out. On the basis of the obtained results, hypotheses have been formulated for improving traditional technologies by optimizing critical unit operations or raw material supply schemes. According to the proposed hypothesis, the traditional flow charts have been modified in order to increase content and retention of important bioactive compounds and dietary fibers and again the destiny of bioactives has been studied and analyzed. New foods have been produced by the modified traditional schemes enriched with additional biologically active components. Testing of new kinds of bread, halva and juice produced at catering or SME level using modified flow charts has been performed. Final reports are in the stage of preparation on the development of three new breads, a new juice, a new product derived from oilseeds (halva), and an improved variety of kvass including raw material characterisation, flow charts analysis and revision, products development and final testing.

Conclusions. All tasks stipulated by the WP4 of the BaSeFood project have been successfully fulfilled and some new products have been developed with increased content of important bioactive compounds.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
BaSeFood research on consumers and stakeholders

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Introduction. From a classic sociological definition, a traditional food is a representation of a group, including all interactions between people, knowledge and local resources. In this respect, the perception of traditional food value in local communities is a typical experience attribute, spontaneously occurring through the association of generally positive cues and a complex of perceived immaterial traits. On the other hand, western European urban consumers have largely lost the knowledge of the origin of the foods they eat. In this context, "traditionality" tends to become a credence food quality attribute, the perception of which needs communication from third parties.

Health promotion is another typical credence attribute, currently often associated with traditional foods, although with still scarce experimental evidence.

Finally during all human history, foods migrated with people and traditional foods of migrant communities have been adopted by host communities, become ethnic foods. Traditional foods are at present highly valued by food chain stakeholders, from consumers to processors, with also attempts of introducing innovation in the traditional food concept, to enhance the commercial opportunities.

Foods of the Black sea Area region, although well known and rooted in the places of origin, are somewhat lesser known at formal level, and outside the native countries. Besides that, the social changes occurred during last 30 year, seemed to have originated a movement towards the adoption of westernised food habits and a kind of refusal of traditional food especially among the young local populations.

Materials and methods. Although BaSeFood main target were not stakeholder and consumers analyses, the above mentioned aspects were considered in some targeted investigation carried out according to four lines:

1. the analysis of consumers' and experts perceptions of the compilation of traditional and health promoting food concepts. This part was carried out by means of a targeted questionnaire in which over 150 combinations of foods, bioactive components and health claims were rated.

2. The analysis of the attitude of Black Sea area consumers towards their own traditional foods, including migrants to west Europe. This part was carried out mainly by means of a questionnaire in which over 30 specific traditional foods were rated according to 25 selected attributes, belonging to the spheres of convenience, sensory traits and health promotion.

3. The attitudes of the Italians towards traditional foods of the Black sea area. In this part, selected foods were rated according to some knowledge and acceptance traits. The neofobia level of the respondents was also monitored.

4. The opinion of food manufacturers towards the potential of traditional foods of the Black sea region. This part was carried out by means of a questionnaire in which
traditional food potential for SMES was assessed through the specification of the innovation capacity of the firm, and the relation between consumer preferences and innovation potential at industrial level.

**Results.** With respect to consumers surveys, demographic characters such as age, gender and education sometimes strongly affected the responses, irrespective of the area of origin of the respondents.
With respect to the analysis of the perspective traditional foods with attached health promoting properties, the categories that were better understood or that are normally already associated with health (e.g. herbs) were the best rated by consumers. Among the professionals, the market experts seemed the ones better representing consumers' preferences.
Black sea area consumers individuated some well defined dimensions in the traditional food perceptions, say convenience, associated to familiarity and easiness of preparation, sensory properties, whereas health promoting characters were less important for a traditional food identification. Individual foods or food categories were rated in substantial consistent way in different countries, with respect to these individuated perceptual dimensions.
Among the Italians, the neofobia level was lower in the more educated people and higher in the elderly. In general, the attitude towards the acceptance of foods from the Black sea area countries was related to neofobia. The food that were less similar to ordinary experience were the ones for which the lowest intention to try was detected.
With respect to the attempt to cross manufacturers and consumers point of view, not such a strong link between consumer preferences (from the stakeholder point of view) and innovation choices exists since, as an example, the major part of respondent considered attributes such as taste, spicy, flavour, smell extremely important to the success of their products, but only 4% of them innovates in the area of Product sensorial properties. When innovations are applied to TFP, the main objective should be to avoid abrupt changes and provide relevant benefit to consumers.

**Conclusions.** As a whole, although the quantitative basis of the analyses carried out was rather restricted, the rather large area and diverse countries involved, and the different approaches adopted to investigate similar aspects, make some of the findings rather consistent. Besides that, most results seem to fit rather well with general literature data, adding information in the lesser known area of Black Sea region traditional foods. In general, the connection between traditional character and health promoting properties seems to be still weak among consumers, thus confirming the background hypothesis that the two traits belong to different spheres of perception. Sensory properties and familiarity seem to be the attributes better characterising traditional foods, although some characters connected to more update aspects of convenience, such as availability in supermarkets and ready to eat are appreciated by some consumers categories.
Food processors still appear to be not well aware of the direction to take when speaking of innovation applied at the traditional food production chain.

**Acknowledgements.** Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
TFI-2012
Street Food Seminar presentations
Street foods: basic definitions and facts

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The definition of "street foods" is at the same time simple and intuitive. The term describes a wide range of ready-to-eat foods and beverages sold and sometimes prepared in public places, notably streets. The definition implies that at least the final preparation is done just before selling. A second aspect is that these foods may be either consumed on place or taken away. For the rest, street foods are intrinsically variable, being generally prepared with a range of ingredients and techniques, making the same food prepared by different actors rather unique. Of course there are several examples of transition between a classic street and a fast food meal, when the food is supplied by organised chains, of whatever size, and served on the street, in an informal, brand-less, context.

Street foods are certainly known from time immemorial. As an example, some of the more fascinating parts of the Pompei and Ercolano archaeological remains are the stalls in which food and beverages were sold. However, street foods are not static. Referring to our Romagna region, the eye is certainly caught by the innumerable kiosks selling piadina, the classical local street food. Well, piadina was a typical traditional home food, until WW2. Then it was transferred to the streets, generating the incredible mass phenomenon now seen. Piadina therefore represents a case of a traditional food become also a street food. Nowadays some foods from other cultures tend to become street foods, according to what is the normal situation in their native places. In Italy we consider middle east kebabs as typical street foods: a case in which street and ethnic go together. By the way, piadina is almost an ethnic food just outside the Romagna borders, indicating that the street, traditional and ethnic characters co-exist, in some cases. And, since the street is, by definition, the place where people meet, it is the place where also food cultures meet. Street food sometimes melt cultures, and include a fourth dimension of "fusion" foods.

Besides these facts, street foods have been very much considered in respect to their role in developing economies, where their function as food supply for low income urban dwellers and revenue for local vendors have been stressed. In western economies, street foods still represent an occasion for the establishment of small scale enterprises, but also of development, technological innovation and business opportunity, in relation to the supply of equipments related to the small-scale, proper and safe street food preparation and selling.

This seminar, generated from the meeting between the organisers of TFI-2012 Congress and the Street Food festival of Cesena, is aimed to be a first occasion of illustration of problems, discussion and, hopefully, fruitful exchange of experiences and future collaboration. Besides the matter connected to definitions, sometimes necessary for a regulatory approach, it will be hopefully a first step to promote individual awareness and choice opportunities.
Street Food on the Move: a socio-philosophical approach

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Introduction. Since the antiquity food has been represented in material and spiritual terms, as a means for human survival and to get in contact with God. In the last century, food became a central topic for natural and social sciences, social policies, public health and human rights. Food is a culturally variable product, which changes in different contexts of live and times, stressing when scarce and unsafe endemic problems and social pathologies.

Street foods are constitutionally on the move and point out socio-economic and political transformations at stake, changing collective identities and different effects of a global age, increasing fluxes of goods and human beings. Because of the physical mobility in public spaces, street food has the possibility to transcend the perimeter it is located in, considering the different cultural origins of the elements cooked and sold and the changing attitudes/identities of both the vendors and the consumers. This “immanent trascendence” of the street food makes the case both local and global, that is glocal.

Results. “Tell me what you eat, and I shall tell you what you are”. “Man is what he eats”. These two affirmations represent a shift from a general understanding of food as a natural and immanent mean for the subsistence of human beings to a philosophy of food as related to a psycho-physical wellbeing, production techniques, social classes, personal identity. The first quotation refers to Jean Anthelme Brillat-Savarin (1), who in this treaty focuses on the connection between food, cooking, and eating as a possibility for an individual to know himself, his faculties and potential. Therefore, “gastronomy is a scientific definition of all that relates to man as a feeding animal. Its object is to watch over the preservation of man by means of the best possible food”. The second quotations relates to Ludwig Feuerbach (2), who theorises the material constitution of the human body as being inextricable with the soul. Better nourishment represents not only an improved of the quality of life but a better psychophysical condition and possibility of thinking and acting.

What could these quotations mean for our case study? Starting from what is prepared and eaten could we individuate the social origin, life conditions, taste, preferences of both manufacturers and acquirers? Our analysis aims at stressing an existing dialectic between these two polarities: their dynamic shows both traditional deprived standards of life and new forms of labour organisation and entertainment, which induce the increasing necessity to consume food on street.

In the 19th century philosophy was thus renewed also thanks to an innovative approach to the meaning of food with the re-elaboration of the materialistic tradition of the Enlightenment and the Kantian aesthetics about the critique of judgement.

In the 20th century food’s knowledge and epistemology became a specific discipline also in terms of public health and human rights. Nowadays food is considered by the international community as “the fundamental right of everyone to be free from hunger” (3). It is “the right of everyone to an adequate standard of living for himself and his family, including adequate food, clothing and housing, and to the continuous improvement of living conditions.” It is a right, which aims “to improve methods of production, conservation and distribution of food by making full use of technical and scientific knowledge, by
disseminating knowledge of the principles of nutrition and by developing or reforming agrarian systems in such a way as to achieve the most efficient development and utilization of natural resources." (3).

Street food is thus related to the broader notions of the right to food and the right to have a decent life. In particular, it refers to the right to have safe food for both the vendors and consumers: “States should adopt measures to protect consumers from deception and misrepresentation in the packaging, labelling, advertising and sale of food and facilitate consumers’ choice by ensuring appropriate information on marketed food, and provide recourse for any harm caused by unsafe or adulterated food, including food offered by street sellers.” (4). This normative affirmation is often empirically neglected because of different social constrains and conditions of endemic deprivation.

In order to consider cultural differences/local bio-diversities, structural/socio-political analogies and new geopolitical trends, our study is interested in considering in a comparative way examples of street food in cities located in Latin America countries and the Mediterranean area, that is in four different continents.

The present research is based on a multidisciplinary approach (the epistemological relation between different sciences and social policies at stake), a comparative/integrate viewpoint (the confront of realities geographically distant), an intercultural approach (the productive and fusional interaction between different products and traditions) and an intersectional perspective (the interconnection between multiple dimensions and modalities of social relationships in the constitution of subjectivities, like in the case of the interaction between gender, race, culture, religion, culture, education, class, ability, etc.).

The case study of food street refers thus to a broader idea of human rights and the development of human capabilities. In this case, it is possible to understand questions of common concerns on the move at a larger scale, the changing collective identities, the stagnation of traditional or the rising of new socio-economic inequalities and global effects of present geo-political order over the daily life of people.

**Conclusions.** The analysis of different practices of street foods in the Mediterranean area and Latin America, permits to consider the changing dynamic between producers and consumers and their standard of living in critical and normative terms as a matter of social justice and the development of human capabilities (5, 6). Considering the variety of street food and the conditions it is produced/sold/consumed means ex-negativo to affirm that “the freedom that people [have] to enjoy to lead a decent life, including freedom from hunger, from avoidable morbidity, from premature mortality, etc., is quite centrally connected with the provision of food and related necessities” (6). Street food is a matter of wellbeing for individuals and communities at global level.

**Acknowledgements.** The paper refers to the project on Food rights and the quality of life (2011-2013). This research is supported by the Region Lombardy, University of Milano-Bicocca, Department of Sociology and Social Research in collaboration with Expo 2015, the Milan Universal Exposition in 2015 on Feeding the Planet, Energy for Life.

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Street Foods: from enforcement to cooperation

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Introduction. Zambia is a low income country in Southern Africa. High levels of urbanisation (44% of the population), high levels of unemployment, low levels of economic growth and on-going problems with HIV/AIDS have driven the rapid growth in street-food vending as the only source of income (~60% of vendors) and route out of poverty for large numbers of urban poor especially women (>80% of vendors are women in the urban centres of Zambia. In 2005, there were an estimated 16,000 street food vendors in Lusaka creating employment for ~50,000 people. The street food “industry” served >81 million meals per annum to an estimated 1.1 million of Lusaka’s population of 1.5 million. Street food vending generated cumulative profits of €8.3 million per annum, profits for individual vendors ranged from €1/day for the most basic operations up to €21/day for the larger more sophisticated businesses.

Assessments of vending sites by Lusaka City Council indicated that ~70% of Lusaka’s population purchase street-vended food on a daily basis. In many cases it is believed that street-food delivers the consumers, main source of energy and nutritional intake. The main type of street food is nshima a cooked maize dough served with meat (mostly beef) and/or vegetable stews. Nshima is considered a highly traditional food even though it is maize based. A small number of vendors sell western or Asian origin non-traditional products such as hamburgers and samosas, sale of these products tend to be restricted to higher income groups. In spite of the encouraging economic figures, street food vending remains an unstable occupation due to the generally negative attitude to street vending taken by the authorities. This restricts public and private sector investment in the street food sector and this in turn is the main underlying reason for street-vended foods being associated with increased risk of foodborne illness.

Results. Microbiological risks were monitored in 12 (50 vendors per market) of the 68 markets in Lusaka over an 18 month period. Microbiological risks were highest during the summer wet season due to impacts related to the link between high rainfall and poor drainage and sanitation systems at the vending sites. Beef stew was found to be the highest risk material, 1.6% of samples were found to contain Salmonella spp, 15% of samples were contaminated with high levels of Bacillus cereus. Enterotoxigenic Staphylococcus aureus was isolated from 18 and 19% of swab samples from vendors hands and utensils. Water used by vendors was often contaminated with high levels of bacteria, but Escherichia coli was only detected in 1.2% of water samples. A partnership was formed between the public health authorities, market police and street-food vendors to implement improved food safety practices, provide recognition for vendors making improvements and to initiate changes to policy and improvements to basic infrastructure. A radio based media campaign was used to promote the importance of eating out safely in Zambia. In 2004 the first sign of success was indicated by a more positive attitude to street-food vending taken by the authorities during a cholera outbreak in the main city market.
**Conclusions.** Street-vended food can become a legitimate source of income for the urban poor and need not represent an unacceptable risk to public health. However, to achieve this requires an integrated approach to addressing problems within the value chain and cooperation among all the actors both public and private. For the public sector appropriate policies and regulations and infrastructural improvements must be linked to a change in approach away from inspection and enforcement towards advice and cooperation with enforcement reserved as a last resort. Street-food vendors need access to knowledge and micro-finance in order to implement improvements to food hygiene practices. It is essential to demonstrate a business case for change and to bring the vendors into partnership with the public health authorities to achieve common goals. During the life of the DFID funded projects encouraging changes in attitude were observed. However, it is still too early to determine if real impact has been achieved in terms of reductions in incidence and spread of food-borne illnesses.

**Acknowledgements.** This paper is an output from a research project funded by the United Kingdom Department for International Development (DFID) for the benefit of developing countries. The views expressed are not necessarily those of DFID. R8272 & R8433 – (Crop Post Harvest Research Programme).

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Food safety of street foods

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Introduction. Street foods in the UK are part of our cultural background. Vendors of these products understand that their trade is based upon a sell and come again clientele, so they cannot afford to sell unsafe food. Risks of a range of food-borne hazards are understood and managed. More recently food safety legislative requirements within the EU require that a documented safety management system based upon the principles of Hazard Analysis and Critical Control Point (HACCP) should be in place to demonstrate that food sold is fit for purpose, that it has been sourced, prepared and sold following basic hygienic requirements. The approach to ensure that street food is safe for human consumption within the United Kingdom will be discussed.

Results. The Food Standards Agency developed a user friendly system that could be used by small food businesses, including street food vendors, to use to demonstrate due diligence in the way they prepared and sold their products. The system was named Safer Food Better Business (SFBB) and is a diary that food retailers, including street food vendors, use to document the systems they follow on a day to day basis and demonstrate that they are following the requirements of the Food Safety Regulations. The diary is not a formal HACCP system but a simplified risk based system that has been designed and based upon HACCP principles. Street food vendors need to understand basic hygiene principles, as well as the specific risks associated with the foods they sell. The diary is easy to use, once the business owner has been trained and mentored in its use, under the guidance and mentoring of an Environmental Health Officer and/or a Food Safety Specialist. Further information upon the way that the diary has been designed and how it is used will be discussed during the presentation.

Conclusions. The SFBB pack is a user friendly system developed by the Food Standards Agency and food enforcement authorities within the United Kingdom that provides documented evidence, based upon HACCP principles, that a street food business is being managed to ensure the sale of safe and wholesome food.

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Street foods of the Mediterranean and Europe

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Introduction. The changes in food consumption patterns, eating habits, food preferences and food choices that are taking place in the 21st century have contributed – among other factors - to the evolution of street foods in countries of Europe and the Mediterranean. The subject of street foods is reviewed within the framework of concerns about food insecurity arising in the wake of the economic crisis, and within the global mobilization for the prevention and control of obesity and diet related chronic non-communicable diseases (NCDs).

Results. The paper reviews the place, role and contribution of street foods of Europe and the Mediterranean to health and nutrition in the 21st century. The subject is gaining in importance given the growing share of street foods in the food intake of both adults and children. The popularity of street foods is being boosted by the demands of the accelerated rhythm of modern life styles, the increased mobility of the consumer, the breakdown of the family meal, among others. The rare reference to street foods in strategies for prevention and control of obesity and of diet related chronic NCDs is attributed to paucity of information in the literature on the actual proportion they represent in the diet of an individual. Furthermore, street food vendors are usually not accounted for when mapping the geographic distribution of food outlets. Hence, their potential share in bridging gaps in food deserts is rarely acknowledged.

Recognizing that street foods are an expression of the dietary system that is at the crossroads of a country’s natural resources and of its history, the paper examines the adaptation and response of street food producers and vendors to a wide range of diverse factors. Such factors relate to cultural considerations, consumer preferences, as well as health, nutrition and environmental concerns. Starting with examples of how street food vendors are adapting tradition to modernity, some of the important trends in the evolution of street foods are presented and discussed. The influence of modern food technology and mechanization in shaping future trends is also reviewed. The example is given of how the inclusion of health and environment related judging criteria in street food competitions in the United Kingdom has resulted in meeting such concerns with creativity and innovation. The issue of children’s relation to street foods is complex and can have untoward consequences if uncontrolled. An important section of the paper is devoted to children and street foods.

Conclusions. The growing importance of street foods in the 21st century renders it imperative to acknowledge their share in food consumed outside the home. Recommendations are made for inclusion of street foods in the global, regional and country level plans for prevention and control of obesity and chronic NCDs. Building on the growing awareness of consumers, street food producers are called upon to enhance health attributes and to raise the nutritional quality of their products. Using
available data bases on street foods and sharing of lessons learned across Europe - and also the Mediterranean - can contribute to increasing the pertinence of the health and nutrition dimension of street food related programmes.

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Street food in Black Sea region countries – Bulgaria, Georgia, Russia, Ukraine

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Introduction. In the frame of BASEFOOD project the Street Foods (SF) of four Black Sea countries – Bulgaria, Georgia, Russia and Ukraine, have been decribed by partner institutions. Each organization took own angle of the studies, although the final results have shown lots of similarities in modern tendencies, as well as differences in range of product offers, consumer-driven developments, traditions and cultural influences, etc. Based on the findings of the studies the organizations presented a poster on country specific SF. This presentation is a short overview of the findings made by the BASEFOOD project partners.

Materials and methods. The BASEFOOD project partners from Georgia (Elkana), Russia (MSUFP) and Ukraine (ONAFT) studied available SF in own countries and presented overview report. Elkana in addition made a comparison of SF in cities and regions. The partner from Bulgaria (UFT) conducted consumer research - structured face to face interviews with 600 randomly chosen consumers of SF.

Results. In Ukraine and Russia consumers' attention shifted to the “new” for the local market food: burgers, kebabs, hot dogs, pizza, doughnuts and sandwiches. Among traditional snacks are fried sunflower/pumpkin seeds, kvass, “olad’y”/“bliny” with sour cream or honey, “blinchiki” with meat, or cottage cheese, “chebureki”, “belyashi”, etc. All these are present in Georgia as well. Here local SFs prevail still – the most popular are “khachapuri”, “khinkali”, “churchkhela”, “tklapi”, “kada”, “shoti” with cheese, etc. Although in large cities introduced SFs are almost dominating and there are also significant differences between the traditional and modern recipes of the traditional SFs.

In Bulgaria about 20% of the respondents rely on SF 3 times per day. The most consumed traditional SF for breakfast are the pastry products – “banitza” (40%), “kifla” (25%) and “tutmanik” (15%) combined with “boza” (45%), “airian” (22%) and soft drinks (20%) for the teenagers; coffee (80%) for the older respondents. The traditional SF menu for lunch favors pastry products (40%) and grilled meat (35%), preferred for dinner also.

Conclusion. With the expansion of SF in the last 20 years, basic concerns are for food safety and health effects. Globalization and fast invasion of foreign cuisines tend to uniform SF offer and threaten the identity and attraction of traditional SF. Some traditional products lost popularity and are replaced by new, borrowed from other countries, both western and eastern. Although, for several traditional SFs, well adapted to consumers’/ tourists’ needs, market is growing and product diversification also takes place.
TFI-2012
Posters’ abstracts
Ancient *Maloideae* and traditional products in the Reggio Emilia Apennines (Northern Italy)

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Introduction. In the hills and mountains of Reggio Emilia province, ancient local apple and pear cultivars (cvs) are present. They were traditionally processed to preserve fruits, to supplement and differentiate diets, and to provide a sugar replacement for local recipes. Some of these traditional products are currently rediscovered. An example is the valorization of “savurett”, a jam obtained by cooking and concentrating juice and slices of old pomes. Other (the dried fruits ‘fleppi’ or ‘sciapeli’) are not prepared anymore. Information on the availability and characterization of the raw material are important in the process of exploitation of traditional products. From 2010, an investigation on pear and apple cvs and their uses has started within the project “Characterization and evaluation of local varieties of fruit trees in the territory of Reggio Emilia”.

Materials and methods. Inventory of cultivars and trees, analysis of historical documents and collection of information from farmers, manufacturers, and local experts have been carried out. Fruits have been sampled, characterized by means of a descriptor list and chemical parameters (°Brix, pH, titratable acidity, content of the main sugars and organic acids).

Results. Different pears and sometimes apple cvs are the ingredients of ‘savurett’, depending on area of production and fruit availability. The main cv is the pear Spalèr, for juice production, and Nobile (Baraban) for the slices that give consistency. Sometimes other pear (Aval, Trentonce, Fradel) and apple (Campanino, Ferro, Limone) cvs are used. The same and other cvs were also dried. Surveys showed the presence of sparse plants of Spalèr, Aval, Nobile, sometimes very old and difficult to harvest for their big size. Recently new small orchards have been established. Other cvs are more rare (Trentonce, Fradel, among pears, Limone, among apples). All these cvs are late ripening and have long storability. The hardness and the graininess of the pulp make their fruits mainly or exclusively suitable for processing like cooking. Fruit analysis revealed differences of composition: the high sugar content of Spalèr and Nobile, and the low acidity and high pulp hardness of Nobile.

Conclusions. The investigation has evidenced loss or survival of old tradition based on fruits, changes in time and space of fruit varieties and dosages in the local recipes and the potential for the exploitation of some traditional products and for a sustainable safeguard of threatened cultivars.

Acknowledgements. Research funded by the Fundation Cassa di Risparmio “Pietro Manodori” - Reggio Emilia and Provincia di Reggio Emilia.
Cornelian cherry in the Black sea area and Italy: local knowledge, uses and potential for health promotion

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Introduction. Cornelian cherry (Cornus mas L.) is a minor fruit woody species with a wide natural distribution, valuable nutritional and health properties and a long history of folk use. A survey on traditional products and local knowledge in the Black sea area and Italy has been carried out in order to highlight similarities, differences and trends from East to West, pointing out the potential of folk knowledge and use of cornelian cherry for local communities and human welfare.

Materials and methods. Investigation on local uses, products and knowledge involved Ukraine, Russia, Georgia, and Italy, as reference for the Western Europe. In-deep review of literature and on site surveys have been carried out in areas where a traditional use was documented or is currently continuing.

Results. Cornelian cherries have been traditionally processed with similar methods in eastern Europe and Italy. In the Black sea area a wide range of storable products with a pleasant sour taste, used mainly as ingredient of different dishes or for direct consumption are still manufactured at home level: dry fruits (used in compotes, herbal teas, soups, gruels and fruit bread), concentrated juices and pulps (jams, lekvar, sauces), dried pulps (the Caucasian fruit leathers), juices; the addition of sugar (pulps preserved in sugar, fruits in sugar syrup, jams); fermentation and distillation. In Italy cornelian cherry exploitation occurs at much smaller scale and a lower number of traditional products has been documented, some of which not produced anymore (dry fruits). Traditional recipes are still found in Trentino, Emilia Romagna and Marche regions, where local manufacturers produce jams, juices, fruits in sugar syrup and wine, sauces, spirits and other.

In the Black sea area the use of cornelian cherry is associated with the popular perception of health promoting properties (disinfector, anti-diarrhoea, anti-inflammatory, vessel-protective, especially against haemorrhoids) whereas in Italy this knowledge has been almost lost in the last two generations.

Conclusions. Cornelian cherry is an important component of the Black sea area traditions; its fresh fruits and products are diffusely marketed and there is awareness of the beneficial effects of its consumption. In Italy despite well documented tradition of use, it is currently under-utilised, but there is a good exploitation potential for new products (juices, drinks) fitting better with present day food preferences and life style.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
The concepts underlying traditional fruit product utilisation: a intercultural comparison between Italian and Black Sea region

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Introduction. The need to preserve and extend the availability of perishable fleshy fruits and obtain derivatives for direct consumption and seasoning has generated in the world a wide range of traditional products characterized by peculiar sensory quality and expected functions and based on different raw material and home processing systems. The current situations in the Black sea area and Italy, as reference Country of the Mediterranean Basin, have been compared with the aim of finding common points and differences in way of processing and uses.

Materials and methods. The survey has focused on Georgia, Ukraine and Bulgaria in the Black sea area, and on the regions of Emilia Romagna, Marche, Trentino in Italy. Growers, processors and local experts have been interviewed. Consultation of historical and recent documentation on ingredients and processing has been carried out; information on paste and present uses and recipes has been collected.

Results. The traditional ways of fruit preservation are: a) reduction of water content - Correspondences between recipes of the two areas have been individuated for the concentrated juices ‘pekmez’ in the Black sea area and ‘saba’ in Italy; ‘pelamushi’ and the Italian ‘sughi’, both produced with flour and concentrated juices of grapes (Italy) and other fruits (Black sea area), ‘lekvar’ (long boiling of fruit juice and slices) and the Italian ‘savor’ and ‘savurett’; the verjuices ‘isrimi’ (Georgia) and ‘agresto’ (Italy) condensed juice of unripe grapes mainly used as a substitute of vinegar; dried fruits (whole or slices) b) addition of sugar or salt; c) fermentation. Within each product category similar processing systems are used in the Black sea area and in Italy, whereas factors of differentiation are area of production, species, available technology and legislation in force, and needs of the local communities. The local and seasonal availability of raw material led to recipes often characterized by ingredients and dosages not strictly fixed. In Bulgaria, Georgia, Ukraine the traditions are well preserved and widely diffused. In Italy some fruits derivatives (‘saba’, ‘sughi’, ‘savor’, ‘savurett’) are produced also in small firms and marketed. Other traditions have been lost or only recently resumed (agresto). Dried fruits are consumed directly or used in soups and sweets in the Black sea area whereas in Italy this tradition survives only in some areas (Trentino Alto Adige, Marche)

Conclusions. The current richness of traditional products is higher in the Eastern areas than in Italy, mostly as a consequence of changed lifestyle and economic conditions which have allowed different levels of preservation of these traditions or pushed to their abandonment and to innovation.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
Black briony (*Tamus communis* L.) in Italy: traditional uses and foods

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**Introduction.** *Tamus communis* L. (*Dioscoreaceae*) is a climbing vine of submediterranean vegetation types. It is a typical geophyte, whose aerial parts die every year and regenerate in spring from the big tubers. The extensive use of its spring sprouts in Mediterranean Italy represent a typical example of the several wild spring sprouts used as components of varied diets based on local food resources.

**Materials and methods.** Investigations were carried out retrieving information from literature, and by means of a specific interview campaign in the area of Tolfa (province of Rome), where the use of black briony sprout is particularly developed. Questions to local informants regarded all aspects of Black briony exploitation, food uses and perceived value for local communities.

**Results.** Black briony is typical of forest margins and clearings generated by periodic cuttings. In these environment the more vigorous sprouts are produced. Spring rainfall is also a determinant of sprout yield. Attempts to cultivate black briony were registered in some areas, at family level. The only plant part used as food are the spring sprouts, picked before the buds open, for a length of 10-30 cm from the terminal bud. The sprouts are diffusely collected for family uses. Some collectors also sell the sprouts to local shops or markets, or simply along roadsides in the area. This use is however declining. The sprouts are also more easily available at the open air fruit and vegetable market of Civitavecchia, that is the main city of the area, also an harbour of the Tirrenian coast: some of the sprouts sold there are reported to come from Sardinia, that is linked to Civitavecchia by regular ferries. Black briony sprouts are used only cooked, either by preliminary boiling or directly by wilting in a pan with oil or animal fat; they are strongly characterised for their typical bitter taste, and therefore they are either appreciated or rejected. The main dish in which they are used as ingredients is the "acquacotta", a kind of bread soup, with other ingredients added according to availability, that was typically prepared at home or in the workplaces by farmers, shepherds and loggers. Another popular way of consumption is as an ingredient of omelettes. Several other dishes are prepared at home level, according to personal likes and inspiration.

**Conclusions.** Black briony sprouts, as well as many other wild plant spring sprouts, were traditionally widely used as fresh vegetables in spring, after the winter period lack of these foods. Nowadays they are still a typical wild and seasonal resource. Modern trends allow however to preserve them frozen and use them as ingredients of typical dishes also out of season. An important constraint to its cultivation is the complex plant biology and long growing phase of the tubers.

**Acknowledgements.** Research funded by FP7 EU project BaSeFood, grant agreement n. 227118
Local corn production and products in Italy: a significant example of chain approach to traditional food recovery from a non native plant

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Introduction. Corn (Zea mais L.) is a world staple crop, ranking first for total production, and second for acreage. Corn exploitation in Europe is characterised by well individuated phases. After its introduction, at the end of the 15th century, it started being used as human food, partly replacing other cereals, because of its productive advantages and social reasons. During this phase, that lasted for about 300 years, locally adapted populations were differentiated. By the beginning of the 20th centuries corn characterised the food habits of several areas of north and central Italy, with also severe drawbacks due to the lack of other dietary components. With the advent of the hybrids corn became an animal feed cereal in industrialised world. Human food uses were progressively abandoned, together with local varieties. The recovery of the high quality local types is presently in full development, representing one of the more significant examples in the area of traditional products.

Materials and methods. The cases of local corn population recovery and exploitation schemes have been revised by means of literature and on-line documentation. On site surveys, according to the usual scheme of BaSeFood, were carried out in the northern Apennines and in two of the more significant areas of the Alpine region. The data will be compared with those being acquired in the Black sea area region.

Results. Several local varieties have been recently described and recovered in the Alpine areas and in NE Italy, also by using materials from gene banks and the application of conventional selection methods. In the Apennines, where local corn types are still rather common, similar actions also generated significant cases in Garfagnana and in the Marche region. Local growers and associations are now generally practising mass selection, to preserve or enhance the characters of local populations, that are all of the vitreous kernel group, suitable for milling for human use. The most popular exploitation chain is the milling to make flour for direct selling, mainly targeted at the preparation of polenta. Although the requirement of whole meal is still prevailing, the milling schemes are sometimes very updated. Much care is put along the chain to avoid any problem connected to fungal toxins, that are strictly monitored. Several corn traditional recipes were collected during surveys, most of which indicate polenta as an energetic staple combined with locally available ingredients, but also the use of corn flour as a substitute of other cereal meals.

Conclusions. Corn represents a perfect case of a non native crop adopted by local populations. Its present recovery is strictly connected to local food traditions, contrary to what is happening for other local crops, but is generally carried out with updated technologies. It represents a potentially useful example for situations where corn is still very common, like in the Black sea area countries.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
Semi-domesticated herbs in the food tradition of the Romagna area

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Introduction. Wild greens are amply used in the traditions of almost whole Italy, with local differences due to the specific availability connected to climatic and soil conditions. Wild greens are mostly used in two ways: a) raw, in mixed salads, called mischianze or misticanze; b) water cooked; in this case they can be eaten alone, or mixed with potatoes (e.g. the prebugiun, from Liguria), or as filling of a wide range of pies and pastries. The composition of these preparations usually varies year round. Sometimes, some species are better individuated with respect to their uses, and also eaten alone as characteristic components of traditional dishes. Every now and then some species gain popularity and start to be more widespread, and cultivated. A recent well know case is that of Rocket salad (Diplotaxis tenuifolia (L.) DC).

Materials and methods. Previous work has been revised and integrated with new references and interviews to stakeholders (seed firms, growers) and local people, in order to retrieve information on four plants of old traditional use in the the Romagna area, that have been more and more subject to cultivation during last years: barilla (Salsola soda L.), bladder campion (Silene vulgaris (Moench) Garcke), wild poppy (Papaver sp pl.), rampion (Campanula rapunculus L.).

Results. Barilla is the species with better established knowledge, also outside the Romagna area; in Romagna barilla is typically consumed boiled, together with the piadina and squacquarone cheese. With many respects, barilla should be considered as an already partially domesticated crop, although of still strongly seasonal availability, due to the peculiar biology of seeds, that are somewhat non-orthodox. Bladder campion is used almost everywhere, as an ingredient of several foods; in Romagna it is mainly used in omelettes and for pasta seasonings. With respect to few years ago, the availability from cultivated crops attenuated the strong spring seasonality of availability, even if out of season product quality is still not optimal. Poppy leaves are also widely used in mixed salads or cooked greens preparations. In Romagna they are the characteristic ingredient of the filling of crescione, a folded flat bread, and tortelli, a filled pasta. The production from cultivated sources is still mainly seasonal and generally available in local markets. Rampion in a lesser known species; the rosette leaves are consumed together with the tuberified root, so harvest from wild stands is very destructive. Cultivation is not easy, for the very small size of seeds, that are also easily dispersed when ripe.

Conclusions. As for several other greens, the species examined represented, in the past, ingredients of a main curse, accompanied by bread or pasta, rather than a side dish. The species examined represent good examples of how the resumption of traditional knowledge may open the way to local small scale production activities.

Acknowledgements. Research funded by FP EU project BaSeFood grant agreement n. 227118.
Wild *Allium* species: local traditional food resources in perspective

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**Introduction.** Genus *Allium* includes about 750 bulbous or rhizomatous species, of the temperate or boreal areas of the Northern hemisphere. They are typical perennial, with an annual vegetative cycle, which length depends on climatic conditions. The genus is also characterised by the content of cysteine sulphoxides, giving the typical flavour and aroma. Besides the few well known important vegetable plants (garlic, onion, leeks, chives), all the species of the genus are edible: many wild *Alliums* are indeed used as food resources, especially in Central Asia and Siberia.

**Materials and methods.** On site surveys were carried out during BaSeFood project, interviewing local respondents in Russia, Bulgaria, Italy and Georgia. A preliminary source review of locally used species was carried out in Italy. Information about the harvesting and uses of local wild *Allium* species were retrieved.

**Results.** Ramson (*Allium ursinum* L.) is the more widely known and used species. It is a typical forest plant, growing in the humid mountains in Mediterranean areas, but also in the lowlands in boreal areas of E Europe. Its leaves are typically harvested from the wild in Bulgaria, sometimes by peculiar harvest/selling arrangement, such as detected for some gypsy communities or the Rodopi mountains. In Russia it is commonly grown in home gardens. The leaves are used to prepare several dishes, as a typical early spring vegetable. Due its strong seasonality, pickling is used for its preservation in Russia and Georgia. In Russia ramson is very popular, so many new recipes, besides the traditional ones, are currently prepared and similar uses are made of *A. victorialis* L. In Italy it is occasionally collected and used in spring salads.

Bulgarian garlic (*Allium bulgaricum* (Janka) Prodan)) is typical of the mid mountain forests in the Balkans. In Bulgaria it gives raise to a true culture of “samardala” exploitation. Local collectors go to forest to harvest the plant that is sold fresh on the markets. It is also cultivated in home gardens. A much wider and interesting way of exploitation is the preparation of samardala salt, representing a popular condiment.

In Italy, the use of several Mediterranean garlics such as *A. vineale* L., *A. roseum* L., *A. neapolitanum* Cirillo, *A triquetrum* L., *A. nigrum* L. is reported but, until now, not yet thoroughly documented. Young bulbs are more frequently used, the same way as garlic or onion, but also the leaves are consumed, mainly in salads.

**Conclusions.** Wild garlics represent a very interesting source of local food specialities. They however retain almost all characters of wild plants, among which strong seed dormancy, making seed reproduction, a possible option for attenuating the strong seasonality of production, still very difficult. The culture of their use is much more developed in eastern Europe.

**Acknowledgements.** Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
Hulled wheat uses and traditional foods, from the Mediterranean to Caucasus

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Introduction. Hullled wheats are Triticum taxa retaining the glumes after threshing, and other primitive traits such as rachis brittleness, long straw, low harvest index. The main species are einkorn (T. monococcum L.), emmer (T. dicoccum (Schrank ex Schübler) Thell.) and spelt (T. spelta (L.) Thell.). They were not subject to breeding except for spelt in central Europe and almost disappeared from modern agriculture in favour of more productive bread and durum wheat cultivars. A recovery of their use took place in W Europe starting from about 30 years ago. Rather detailed surveys were carried out in Italy, whereas less information is available in the Black sea area.

Materials and methods. On site surveys were carried out in Italy, Bulgaria, Turkey, Ukraine and Armenia, according to qualitative descriptive methods, interviewing local respondents. Information about the local populations, growing systems, uses, recipes and health promoting properties perceptions were retrieved.

Results. Emmer wheat is almost the only species grown in Italy. With respect to some years ago the following facts emerged: a strong reduction of the traditional crops for self consumption; the establishing of two protected (DOP and IGP) label situations, the strong increase of commercial productions outside traditional areas, also with the use of few new bred varieties. In Bulgaria emmer is still a neglected crop in the Rodopi mountains, whereas some attempt to recover einkorn production for the organic food market is taking place. Turkey is a strong grower of einkorn and emmer wheat, of which mainly the first is used for human food. Armenia grows relevant amounts of emmer wheat, almost exclusively for local consumption. Spelt is commercially grown in Ukraine, on contract with European organic companies. The traditional uses of these wheats are strikingly similar, and are basically limited to the use of crushed grain to make pilaf or soups. This use is clearly connected to the former lack of efficient machines to separate the glumes from the kernel. Several recipes based on local ingredients were registered. At present most new products manufactured in Italy are substantially different from local exploitation schemes.

Conclusions. The transect of the exploitation schemes from Italy to the Caucasus suggests that potential for establishing a consolidated market oriented production does exist in the Black sea area. This can also determine a positive trend to a differentiation and co-existence of traditional and new productions, with positive effects on the conservation of local populations, as it happened in Italy.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
South European Brassica oleracea leafy types: traditional foods and uses in a cross-country, intercultural perspective

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Introduction. Brassica oleracea L. is a polymorph species including, besides the more commonly used horticultural types (cauliflower, broccoli, head cabbage, Brussels sprouts), also types which leaves are the more commonly used part. These are mainly referred to as kales, or collards, but also include kohlrabi types, when the leaves are consumed. Kales are typical components of local food systems of many European areas, but are not generally utilised as large scale commercial crops. The rather unique abundance of glucobrassicin, besides that of flavonoids and carotenoids, make them also a potentially interesting health promoting crop.

Materials and methods. On site surveys were carried out during BaSeFood project, interviewing local respondents, according to qualitative descriptive methods in Italy, Portugal, Turkey, Georgia and Bulgaria. Information about the local populations, growing systems, uses, recipes and health promoting properties perceptions were retrieved. Cross country comparison were carried out.

Results. Kales are used in Italy, Portugal and Turkey, whereas the use of kohlrabi leaves is reported in Bulgaria and Georgia. The local populations present a different level of variability; selection is practised by farmers but only in Italy and Portugal some kind of organised seed production seems to occur. In almost all areas, the leaves are used at different stages, as a typical winter vegetable, often representing the only fresh green available during the cool season. Over 40 traditional recipes were recorded and critically compared. They combine locally available ingredients and, in almost all cases, they represent a main course: the use of kales as side dish does not belong to tradition. Kales are exploited at commercial level especially in Italy, and to a lesser extend in Portugal; these cases may represent an example for other situations. The local perception of health promoting value is very low.

Conclusions. Leafy forms of Brassica oleracea can be considered a very significant example of traditional crops with potential of exploitation. They are highly adaptable but also sufficiently plastic to be fitted to more intensive exploitation systems. Kale recipes also represent a typical example of how traditional foods make use of what available, are intrinsically variable and are difficult to define in terms of quality and quantity of ingredients. Kales are an example of how new knowledge of potential health promoting properties can enhance the interest on traditional crops and foods.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
Kvass – from past to future: changing in time

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Introduction. Kvass - the drink that has appeared even before Russia was formed as a state. Kvass has changed along with the country, has had its rises and falls, but devoted admirers who made it commercially or at home always exist.

Results. According to some sources, beverages like kvass appeared at preSlavic peoples who lived in the territory of modern Russian Federation at the end of the 2nd millennium BC. Ancient Russian chronicles report that on the occasion of the baptism of Rus in 989 Prince Vladimir I Svyatoslavovych ordered to treat residents of Kiev (once a the major Russian cities) to free food, and kvass and honey (alcoholic drink from honey). At this time, kvass was stronger and thicker than modern beer, and, obviously, more frequently used during the holidays and for religious ceremonies.

Since the beginning of the XXII century technology of preparation and characteristics of kvass began to change - kvass become low alcoholic beverage and the part of the everyday diet of Russians. Kvass was consumed by all estates of Russian society, the number of its recipes increased significantly due to the use of different raw materials, including honey, fruits and berries. However, during long period kvass was prepared only in households, mainly for their own consumption.

Only in the XIX century commercial production of kvass began, in so doing kvass was the drink which was consumed mainly by representatives of the lower estates and by monks. At the end of this century, there were the first studies on the benefits of kvass to the health. Kvass was included in the diet in many Russian hospitals.

During Soviet times, kvass was one of the most popular drinks. It belonged to the soft drinks, was cheap, so people of all ages have drank it often, especially in hot weather due to perfect kvass ability to quench a thirst. During this period, kvass became popular in some republics of the Soviet Union, including Central Asia.

After the collapse of the USSR production of foods, including kvass, has decreased dramatically, and the market has been occupied by Western-made soft drinks, many of which were made with ingredients which were identical to natural. During this period, many Russians were prepared kvass from concentrates in households.

Since the beginning of XXI century the interest of the Russian population to kvass increased significantly. The reason for this are, on the one hand, perception kvass as patriotic, national drink, on the other hand, the increased awareness that drinking of beverages with a high sugar content and/or non-natural ingredients can be harmful.

Conclusions. Today kvass is one of the symbols of Russia, its "gastronomic" representative in the world, though still the majority of consumers of kvass are the Russians. Currently, an important task is to expand the range of varieties of kvass, produced on an industrial scale and have their unique flavor characteristics.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
A typical high energy source traditional food from Turkey: "Tahin with pekmez"

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Introduction. “Tahin with pekmez” is a typical traditional food of Turkey. It is mainly consumed by rural area people in almost all parts of the country, especially during breakfast, following the meal time and during winter because of its high-energy including properties.

Results. “Tahin with pekmez” is prepared as a mixture of 2 parts of Tahin with 1 part of Pekmez. However, the ratio of tahin to pekmez is determined according to consumer preference, because tahin and pekmez are sold separately and for blend preparation. Tahin is produced from ground, dehulled, dry roasted sesame seeds. It has high nutritive value. It is rich in lipids (54-65%), proteins (17-27%), carbohydrates (6.4-21%) and dietary fiber (9.3%). It also contains important minerals and vitamins such as calcium (429mg/100g), phosphorous (732-40mg/100g), and iron (9g/100g), niacin (4.5-5.5 mg/100g), and thiamin (1.1mg/100g). Pekmez, is a kind of concentrated fruit juice produced from different fruits, such as grape, mulberry, raisin, apple and sugar beet, and is named after the fruit from which it is obtained (i.e. grape pekmez, mulberry pekmez, beet pekmez etc.) Carbohydrates, organic acids and minerals are the major constituents of pekmez. Carbohydrates in Pekmez are basically monosaccharides which provide energy easily and make it a preferred food of winter time. Protein, amino acids, phenolic compounds and flavinoids are also minor components of pekmez. Grape pekmez is the most commonly used pekmez during preparation of “tahin with pekmez”. Grape pekmez is the concentrated form of grape juice. It is obtained by boiling the juice without addition of sugar or other food additives. The aim of concentration and boiling is to pasteurize the grape juice and to extend the shelf-life by decreasing the water content.

Conclusions. “Tahin with pekmez” is a valuable high energy source traditional food in Turkey, and production and marketing of should be promoted because of its nutritious properties, availability and low cost.

Acknowledgements. The present work received support from the European Community’s Seventh Framework Program (FP7 2007-2013) under grant agreement nº 227118.
Recovery and utilization of the threatened olive cv Tortiglione

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Introduction. The conservation of biodiversity of cultivated crops often relies on the work of local farmers over generations. One example of a potential conservation priority is the olive cv Tortiglione, a valuable old local olive cultivar from the province of Teramo (Italy), currently only represented by individual trees and some orchards of limited area owned by local growers. Oil from the cv. Tortiglione is distinct, among others, for its bitter and pungent taste due to the high polyphenol content (nearly 600 ppm, http://www.olimonovarietali.it), which are valuable natural antioxidant compounds. The emerging interest for monovarietal olive oil consumption, with a distinct taste, provides a new incentive for recovering this local variety. Moreover, the by-products (wastewater, pomace) contain high quantities of phenolic compounds, which can be used in the food, pharmaceutical, and cosmetic industries as natural antioxidants. The recovery (patent n° FI 2006A000155, 2006) of such compounds could represent a profitable opportunity.

The aim of this preliminary study was to analyse the oil and by-products from the olive cv Tortiglione to assess the polyphenol content, in order to determine the viability of restoring this cultivar on local agricultural lands.

Materials and methods. Olive oil extracted by the two-phase process was sampled at the private olive mill Montecchia (October 2011 harvest), and analysed according to the EU Commission Regulation methods (1993). Total polyphenol compounds in the oil mill by-products (wet pomace) were determined in according to Ena et al. 2011.

Results. The results of olive oil analysis confirm the extra category of Tortiglione olive oil (extra virgin olive oil). The oil had a very high polyphenol content of more than 700 mg/kg, which confirms its the distinctive nature. High polyphenol levels in oil indicate high stability, and good organoleptic properties. As expected, in wet pomace high level of poliphenols has been observed as 4.6 gr/kg. These valuable substances recovered from the by-products could represent an high-added-value-products for industrial use (Ena et al., 2011) as a consequence an incentive to the utilization of cv Tortiglione.

Conclusion. The high polyphenol level in oil and by-products from the cv Tortiglione support the recovery of the cultivar as an interesting niche market product for farmers.

References.
Wild plants and traditional foods in Val D’Agri (Potenza) area of Lucania

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Introduction. Environmental factors have always addressed people attitude, influencing storical-cultural evolution and creating, over the centuries, a specific traditional cuisine. Food use of wild plants is strongly connected to a territory, usually sub-regional or limited in a little area. Born because of hunger, wars, drought, poorness and grown up in rural societies, this practice slowly stratified in a territory becoming part of its habits. Lucania cuisine has old origin and is strictly linked to the rurality of the people. It is a poor simple cuisine but racy, tasty and savoury.

Materials and methods. The field work was conducted in Sant’Arcangelo, Castronuovo di Sant’Andrea and Gallicchio (Val D’Agri area, Potenza Province, Lucania) during the period May–August 2012. Ethnobotanical information was collected after semi-structured and structured interviews with 20 persons, who still retain traditional environmental knowledge, and after many talks with local people.

Results. Some traditional Lucania recipes using wild plants have been passed on until now becoming traditional foods. In Val D’Agri area, wild fennel seeds (Foeniculum vulgare Mill.) are still commonly used to aromatize salami giving them a recognizable taste. Wild asparagus spears (Asparagus acutifolius L.) are boiled and fried with olive oil, garlic, eggs and, if wanted, matured salami. Bulbs of Leopoldia comosa (L.) Parl. are particularly relished. They are collected after field plowing, macerated in cold water or boiled and prepared in different ways: in oil, pickled, seasoned with olive oil, garlic and chilli or fried with garlic, tomatoes and dried peppers. To celebrate Carnival, it’s widely cooked the “rafanata”, an omelet with “rafano” (radish), the root of Armoracia rusticana Gaertn., Mey. et Scherb. and it is also grated on home pasta. Radish gives to these dishes an intense and very hot flavour. Among wild herbs, the most used is wild chicory (Cichorium intybus L.), boiled and then eaten variably. After summer rain, it is used to collect escargots that are cooked using a particular dried herb, called in dialect ‘piliesc’ (Thymus serpyllum L.). It’s meaningful to note that Sambucus nigra L. flowers, that are not at all used in Val D’Agri area, are widely used in a very near village, Chiaromonte (PZ), demonstrating how deep-rooted and geographically limited are food wild plant use.

Conclusions. Wild food plants, symbol of poorness and adversity, are today strongly revalued representing biodiversity, healthy, nature bond, folkway comeback. Nevertheless, traditional wild plant foods are quickly disappeared for different reasons: abundance and easy availability of vegetables and less rural societies. Besides mechanized machines, weeds, pesticides used in agriculture, pollution and aggressive building trade are destroying the majority of wild flora.

Local medicinal/food knowledge and indigenous health: How ethnopharmacology can contribute. The case of Artemisia.

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Introduction. Since ancient times, human beings have lived tightly in contact with nature, exploiting it for their vital necessities. Over time each indigenous community developed knowledge, beliefs, traditions in its own local knowledge system (henceforth LKS). The use of wild plants represents an example of LKS. Traditional herbal remedies for the treatment of different kind of diseases have always been important to people living in rural areas of the world. The objective of this article is to provide an overview of the literature concerning the health relevance of wild plant resources (both medicinal and functional wild foods) for local people, to explain how ethnopharmacological tools can be used to help produce vegetable drugs and nutraceuticals for the local markets, and to provide examples of effective integration between local healers and biomedical health services. The final review of the ethnobotanical and scientific literature on the genus Artemisia is presented as an example of the richness of popular uses of these plants, and as an attempt to define their usefulness as nutraceuticals or vegetable drugs.

Results. Artemisia L. is a genus of small herbs and shrubs, that belongs to the important family Asteraceae. The composition of the genus Artemisia in terms of nutritional compound is really varied. Many spices of the genus Artemisia are known as aromatic plants and have a characteristic scent or taste caused by essential oils, which in many cases are the reason for their application in folk medicine. The genus Artemisia contains all the common natural products of the Asteraceae, included iso/chlorogenic acids, isoflavonoids, sesquiterpene lactones (SQLs), pentacyclic triterpene alcohols, essential oils (mainly composed of mono- and sesquiterpenes), various alkaloids, heterocyclic, aromatic polycyclenes with vinyl end groups, a variety of fatty acids in the seeds, and coumarins. Some species of Artemisia, thanks to their bitter taste, are responsible of the reduction of dyspepsia’s symptoms, control of glucose homeostasis and body-mass index.

Conclusions. The objective of this article is to show the health relevance of wild plant resources for indigenous people, and the role of ethnopharmacology in disseminating information on these resources amongst the same local people. Even if many wild plants are still used as supplementary food, most of this knowledge survives only in the memory of the elderly, and part of the role of health professionals and scholars alike is to safeguard this heritage and to use it to change the health status of people. We choose the genus Artemisia as an example of richness in natural compounds, exploitable both from a nutritional and a medicinal perspective.
Comparison of proximate data among traditional foods from Black Sea Area countries per food group

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Introduction. Traditional foods from 6 Black Sea Area Countries (Bulgaria, Georgia, Romania, Russian Federation, Turkey and Ukraine) were prioritized within the frame of the EU Project BaSeFood (Sustainable Exploitation of Bioactive Components Black Sea Area traditional foods). The selected traditional foods were categorized into 6 food groups: 1) Cereal or cereal based foods; 2) Fruit or fruit based foods; 3) Vegetable or vegetable based foods; 4) Oilseeds or oilseed products; 5) Herbs, spices and aromatic plants; and 6) Low or non-alcoholic fermented products. One of the aims within BaSeFood project was to produce an overview on the nutritional value of each traditional food and compare it among the categorized food groups.

Materials and methods. 33 selected traditional foods were prepared according to a recorded traditional recipe, ingredients and traditional preparation methods. The following components were determined: moisture, ash, total nitrogen (for protein), total fat, individual fatty acids, starch, total sugars and dietary fibre for each food.

Results. Vegetables and vegetable based foods; herbs, spices and aromatic plants; and low or non-alcoholic fermented foods and beverages had the lowest energy content, mainly due to their high water content (>60.0 g/100 g). Oilseeds or oilseed products presented the highest mean content of ash (2.23 g/100 g), total protein (15.9 g/100 g) and total fat (72.0 g/100 g). Sour rye bread, belonging to cereal based foods group, had the highest starch content (66.3 ± 0.55 g/100 g). The highest total sugar content (85.3 ± 0.30 g/100 g) was found in rose jam, a food from the fruit or fruit based foods group. All results are given per 100 g of edible portion.

Conclusions. The proximate composition of the selected traditional foods from Black Sea Area countries is important in order to elucidate their role in the dietary pattern of populations and will be useful to include new nutritional data in national food composition databases.

Acknowledgments. Research funded by EU FP7 grant number 227118 (‘BaSeFood’).
Selected traditional foods from Bulgaria in the frame of BaSeFood project

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Introduction. Bulgaria is located in Southeast Europe, in the northeast part of the Balkan Peninsula. Its location on the transition line between two climate zones influences the climate, soils, vegetation and animal species. Bulgarian cuisine is exceptionally diverse and delicious, consisting of various salads, breadstuffs, stews, and other local foods. Many of the dishes are prepared according to traditional recipes and have been passed from generation to generation over the centuries. This study was carried out within BaSeFood project (Sustainable Exploitation of Bioactive Components Black Sea Area traditional foods) and the aim was to determine the nutritional composition of six traditional foods from Bulgaria.

Materials and methods. Six traditional foods: baked layers of pastry stuffed with pumpkin, rodopian dried bean, rose jam, halva, mursal tea and millet ale were selected and the nutritional composition was determined. The following components: moisture, ash, total nitrogen (for protein), total fat, individual fatty acids, starch, total sugars and dietary fibre were quantified for each food.

Results. Our results show that mursal tea, millet ale and rodopian dried beans were the analysed traditional foods with the lowest energy content due to the high water content (>81%). Total protein content varied between 0.344 ± 0.01 g/100 g and 11.0 ± 0.10 g/100 g for rose jam and halva, respectively. Halva was the selected traditional food with the highest amount of total fat (30.1 ± 0.74 g/100 g), from which the major fatty acids were unsaturated, since it is made with sunflower seeds. All results are given per 100 g of edible portion.

Conclusions. New data on nutritional composition of Bulgarian traditional foods will enhance the knowledge base on traditional foods which is necessary for the development of exploitation plans and will be useful for their promotion.

Acknowledgements. The research leading to these results has received funding from the European Community’s Seventh Framework Programme (FP7/2007-2013) under grant agreement n.º 227118.
Study on the antioxidant activity of selected local Bulgarian culinary spices

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Introduction. The study aims at evaluating antioxidant activity and total polyphenol content of Bulgarian local spices “levurda”/ramson (Allium ursinum L.), “samardala” (Allium bulgaricum), and “matochina”/lemon balm (Melissa officinalis) used for centuries as a folk remedy for diseases and as food ingredients. Antioxidants in plants play important role in foods and living organisms because of the radicals scavenging ability and reducing cell damage in human body for which they are recognized as anti-aging, anti-inflammatory, anti-carcinogenetic potentials.

Materials and methods. Wild “levurda” A. ursinum L. (Krichim), and “samardala” A. bulgaricum (Stara Zagora), “matochina” C. balsamita (Stara Zagora) collected in spring 2012 are analysed fresh and dry. The content of dry matter of fresh herb has been determined by BSS. Methods of extraction, based on the traditional application of the studied plants: water infusion (HM /hydro module/ - 20; 30 min extraction with water brought to boiling point), decoction (HM 20; 30 min boiling in water), 70% and 96% ethanol and methanol extracts (HM 20; 3 times for 30 min at 70°C); supernatant of fresh spices, (mashed with quarts sand, diluted with 0.1mol/l K2HPO4, pH 7.0 and centrifuged 10 min at 4˚C, 15000 g). Antioxidant activity is estimated with use of DPPH (modification of Brand-Williams et al., 1995) and ABTS (Re et al., 1999) radicals scavenging methods. Total polyphenol content (TPhC) is determined by the modified method of Kujala et al. (2010) with Folin-Ciocalteu's reagent, using gallic acid as calibration standard: results are expressed as gallic acid equivalents (GAE) per 100 grams DW. Reduction capacity (RC) is determined by the method of Oyaizu (1986) using L-ascorbic acid as a standard.

Results. The extraction with 70% etanol gives highest DPPH, ABTS, TPhC and RC values. The highest DPPH scavenging activity is determined for 70% etanol extract of “matochina”, while for the ABTS – “samardala” shows the highest value. The highest values of TPhC are achieved with 70% ethanol extraction of “matochina”. Water extraction (infusion) resembles the cooking process and the process of herbal infusion (chai), prepared most often in folklore medicine. “Matochina” (Melissa officinalis) infusion is characterized with highest TPhC values (21.78 mg GAE/g). Dekoktion, similar to most of the cooking processes, arranges the studied spices according to their antioxidant characteristics in the row - matochina”> “samardala”> “levurda”. The supernatant of fresh “levurda” shows better antioxidant activity than “samardala”, although the method of sample preparation is characterised with lowest values of DPPH, ABTS, TPhC and RC for all the studied samples.

Conclusions. The method of extraction effects antioxidant activity characteristics of the spices, least felt in the “levurda” samples.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
A systematic and comprehensive study of traditional foods in the Turkish food composition database project

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Introduction. Traditional foods are a significant element of the cultural heritage in countries, as in Turkey, and their sustainability must be supported by scientific research. In Turkey, there was a need for a systematic investigation on traditional foods due to lack of information on these foods. Turkish food composition database (T-FCDB) project aimed to study the traditional foods at a national level by providing information on their nutritional content, historical and cultural properties.

Materials and methods. Within the traditional foods work package of T-FCDB, a standardised and systematic procedure was applied for the study of traditional foods. Fifty traditional foods originated in Turkey were prioritised with a group of members from universities, the ministry of agriculture and Turkish cuisine specialists according to specific criteria’s and consumer needs. Main geographical areas of origins (approx. n=3) in Turkey were identified for each traditional food. Project personnel were scheduled visits to selected local formers in each geographical region for recipe recording, sampling and collecting cultural information of foods. In the sample handling process, a composite sample was formed by 3 individual food samples from each geographic origin and divided into laboratory samples for nutrient analyses. For the standardisation of study practices; standard filling forms for recipe recording, sample distribution, and analytical data documentation, a collaboration agreement for local formers and a guideline for literature survey were established.

Results. Recipes and samples were collected from 150 geographical areas for 50 traditional foods. Food compositions of 150 composite samples were determined by nutrient analysis through a collaboration of 11 project partner laboratories. Information on the cultural and historical characteristics of traditional foods that were provided from locals and the comprehensive literature surveys (public and university libraries, palace collections etc.) were documented.

Conclusions. The systematic and standardised investigation of traditional foods would constitute a valuable source of information on Turkish traditional foods and become the basis of the further quality traditional food studies in Turkey.

Acknowledgements. The study has been funded under TÜBİTAK KAMAG TARAL-1007 Research Programme, 107G208. The authors would like to thank the team of EuroFIR Network of Excellence (FOOD-CT-2005-513944) for their contribution towards improving our technical knowledge on traditional food studies.

Selected traditional foods from western Ukraine in the frame of BaSeFood project

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Introduction. The Ukrainian traditional foods are characterized by the use of a large diversity of recipes for the same dish. The best example is the traditional Ukrainian food – borsch – known at least in dozens of varieties containing up to twenty ingredients.

This work aims to determine the nutritional composition of three traditional foods from western Ukraine that have been prioritised in the frame of the BaSeFood project (Sustainable Exploitation of Bioactive Components Black Sea Area traditional foods).

Materials and methods. Three traditional foods: Transcarpathian green borsch, roasted sunflower seeds and cottage cheese with dill and garlic were selected and the nutritional composition was determined. The following components: moisture, ash, total nitrogen (for protein), total fat, individual fatty acids, starch, total sugars and dietary fibre were quantified for each food.

Results. The energy value for the analysed traditional foods was 181 kJ/43 kcal for Transcarpathian green borsch, 687 kJ/164 kcal for cottage cheese with dill and garlic, and 2675 kJ/640 kcal for roasted sunflower seeds. From the three selected traditional foods for western Ukraine, roasted sunflower seeds have the highest total fat content (58.2 ± 2.16 g/100 g), of which 49.4 g/100 g are unsaturated fatty acids. They also contain a high protein content (20.8 ± 0.40 g/100 g) and a considerable total dietary fibre content (11.3 ± 1.09 g/100 g).

Regarding the available carbohydrates content, the amount per 100 g was 2.49 ± 1.33 g for roasted sunflower seeds, 5.52 ± 1.75 g for Transcarpathian green borsch and 8.20 ± 0.25 g for cottage cheese with dill and garlic. In the case of roasted sunflower seeds, most of the carbohydrates were sugars (2.36 ± 0.13 g/100 g).

Conclusions. This study will contribute to characterize the dietary pattern of western Ukraine as a part of the cultural inheritance of this country. Moreover, these results can be useful to preserve and promote these traditional foods.

Acknowledgements. The research leading to these results has received funding from the European Community’s Seventh Framework Programme (FP7/2007-2013) under grant agreement n.º 227118.
Effects of 6 weeks consumption of bioactive-rich nettle and Sideritis teas on endothelial function and other markers of cardiovascular disease risk in an at-risk subject group: a randomised controlled trial

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Introduction. Diets rich in fruits and vegetables have health-protective effects, which could be translated in reduction of risk of cardiovascular disease (CVD). It has been postulated that beneficial effects of such diet could be attributed to polyphenolic compounds found in numerous plant foods. There is a substantial body of scientific evidence that flavonoids of plant origin favorably influence endothelial function, blood pressure, lipid profile and insulin sensitivity. Many traditional foods of Black Sea region containing or based on plants are rich in bioactive substances and polyphenols. Both Sideritis spp. and Urtica spp. contain flavonol or flavonol-related substances which could potentially influence endothelial function.

Materials and methods. We have conducted a randomized, parallel design (3 groups, n=27 per group) clinical trial investigating the effects of mountain tea (Sideritis scardica) and Nettle (Urtica dioica) on endothelial dependant flow mediated vasodilation and other risk markers for CVD. Subjects were randomized to receive either a) 2 g dried mountain tea infused in 200 ml hot water b) 3 g dried nettle infused in 200 ml hot water or c) 200 ml hot water as a placebo control. Flow-mediated vasodilatation (FMD) was measured at baseline and after 6 weeks of follow-up.

Results. There were no significant differences in FMD between the 3 groups at baseline. Neither treatment has demonstrated a favorable effect on FMD comparing to control group. The mean change in FMD was significantly lower after 6 weeks regular ingestion of nettle (5.90 ± 2.33% compared with 7.62 ± 3.92%; p = 0.037 (unadjusted)) but the difference was not significant when compared with the control group. There were no beneficial effects on blood pressure after ingestion of either sideritis or nettle. There was a small decrease in total cholesterol after 6-weeks consumption of both nettle (6.1%) and sideritis (4.6%) when compared with baseline values. Similarly, total cholesterol was lower in the nettle and sideritis groups compared with control at the 6-week time point (by 4.5 and 6.5% respectively). Same applies to LDL-cholesterol with differences between nettle and control at 6 week time point 6.4% and sideritis and control at 6 week time point 14.0%. However, none of the effects were significant.

Conclusions. Six-week consumption of Sideritis Scardica and Nettle (Urtica Dioica) in the form of water decoction did not influence flow-mediated vasodilatation in patients at high cardiovascular risk. No improvement was seen in office blood pressure levels or plasma lipids.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
Selected traditional foods from Romania in the frame of BaSeFood project

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Introduction. Romania has an old tradition in different dishes that suffered outstanding influences along the time from: a) developed countries cuisines and experiments - French, Prussian; b) invading people (Ottomans), c) neighbourhoods related - Serbian, Hungarian, Ukrainian. Despite the strong influences, national food still maintained its own character. This work aims to determine the nutritional composition of five traditional foods from Romania that have been prioritised in the frame of the BaSeFood project (Sustainable Exploitation of Bioactive Components Black Sea Area traditional foods).

Materials and methods. Five traditional foods: cornmeal mush, nettle sour soup, plums jam, herbal dish and elderberry soft drink were selected and the nutritional composition was determined. The following components: moisture, ash, total nitrogen (for protein), total fat, individual fatty acids, starch, total sugars and dietary fibre were quantified for each food.

Results. The energy value for the analysed Romanian traditional foods varied between 99 kJ/24 kcal for elderberry soft drink and 732 kJ/175 kcal for plums jam. The food with the highest available carbohydrates content was plums jam with 40.1 ± 0.40 g/100 g. Among the analysed traditional foods, total fat varied between 0.237 and 3.58 g/100 g, while total protein ranged from 0.903 to 1.99 g/100 g, with the exception of elderberry soft drink, which does not contain these nutrients. Herbal dish presented the highest content of total dietary fibre (3.48 ± 0.26 g/100 g), followed by plums jam with 3.30 ± 0.14 g/100 g. All results are given per 100 g of edible portion.

Conclusions. This study provided new data on nutritional composition of five traditional foods from Romania, in order to preserve and promote these foods.

Acknowledgements. The research leading to these results has received funding from the European Community’s Seventh Framework Programme (FP7/2007-2013) under grant agreement n.º 227118.
Hypocholesterolemic effect of dill and kale extracts: assessing mechanisms of action in hepatic cultured cells

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Introduction. Plants from the Brassicaceae family are rich sources of biologically active compounds such as flavonoids. Anethum graveolens L. (dill) is considered anti-hypercholesterolemic in folk medicine. Positive effects on cholesterol metabolism by various Brassica spp. and by dill have been previously reported (1-2), and they have been hypothesized to be in part related to the inhibition of HMG-CoA reductase (HMG-CoAR) enzyme through a downregulation of the encoding gene. In this study we evaluated the modulation of genes and proteins related to cholesterol metabolism and trafficking by kale and dill extracts in HepG2 cells. Results obtained were compared to those obtained in control, cholesterol and mevastatin treated cells.

Materials and methods. Kale and dill were extracted using hot 70% MeOH (3) and their total phenolic content (TPC) and pattern analysed by the Folin-Ciocalteu assay and by LC-DAD-MS. In kale extract, glucosinolate composition and content were also evaluated. The vegetable extracts were supplemented to HepG2 cells for 24 h. Gene expression analysis of sterol regulatory element binding protein (SREBP)-1 and -2, HMG-CoAR, and LDL receptor (LDLR) was performed by quantitative real-time PCR. The expression of corresponding proteins was carried out by western blot analysis.

Results. TPC of the extracts ranged from 42.60 µg gallic acid equivalent /mg (for kale) to 58.07 (for dill). Although the transcription of SREBP-1 gene was significantly increased in supplemented cells, no modification occurred in the expression of the encoded protein. SREBP-2 gene and protein expression was not modified by dill and kale, as well as HMG-CoAR and LDLR gene transcription. Notwithstanding, HMG-CoAR and LDLR protein level was increased by dill and kale, respectively.

Conclusions. Although further studies are needed, our data indicate that kale and dill cholesterol-lowering activity is not related to a decreased expression of HMG-CoA protein. We acknowledge that results in whole organisms may diverge from those in the cultured cells in part because of liver or other organ metabolism of ingested phytochemicals mixtures and agents, and therefore results in the cultured cells could be misleading if taken in isolation. Nonetheless, this study represents a first contribution for the evaluation of kale and dill extract mechanism of action.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118. The Authors thank Nadiya Boyko (Uzhhorod National University, Ukraine), and Bike Koçaoglu and Osman Hayran (Yeditepe University, Turkey) for providing kale and dill.

Mechanisms for the cholesterol-lowering effect of phytosterols, main bioactives of many Black Sea area traditional foods

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Introduction. Phytosterols (PS) are minor constituents of plant foods; according to their composition, many traditional BSA foods could represent a rich source of PS. PS are well-known cholesterol-lowering agents (1), and several theories have been proposed to explain their action. Sterol regulatory element binding proteins (SREBP) are master regulators of intracellular cholesterol concentration (2). When intracellular cholesterol is high, nuclear SREBP concentration decreases, so reducing the transcription of genes related to cholesterol metabolism, as those encoding for HMG-CoA reductase (HMG-CoAR) and LDL receptor (LDLR). This cholesterol-mediated regulation relies on the presence of a sterol-sensing domain (SSD) in SREBP proteins; it is not clear if this domain can sense free cholesterol only, or other sterol such as PS can contribute to the regulation. Since PS structure is very similar to cholesterol, they could mimic its action within the cell, and their increased concentration could reduce nuclear SREBP concentration, therefore modulating cholesterol synthesis and trafficking. To verify this hypothesis, selected PS were supplemented to cultured cells.

Materials and methods. Primary cultures of rat cardiomyocytes were supplemented with PS (sitosterol, campesterol, and brassicasterol, separately or in a mixture), cholesterol or mevastatin. At confluence, PS incorporation and cellular cholesterol concentration were verified by GC/MS. SREBP-1, SREBP-2, HMG-CoA reductase, and LDL receptor gene expression evaluated by quantitative real-time PCR. Cell proliferative activity and lactate dehydrogenase (LDH) leakage were also determined.

Results. All PS were incorporated into cells, and this was accomplished by a decrease in cholesterol content similar to that obtained with mevastatin treatment. Notwithstanding, the expression of genes encoding for SREBP-1, SREBP-2, HMG-CoA reductase, and LDL receptor was not modified by PS supplementation.

Conclusions. The absence of modification in gene expression could be due to the insensitivity to PS of SREBP-SSD, or to a too low PS intracellular concentration. Preliminary data confirmed this hypothesis, since supplemented PS concentrated in the membrane and not in the cytosol, where the SSD-mediated regulation takes place. In PS supplemented cells the observed reduction of cholesterol concentration seems not related to a modulation of key genes of cholesterol metabolism, but to the displacement of cholesterol from membranes. This could explain the reduced proliferative activity of PS supplemented cells, and deserves further attention.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.

Modulation of antioxidant enzyme gene expression by pomegranate (Punica granatum L.) extract and punicalagin

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Introduction. In recent years, the number of scientific papers concerning pomegranate (Punica granatum L.) and its health properties has increased greatly. Among the great variety of chemical components present in the pomegranate (POME), ellagic acid, ellagitannins (including punicalagins), punic acid, anthocyanins, flavonols, flavan-3-ols, and flavonoids seem to be the ones responsible, at least in part, for most of the health benefits, which appear mainly related to its antioxidant potential (1). POME antioxidant activity could be due not only to a direct scavenging activity, but also to the modulation of the main antioxidant enzymes (2). To further elucidate the mechanisms of the reported antioxidant activity, HepG2 cells were supplemented with a Georgian POME extract, and then subject to an exogenous oxidative stress. The expression of the gene encoding for the main antioxidant enzymes (superoxide dismutases – SODs; catalase – CAT; and glutathione peroxidases – GPXs) was determined. To compare the biological activity of whole POME extract to its main phenolic component, some cells were supplemented with punicalagin (PUNI).

Materials and methods. Pomegranate fruits were collected in Georgia. The methanolic extract was analysed by reversed HPLC. HepG2 cells were supplemented with 0.6 mg/mL POME extract or 1 µM punicalagin (PUNI) for 24 h, then some cells were exposed to 300 µM tert-butyl hydroperoxide (t-BOOH) for 3 h. SOD-1, -2, and -3, CAT, and GPX-1 and -4 gene expression was determined by quantitative real-time PCR. Cell viability, lactate dehydrogenase (LDH) leakage, and cellular lipid peroxidation were also evaluated.

Results. At tested concentration, POME extract and PUNI did not counteract the detrimental effects of t-BOOH. Gene expression data evidenced that POME and PUNI had limited and different effect on the transcription of the main antioxidant genes; in stressed condition, the up-regulation of SOD-1, SOD-3, and GPX-4 was evidenced in POME cells, while SOD-2 only was modulated in PUNI ones.

Conclusions. Experiments are in progress on the evaluation of the activities of SOD, CAT and GPX enzymes, and conclusions on the direct/indirect POME antioxidant activity cannot be drawn without considering the incoming results. The absence of protective effect by POME and PUNI could be related to the low concentration used, due to the observed cytotoxicity of higher concentrations. This underlines the well-known problem on the boundary between toxicity and protective effect.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118. The Authors thank M. Jorjadze from “Elkana” (Georgia) for providing pomegranate fruits.

Protective role of *Sideritis scardica* and *Camellia sinensis* extracts in oxidatively injured mammalian cells

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Introduction. In several countries, tea is the major source of antioxidant flavonoids, and high tea consumption has been associated to many different favourable outcomes. Other plants used for the preparation of herbal teas are source of phenolic antioxidant compounds; among them *Sideritis scardica* (SS) is used for the preparation of a popular drink (mountain tea) throughout Eastern and Central Europe. In this study the antioxidant effects of a SS extract have been compared to a *Camellia sinensis* (CS) extract in a biological system (HepG2 cells), to set the scientific basis for the exploitation of other herbal teas in counteraction of oxidative stress.

Materials and methods. SS plant material was collected from the South-Western area of the Pirin mountains; the methanolic extracts of dried SS were characterized by HPLC/DAD-MS. CS extract was from Indena (Milan, Italy). The *in vitro* total antioxidant capacity (TAC) of the extracts was assessed using the ABTS method (1). HepG2 cells were supplemented with 50 µg/mL SS or CS for 24 h, and then exposed to 300 µM tert-butyl hydroperoxide (t-BOOH) for 3 h. Cytotoxicity was assessed via measurements of mitochondrial viability (MTT assay) and lactate dehydrogenase (LDH) leakage in the media. Protection against oxidative stress was verified by the TBARS (thiobarbituric acid reactive substance) assay and by evaluating the cellular TAC and reduced glutathione (GSH) content.

Results. In our experimental conditions SS and CS extracts were not cytotoxic, and supplemented cells showed an increased resistance to the oxidative challenge, as revealed by a higher cellular TAC in respect to control cells. This effect seemed related to the ability of the herbs extracts to increase GSH content and to inhibit lipid peroxidation. Even if SS extract had a lower phenolic concentration and TAC than CS one, their antioxidant effects on the cells were similar. Furthermore, the very different phenolic pattern of the two extracts suggests that the protective activity is not limited to catechins.

Conclusions. We have demonstrated that a bioactive-rich extract of the mountain tea plant (SS) performs as well in improving cellular antioxidant status as a catechin-rich extract of CS. Although further research is needed to identify SS active components and to evaluate its effects in humans, our data suggest that consumption of *S. scardica* may have health benefits.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.

Screening of antioxidant capacity and phenolic content of selected Black Sea area traditional foods

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Introduction. There is increasing interest in the potential benefits of phytochemicals, and an antioxidant-rich diet has been recognized to improve health by attenuating the adverse effects of oxidation. In this light many traditional foods are currently being explored for their potential health-enhancing properties. In the BaSeFood project, the total antioxidant capacity (TAC) and the polyphenol content of 39 traditional foods of the BSA have been tested for the first time.

Materials and methods. Traditional dishes were prepared in BSA (Bulgaria, Georgia, Romania, Russia, Turkey, and Ukraine) by local Partners, according to the typical recipes and to the seasonal availability of plant ingredients, and sent to the University of Bologna for further analysis. After a water/ethanol extraction procedure, the food extracts were examined for their total antioxidant capacity (TAC) - evaluated by two different assays, ABTS (1) and DPPH (2) – and total phenolics (TP), hydroxycinnamic acids (HI), and ortho-diphenols (ODI) content (3-5). Correlations and multiple regression/path coefficient analysis between TAC and specific phenolics were carried out to evaluate their contribution to the total antioxidant potential.

Results. TAC, TP, HI, and ODI content of analysed BSA traditional foods varied among food categories, and among foods within the same category. Correlation analysis between TAC and the concentration of analysed bioactive compounds evidenced that HI and ODI do not play a prominent role in promoting antioxidant capacity that is on the contrary strongly linked to total phenolic content.

Conclusions. Although these foods are largely consumed with the daily diet in BSA countries, less is known about their potential health benefits. Our data, selecting BSA traditional foods with the highest antioxidant capacity, represent the first step for further researches on their health effects. The nutritional revaluation of BSA traditional foods, generally unknown in Western European countries, is interesting for both consumers, that could optimize their antioxidant intake discovering typical dishes, and food producers, that could exploit new products with healthy characteristics.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.

Pomegranate juice counteraction of $H_2O_2$-induced oxidative damage and cytotoxicity in HepG2 cells. Influence of the cultivar

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Introduction. Pomegranate (Punica granatum), a fruit native to the Middle East, has gained widespread popularity as a functional food and nutraceutical source. In different studies in human and murine models, pomegranate juice (PJ) has been shown to exert significant antiatherogenic, antihypertensive, anti-inflammatory, and antioxidant effects [1]. The antioxidant activity of PJ has been attributed to its high polyphenolic content, specifically punicalagins, punicalins, gallagic acid, and ellagic acid. Evaluating the health effects of PJ, the deep differences in polyphenols contents and antioxidant activities evidenced in diverse commercial PJ and related to the different cultivars and/or processing [2] must be carefully taken into accounts. The aim of this study was to evaluate the effectiveness of three PJ obtained from different cultivars (Wonderful, Hicaz and G2) in the counteraction of the $H_2O_2$-induced cytotoxicity and oxidative damage in HepG2 cultured cells.

Materials and methods. In vitro total antioxidant capacity (TAC) of the three PJs was evaluated by the method of Re et al [3]. Cells were supplemented with PJs at 5µl/ml and 10µl/ml medium concentration, and an oxidative stress was determined in some experiments by cell exposure to 0.4mM $H_2O_2$ for 1h. The effects of PJ supplementation in both basal and stressed conditions were evaluated by measuring cell vitality and viability, lactate dehydrogenase (LDH) release in the media, glutathione and reactive oxygen species (ROS) intracellular content, cytosolic TAC and concentration of thiobarbituric acid reactive substances.

Results. In not stressed condition, PJ supplementation did not reduce cell viability but increased LDH activity when supplemented at the highest concentrations. This effect was more evident for Hicaz cultivar. In stressed condition, all PJ but Hicaz at the highest concentration counteracted $H_2O_2$ induced cytotoxicity. Interestingly, Wonderful and Hicaz cultivars showed the highest TAC in vitro, our data evidenced that all PJ had similar protective effect on the considered of oxidative damage tests.

Conclusions. Our data indicates a similar protective effect of all PJ on different oxidative damage traits. Further analysis are in progress for evaluating the protection also at DNA and protein level, possibly explaining the different prevention of $H_2O_2$-induced cytotoxicity, which appeared related to the cultivar and concentration used.

Acknowledgements. Work partly funded by the TEPASS Project - Technologies for Safe and Sustainable Food, co-financed by the Emilia-Romagna Region within the call "From Industrial Districts to Technology Clusters"

Nutrition claims within the EU regulatory context: a potentially important tool for the endorsement of traditional foods of the Black Sea Area Countries

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Introduction. Traditional foods are footprints of the past in the contemporary life of every nation. The advantages linked to traditional foods, often including their beneficial nutritional properties and their historical, social and geographical traits, attract the interest of consumers. At the same time, however, modern lifestyle trends and fast food habits drive people away from their culinary roots. Food labeling plays an important role towards informing consumers on prudent food choices. The European Commission has recently regulated a framework with which the nutrient content and consequently the health properties of foods may be communicated to the consumer. Since most traditional foods are believed to be healthy, this framework might offer substantial contribution towards sustaining traditional foods in the daily diet. In the context of the BaSeFood project, data are provided on the eligibility of 33 traditional foods from the Black Sea Area to bear nutrition claims according to the EU legislation.

Results. Most frequently suggested claims were related to the sugars, saturated and total fat content of the foods, followed with claims on the fiber and sodium content. Claims on the energy and protein content of the foods were eligible only for a few foods. Traditional foods with the most suggested claims were Mursal tea (Bulgaria), Rhodopian / Smilyan bean soup (Bulgaria), Tsiteli doli bread with makhobeli (Georgia), Bread Kvass (Russia), Buckwheat porridge, crumbly (Russia) and Black tea (Turkey) with several claims each. About half of the 33 foods were found eligible to bear at least one nutrition claim on their vitamin or mineral content. Five foods were found eligible to bear a “high unsaturated fat” claim, from which four could also be claimed as “high polyunsaturated fat” and one as “high monounsaturated fat”.

Conclusions. Traditional foods of the Black Sea Area possess several beneficial nutritional properties and are eligible to bear a wide range of nutrition claims based on the EU legislative framework, a fact that may attract the attention of the international food and nutritional community.

Acknowledgements. The present work received support from the European Community’s Seventh Framework Program (FP7 2007-2013) under grant agreement n° 227118.

Acute effects of hot water infusions of mountain tea, nettle and dill on platelet function in subjects with metabolic syndrome: a randomised controlled intervention study

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Introduction. Platelet hyper-reactivity, often seen in patients metabolic syndrome, plays an important role in the etiopathogenesis of cardiovascular diseases (CVD), which imposes platelets as one of putative targets of food bioactive compounds action in CVD prevention. The aim of the study was to investigate the acute effects of hot water infusions of mountain tea, nettle and dill, traditional dietary plants of Black Sea region rich in polyphenols, on different markers of platelet function. Study was conducted as a single-blind, randomized, controlled intervention trial.

Materials and methods. After a 2-week run-in period with a low intake of polyphenols-rich food, 88 participants with metabolic syndrome (ATP III criteria) were randomly assigned into 1 of 4 intervention groups. Participants consumed a meal that included single portion of hot water infusion (200 ml) made of dried mountain tea, nettle or dill (2g) and 50g of white bread or 200 ml of hot water with white bread as control meal. Blood samples were collected at baseline and 2h after the intervention. Markers of platelet activation (expression of P-selectin and GPIIbIIa) or aggregation (with monocytes and neutrophils) were evaluated using whole-blood flow cytometry, in basal conditions (without agonists), or after ex vivo action of agonists (0.5µM ADP, 20 µM ADP, 250 µM arachidonic acid (AA), or 250 µM arachidonic acid (AA) with 65 µM acetyl salicylic acid).

Results. Single portion of mountain tea hot water infusion significantly decreased P-selectin expression in basal conditions (p<0.05) and induced by ex vivo treatment with 20 µM ADP (p<0.05), compared to the control. It also aggravated ex vivo inhibitory effects of acetyl salicylic acid on platelet-monocyte aggregation induced by AA (p<0.05). Acute consumption of dill hot water infusion decreased P-selectin expression in basal conditions and after 20 µM ADP (p<0.05), but increased platelet-neutrophil aggregation in basal state and after 20 µM ADP (p<0.05). Hot water extract of nettle decreased P-selectin expression after 20 µM ADP(p<0.05), and was the only intervention that decreased expression of GPIIbIIa in basal state (p<0.05) and after AA action (p<0.05), compared to the control.

Conclusions. Obtained data indicate that even single portions of investigated polyphenol-rich plant food could influence some markers of platelet function and their potential in reducing pathologically increased platelet propensity for activation and aggregation, should be further evaluated.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
Can bioactive-rich plant food extracts of the Black Sea Region and isolated bioactive metabolites inhibit platelet function?

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Introduction. Polyphenols are thought to contribute to the cardiovascular-protective effects of a diet rich in fruit and vegetables. How polyphenols exert this protective effect is not clearly understood but previous research has demonstrated that they have the potential to modulate platelet function. For example, there are several reports of human intervention trials with polyphenol-rich foods such as cocoa and berry fruits and in-vitro assessments with isolated compounds such as quercetin, in which reductions in platelet aggregation have been shown. The aim of this study was to investigate the effects of extracts of bioactive-rich food plants typical of the Black Sea region and isolated bioactive metabolites of these plants, on platelet activity.

Materials and methods. 15 subjects donated whole blood samples that were subsequently treated with 1) methanolic extracts of annual nettle (Urtica urens), dill, kale, Sideritis scardica (‘mountain tea’), persimmon and pomegranate fruit at concentrations of 100 µg/ml and 2) a mix of the predominant human plasma metabolites of the flavonoid quercetin (quercetin-3-GlcA, 3'-methyl quercetin-3-GlcA, quercetin-3'-sulfate; 5, 20 and 100 µM) and of the isothiocyanate sulforaphane (sulforaphane and sulforaphane-cysteine-glycine; 2 and 20 µM). Platelet function was assessed with a platelet function analyser (PFA-100) which measures the time it takes for a platelet plug to form and block an aperture cut into a biologically active membrane at the end of a capillary. The whole blood sample is induced to form a plug by collagen and adenosine diphosphate (ADP) or collagen and epinephrine that are coated on to the cartridges through which the blood flows.

Results. Analysis of the methanol extracts of the six plants showed that they contained various flavonoids, phenolics, glucosinolates and other bioactive compounds (see poster by Saha S et al. for full details). None of the six bioactive-rich extracts or the isolated bioactive metabolites of these food plants induced significant increases in closure time in response to either collagen and epinephrine or collagen and ADP-stimulated platelets. No significant effects were observed at either physiological or supra-physiological concentrations of isolated bioactives.

Conclusions. These data show that none of the bioactive-rich plant extracts, or quercetin, sulforaphane and their human metabolites, can reduce PFA-100 closure time. This strongly suggests that consumption of these plants/bioactives is not likely to induce beneficial changes in platelet function in humans.

Acknowledgments. Research funded by EU FP7 grant number 227118 (‘BaSeFood’) and the BBSRC, UK.
Selected traditional foods from Georgia in the frame of BaSeFood project

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Introduction. Georgia is a small country in the Caucasus which has a variety of regions, which differ greatly from each other. The Georgian cuisine is specific of the country, but it also contains some influences from other Middle Eastern and European culinary traditions, as well as those of the surrounding Western Asia. The cuisine offers a variety of dishes with various herbs and spices.

This study was carried out within BaSeFood project (Sustainable Exploitation of Bioactive Components Black Sea Area traditional foods) and the aim was to determine the nutritional composition of five traditional foods from Georgia.

Materials and methods. Five traditional foods: tsiteli doli bread, nettles with walnut sauce, churchkhela, flax oil and wild plum sauce were selected and the nutritional composition was determined. The following components: moisture, ash, total nitrogen (for protein), total fat, individual fatty acids, starch, total sugars and dietary fibre were quantified for each food.

Results. The energy value for the analysed traditional foods varied between 193 kJ/46 kcal and 3758 kJ/899 kcal, for wild plum sauce and flax oil, respectively. Nettles with walnut sauce have the highest total protein content (9.56 ± 0.26 g/100 g). Besides the oil, the analysed traditional foods with the highest total fat content were churchkhela and nettles with walnut sauce, mainly due to walnuts which is present in both recipes. Flax oil is mainly composed by unsaturated fatty acids (79.8 g/100 g). The highest starch and total dietary fibre concentrations (41.3 ± 0.16 g/100 g and 8.59 ± 0.34 g/100 g, respectively) were found for Tsiteli doli bread. All results are given per 100 g of edible portion.

Conclusions. New data on nutritional composition of Georgian traditional foods will enhance the knowledge base on traditional foods which is necessary for the development of exploitation plans and will be useful for their promotion.

Acknowledgements. The research leading to these results has received funding from the European Community’s Seventh Framework Programme (FP7/2007-2013) under grant agreement n.º 227118.
Effects of 6 weeks of pomegranate juice consumption on cardiovascular disease risk biomarkers in subjects with metabolic syndrome: a randomised controlled intervention study

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Introduction. Pomegranate juice, a traditional food of Black Sea Region, is promising source of health-promoting bioactive compounds, mainly polyphenols, with numerous proposed health effects. Several studies investigated the effects of pomegranate juice in cardiovascular disease prevention (CVD) based on the influence of pomegranate bioactives on endothelial function including effects on nitric-oxide levels and activity, effects on redox balance, oxidative modifications of lipids and proteins, anti-inflammatory action and effects on cells directly involved in CVD pathogenesis (monocytes, platelets, macrophages). Some studies also indicated that pomegranate juice consumption could be effective in reducing traditional risk factors for CVD (hyperglycemia, hyperlipidemia, high pressure, obesity) often associated with each other and defined as metabolic syndrome. The main goal of this study is investigation effects of 6-week of pomegranate juice consumption on cardiovascular disease risk biomarkers in subjects with metabolic syndrome.

Materials and methods. The study was conducted as a single-blind, parallel, randomized, controlled intervention trial. After a 2-week run-in period with a low intake of polyphenol-rich food, 50 participants (29 women and 21 men) aged 35 to 65 with metabolic syndrome (ATP III criteria) were randomly assigned into one of two intervention groups and asked to consume restricted (low-polyphenol) diet supplemented with 330 ml/day of pomegranate juice or a restricted diet without supplementation for 6 weeks. Blood samples were collected at baseline, and after the intervention (day 42) and analysed for traditional biochemical and anthropometric parameters of CVD risk.

Results. After the 6-week intervention period there was no significant effects of pomegranate juice consumption on biochemical parameters of cardiovascular risk. In supplemented group we observed significant reduction in systolic and diastolic blood pressure compared to the control (p<0.05). Pomegranate juice also induced weight-loss in intervention group (p<0.05), compared to the control, and beneficial influence on percentage of fat mass and water content.

Conclusions. The results showed that pomegranate juice could have beneficial effects on some of the CVD risk factors, but further studies should confirm if these effects are sufficient for CVD prevention or bioactives of pomegranate could directly target cells and tissues of cardiovascular system (endothelial cells, macrophages, platelets) and on this level prevent harmful effects of traditional risk factors.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
Introduction. Russian Federation traditional foods are part of the cultural heritage. Some of them, unfortunately, are almost forgotten, and their recipes are preserved only in old cookbooks. Others are prepared only in some regions of Russia. However, some traditional foods are still part of the usual dietary patterns of most Russians. The latter include buckwheat porridge and, to a lesser extent, kvass and okroshka, for which consumption increases significantly in the summer. This work aims to determine the nutritional composition of five traditional foods from Russian Federation that have been prioritised in the frame of the BaSeFood project (Sustainable Exploitation of Bioactive Components Black Sea Area traditional foods).

Materials and methods. Five traditional foods: buckwheat porridge crumby, vegetable okroshka, watermelon juice, mustard oil and kvass southern were selected and the nutritional composition was determined. The following components: moisture, ash, total nitrogen (for protein), total fat, individual fatty acids, starch, total sugars and dietary fibre were quantified for each food.

Results. The energy value for the analysed traditional foods varied between 18 kJ/4 kcal and 3760 kJ/900 kcal, for kvass southern and mustard oil, respectively. From the five selected Russian traditional foods, 3 contain mainly water (92.2 ± 0.02 g/100 g for watermelon juice, 92.4 ± 0.03 g/100 g for vegetable okroshka and 98.7 ± 0.03 g/100 g for kvass southern.

The food with the highest monounsaturated fatty acids content was mustard oil (55.1 ± 0.68 g/100 g), and it also has a high polyunsaturated fatty acids content (38.0 ± 0.56 g/100 g).

Buckwheat porridge crumby has a significant amount of available carbohydrates (about 24%) and about 5% of total dietary fibre because it is prepared with buckwheat. For watermelon juice the available carbohydrates are mainly sugars (6.43 ± 0.14 g/100 g). All results are given per 100 g of edible portion.

Conclusions. New data on nutritional composition of Russian traditional foods will enhance the knowledge base on traditional foods which is necessary for the development of exploitation plans and will be useful for their promotion.

Acknowledgments. Research funded by EU FP7 grant number 227118 (‘BaSeFood’).
Effects of 6-week of pomegranate juice consumption on platelet function in subjects with metabolic syndrome: a randomised controlled intervention study

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Introduction. Numerous human studies, both in vitro and ex vivo, showed that dietary extracts and compounds can modulate platelet functions. These findings rationalize the investigation of anti-platelet effects of pomegranate juice, traditional food of Black Sea Area countries, as one of the proposed mechanism in CVD prevention. The aim of the study was to investigate the effects of 6-week pomegranate juice consumption on markers of platelet function in subjects with high risk for CVD. The study was conducted as a single-blind, parallel, randomized, controlled intervention trial.

Materials and methods. After a 2-week run-in period with a low intake of polyphenols-rich food, 50 participants with metabolic syndrome (ATP III criteria) were randomly assigned into one of two intervention groups and asked to consume restricted (low-polyphenol) diet supplemented with 330 ml/day of pomegranate juice or a restricted diet for 6 weeks. Blood samples were collected at baseline, and after the intervention. Markers of platelet activation (expression of P-selectin and GPIIbIIa) or aggregation (with monocytes and neutrophils) were evaluated using whole-blood flow cytometry, in basal conditions (without agonists), or after ex vivo action of ADP as agonist in suboptimal (0.5µM) and optimal (20 µM) concentrations.

Results. P-selectin expression (anализed as % and MFI) was significantly decreased after the intervention, compared to the control group in basal conditions (p<0.01 and p<0.05, respectively), and after ex vivo treatment with suboptimal ADP concentration (p<0.05 and p<0.01). With 20 µM ADP, decrease is not significant. Percentage of GPIIbIIIa positive platelets and the density of the antigen per platelet were also decreased after the intervention, with ex vivo agonist in optimal (p<0.01) and suboptimal concentrations (p<0.01). Aggregation of platelets with neutrophils was not influenced by the treatment, and aggregation with monocytes (%) MFI also decreased significantly after the intervention, measured after the ex vivo action of suboptimal (p=0.05; p=0.05) and optimal concentrations of ADP as agonists (p=0.05; p<0.05. In basal conditions, platelet-monocyte aggregation was not influenced by the pomegranate dietary intervention.

Conclusions. Obtained data indicate that pomegranate juice supplementation for 6-weeks significantly decreased parameters of platelet function in subjects at high risk for CVD. Futher investigation should investigate more precise mechanism and bioactives or metabolites responisble for the observed effects.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
Development of a national food composition database in Ukraine following EuroFIR and BaSeFood projects

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**Introduction.** Food composition databases (FCDB) are an important resource of nutritional composition data which is essential for the assessment of nutritional status, at individual, regional and international levels. The European Food Information Resource (EuroFIR) is the world-leading European Network of Excellence on Food Composition Databank systems. This project aimed to develop and integrate a comprehensive, coherent and validated databank providing a single, authoritative source of food composition data in Europe. EuroFIR has designed and implemented a process for the identification, prioritisation, collection and analyses of traditional foods, using a common methodology for European countries. These approaches have been further extended in BaSeFood project which aims to promote sustainable development and exploitation of traditional foods of plant origin containing emerging bioactive compounds with putative health effects in the Black Sea region. The aim of this work is to contribute for a new FCDB in Ukraine based on these quality standards with the compilation of a selected range of traditional foods.

**Results.** Following these methodologies, 59 traditional foods were prioritised and full documented including information on food description, sampling plan, sample handling, component identification, method specification, value and quality assessment. This information was collected for each of the traditional foods for further inclusion in the Ukrainian national food composition database.

From these, 6 foods (rye bread, Ukrainian red borsch with beets, Transcarpathian green borsch with sorel, pomazanka with dill and garlic, sauerkraut and roasted sunflower seeds) were analysed for nutritional composition. The following components: moisture, ash, total nitrogen (for protein), total fat, individual fatty acids, starch, total sugars and dietary fibre, vitamins, minerals and trace elements were quantified for each food.

Following a training, Ukrainian compilers have earned the skills to carry out the compilation of traditional foods with EuroFIR requirements. A total of 59 Ukrainian traditional foods have been indexed according to LanguaL Thesaurus system (http://www.langual.org/). LanguaL provides an international framework for food description using a system of controlled vocabularies.

**Conclusions.** The EuroFIR and BaSeFood standardised procedures have been implemented in a pilot study to be further extended to other foods for development of a Ukrainian FCDB.

**Acknowledgements.** Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
Beneficial microorganisms of traditional foods of Black Sea Region and their potential implementation

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Introduction. Ethical cuisine are potential providers of the original sourdough are used locally. It is little known of microorganisms associations from prioritised traditional foods of Black Sea region countries (BSAC).

Materials and methods. Beneficial microorganisms belonged to \textit{Lactobacillus}, \textit{Bifidobacterium}, \textit{Bacillus}, \textit{Enterococcus}, \textit{Saccharomyces}, \textit{Bacteroides} Genera were collected from 33 prioritised traditional foods. Antimicrobial properties to clinically important isolates were determined \textit{in vitro} and \textit{in vivo} in all the tested strains.

Results. Locally produced original national fermented products of BSAC were rich source for beneficial microorganisms. \textit{L. casei} originated from Russian rye bread Kvass inhibited \textit{S. enterica} found in patients with toxical infectious colitis. \textit{L. delbrueckii} demonstrated high antibacterial properties against methicillin resistant \textit{S. aureus} (MRSA) and \textit{Str. mitis} obtained from preschoolers with caries combined with symptoms of gastrointestinal disorders. \textit{L. casei} and \textit{L. delbrueckii} found in Ukrainian Sauerkraut are active against the agents of nosocomial infections: \textit{E. cloacae}, \textit{K. pneumoniae} and ESBL-producing EPEC \textit{E. coli}. Association of beneficial microorganisms from Bulgarian Bosa and Romanian Socata (\textit{L. casei} / \textit{L. plantarum}, \textit{L. fermentium}, \textit{L. acidophilus}, \textit{B. longum}, \textit{A. israeli} / \textit{L. delbrueckii}, \textit{B. breve} / \textit{L. acidophilus}, \textit{B. longum}, \textit{C. pelliculosae}) is not affecting significantly on any of tested potentially pathogenic bacteria being able at the same time stimulate local immune response in BALB/c mice following oral administration of such cocktail. \textit{C. famata} obtained from Turkish Sautéed pickled green beans was specifically active in utilisation of cellulose and can be potentially involved in regulation of stool formation in patients with irritable bowel syndrome. The synergetic antimicrobial activities of plant extracts and beneficial microbes are useful novel tools in prevention and treatment of variety of human and farm animal infectious and somatic diseases.

Conclusion. The food and nonfood innovative products for the interest of SMEs and consumers are subject of great importance. All selected microbial or plant/microbial compositions had been tested in preclinical study. Efficacy of complex preparation for protection and treatment children suffering from tooth decay, periodontal diseases and intestinal disorders had been proved in limited clinical experiments with volunteers. Further studies are required to enable wide practical implementation of our research results in food technology, veterinary and medicine practice.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
Cells and animal models used for testing of biological active compounds of plant originated traditional foods: results of BaSeFood project

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Introduction. Gut microbes, their metabolites and diet/food driven biologically active compounds modulate the innate and adaptive host immune response.

Materials and methods. Plants’ extracts of Nettle, Dill, Kale, Persimmon, Pomegranate and Sideritis were tested for their ability to alter the representatives of gut microbiota and regulate systemic and local host immune response on animal and cell models. BALB/c mice were fed with extracts orally (15 mg/200µl/day) for two weeks; assays had been performed in dynamic. Human derived dendritic cells (moDCs) were exposed for 6 and 24 to plants’ extracts at the concentration 2 mg/ml. The CD markers expressed by immune cells were detected by FACS. Cytokines’ profiles were evaluated in supernatant of activated moDCs and fragment cultures of the BALB/c mice tissue/organs by ELISA. Intestinal microbes were identified by API and ENTERO test-systems, PGEP and MALDI.

Results. Nettle significantly (p< 0.01) effects on expression of pro-inflammatory CD1a+ cells compare to the control. Dill and Kale demonstrated similar but less strong influence while Sideritis is statistically lowered the expression of CD1a+ on 6h but not on 24 h of incubation. Dill (6 and 24 h) and Nettle (6 h) induced IFN-g secretion. IL-4 was initiated by Nettle (6 and 24h) and Kale (6 h), less significant but more stable effect was caused by Sideritis while Pomegranate not affected on this cytokine production. TNF-α was dramatically increased after DCs exposure to Kale, Dill and Nettle (6 h). Lactobacilli were not affected by Dill and Sideritis; stimulated by Pomegranate on 3d, inhibited by Kale on 3-14d and by Persimmon on 7d; after wash-out period was no statistical differences observed. K. pneumoniae and E. cloacae were eliminated from mice colon by feeding of extracts of Sideritis, Dill, Nettle and Persimmon but not Pomegranate and Kale. E. faecium and faecalis were stimulated significantly by Pomegranate. B. bifidum and B. longum were increased only in colon content of mice fed with extracts of Sideritis, Pomegranate and Kale. Commensal E. coli was not affected by any of tested plants’ extracts. All plants’ extracts had promoted of Candida albicans persistence in mice colon; only Kale had lowering its amount on 7-14 d but not on 21-28 d and after wash-out period. Plants’ extracts differently regulated IgA secretion by splenic and peritoneal cavity B1/B2 cells; changed the ratio of CD45/CD45 RB, T4/T8/NK and CD4(+)CD25(+) regulatory T cells (T reg cells) in mesenteric lymph nodes, Peyers’ patches and spleen.

Conclusion. Human DCs, colon microbial composition, local and systemic immune response of mice are influenced differently by tested plants’ extracts.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
The use and extension of eBASIS bioactives database by BaSeFood

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Introduction. eBASIS is an internet-deployed food composition database containing quality assessed composition and biological effects data from peer reviewed literature, an important research resource for scientists, epidemiologists, food regulatory authorities and food industry professionals. In order to remain abreast of current research, the EuroFIR-BASIS platform accommodates continual expansion and the inclusion of additional compound classes, plants and processed plant-based foods. Recently the database has been extended to include bioactive composition data in ingredients used in traditional foods in the Black Sea Region.

Materials and methods. 4 new traditional food ingredients were added to eBASIS: Cherry Laurel, Elderflower, Nettle, Sideritis and a literature search for composition data on bioactives in these traditional foods of the Black Sea Area were carried out. Peer reviewed articles were sourced containing data for quality assessment and entry into eBASIS.

Results. 37 peer reviewed articles were sourced containing quantitative data on bioactive compounds in the 4 traditionally used plants. After thorough analysis of the papers, data entry into eBASIS yielded over 450 new data points covering anthocyanins, flavonols and cinnamic acid derivatives.

Conclusions. The newly added data provides an improved resource on composition data on food plant ingredients in the Black Sea Region.

Acknowledgements. The authors acknowledge all partners in the BaSeFood Project.

Website: http://ebasis.eurofir.org/Default.asp
The potential of traditional foods from Black Sea Area as source of vitamins and bioactive compounds

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Introduction. In the last years, great attention has been devoted to the study of bioactive compounds in order to prevent or delay the onset of chronic diseases. This work aims to study the carotenoid, vitamins and total folate content of the traditional foods from Black Sea Area countries (BSAC) that have been prioritised in the frame of the BaSeFood project.

Materials and methods. Carotenoids and vitamins A and E were quantified by ultra-high pressure liquid chromatography with diode array detection (DAD). In order to quantify L-ascorbic acid and vitamin B_2, samples were analysed by high-performance liquid chromatography with DAD and fluorescence detection, respectively. The total folate content in foods was carried out by a microbiological assay.

Results. From the analysed BSAC foods, 12 (43%) contained lycopene. The foods with highest lycopene content were watermelon juice, sautéed picked green beans and Ukrainian borsch (235 ± 19.9, 176 ± 48.3 and 166 ± 1.01 µg/100 g, respectively). Rodopian dried beans from the group of vegetable based foods presented the highest α-carotene content (167.8 ± 18.0 µg/100 g). Among the analysed traditional foods, 15 (54%) contained β-carotene. The highest β-carotene content (608 ± 52.4 µg/100 g) was found in plums jam, followed by kale soup (538 ± 51.4 µg/100 g). Vitamin C was quantified in only 5 of the analysed foods, with fruit of the evergreen cherry laurel (29.9 mg/100 g) having the highest content. The traditional food from BSAC with higher concentration in vitamins B_2, E and total folate was roasted sunflower seeds (0.19 ± 0.02 mg/100 g, 6.0 ± 0.99 mg/100 g and 113 µg/100 g, respectively). All results are given per 100 g of edible portion.

Conclusions. Despite the great variability on the content of carotenoids and vitamins, most of the analysed traditional foods from BSAC can be considered good sources of these health promoting compounds.

Acknowledgements. Research funded by EU FP7 grant number 227118 (‘BaSeFood’).
Comparison of the functional characteristics of rice and wheat bran fermented by lactic acid bacteria

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Introduction. Bran is an underutilized by-product of the milling process, generally discarded or used in animal feeding. However, it is a potential rich source of valuable health-promoting compounds, including phytochemicals and antioxidants, that can account for the benefits associated with the consumption of whole grain as the reduced incidence of certain chronic and inflammatory diseases (Min, 2011). The objective of this study was to evaluate and compare the exploitation of rice and wheat bran by enzymatic treatments and lactic acid bacteria (LAB) fermentation.

Materials and methods. Wheat and rice bran was subjected to a hydrolytic treatment with Driselase, a commercial cocktail of cell-wall degrading enzymes. The hydrolysates were then inoculated with different LAB as \textit{L. plantarum} and \textit{L. rhamnosus}. Fermentations were monitored by microbial viability of natural microflora and inoculated starters, volatile microbial metabolites (GC-MS/SPME) and chemical stability. Bran samples were then dehydrated and characterized in terms of total antioxidant capacity (TAC), total phenolic compounds (TPC), the presence of oxidized compounds (TBARS) and LAB viability.

Results. The enzyme-treated bran supported the growth of the LAB up to \(10^{8.9}\) CFU/g both for rice and wheat bran, while inhibited the natural occurring microflora. Concerning the lyophilized fermented bran, LAB maintained their viability at \(10^7\) CFU/g. Significant differences in the metabolic profiles were dependent on the bran type: wheat bran was characterized by the presence of lactones and pyrazines, whereas rice bran by the release of benzaldheyde. Before fermentation peroxidation products were higher in wheat than in rice bran, while after fermentation TBARS level increased in rice bran and decreased in wheat samples. The enzymatic treatment with Driselase enhanced wheat and rice bran TAC and TPC. Particularly, TAC increased after the fermentation with the LAB mixture.

Conclusions. The results of the microbiological, chemical and antioxidant analyses showed that both rice and wheat bran can be exploited by enzymatic treatment and LAB fermentation to produce stable and antioxidant food ingredients.

Acknowledgements. The research leading to these results has received funding from the European Community's Seventh Framework Programme (FP7/2007-2013) under grant agreement n. 245267, project NAMASTE.

Sweetening agents as functional components of food: the case of molasses

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Introduction. Molasses, the main byproduct of sugar production, is a rich source of phenolic compounds (Payet et al., 2006), whose possible role in the prevention of several chronic diseases involving oxidative stress has been reported (Scalbert et al., 2005), and macromolecules produced through the Maillard reaction during sugar processing, that have been reported to have antioxidant activities (Yilmaz and Toledo, 2005). The overall aim of this study was to evaluate the functional properties of molasses, focusing on its antioxidant properties in cultured cells.

Materials and methods. Sugar cane molasses (SCM) and sugar beet molasses (SBM) in vitro total antioxidant capacity (TAC) and phenolic composition were first determined, comparing the former to other commons sweeteners. Then, 10² and 10³ µg mL⁻¹ medium of SCM and SBM were supplemented to HepG2 cells. Protection from the oxidative damage induced by 0.2 mM H₂O₂ was assessed in control and supplemented cells by measuring viability, reduced glutathione and reactive oxygen species intracellular content, cytosolic TAC, lactate dehydrogenase release and thiobarbituric acid reactive substances content in the media. To compare the effect of molasses to a well-known antioxidant, analyses were performed also in cells supplemented with 20 µM α-tocopherol.

Results. Molasses evidenced a significant protective activity from the induced oxidative stress, this protection being dependent on the concentration used and greater for SCM than SBM. The higher biological effectiveness of SCM was in agreement with data on in vitro TAC and phenolic composition.

Conclusions. Our results underline the potential health effects of molasses, adding functional properties and nutritional value to a sweetening agent, and sustaining its use as refined sugar substitute. This could be particular important considering that high dietary sugar consumption is a causal factor of numerous health problems.

Acknowledgements. This work was partially supported by Optima Srl with a personal grant to VV and by the Italian Ministry of the Economic Development (MIAOVER50 project).

Are polyphenols found in plants from the black-sea region able to attenuate TNFα induced increases in adhesion molecules in endothelial cells?

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Introduction. Atherosclerosis is an inflammatory disease associated with increased expression of intracellular adhesion molecule-1 (ICAM-1) and vascular cell adhesion molecule-1 (VCAM-1) on the surface of endothelial cells. Previous studies have shown that isolated polyphenols (PP) and PP-rich diets can reduce the expression of adhesion molecules in cultured cell [1] and animal models [2]. We examined the ability of PP-rich extracts of plants from the Black Sea region (kale, dill, pomegranate and Sideritis scardica) for their ability to attenuate TNFα-induced increases in surface expression of ICAM-1 & VCAM-1 on human umbilical vein endothelial cells (HUVEC). We also examined the ability of the anthocyanins cyanidin-3-glucoside (Cy-3-Glc) and delphinidin-3-glucoside (Del-3-Glc), the anthocyanidins cyanidin (Cy) and delphinidin (Del) and their metabolites protocatechuic acid (PA) and gallic acid (GA) to modulate TNFα-induced expression of ICAM-1 & VCAM-1 in HUVEC.

Materials and methods. HUVECs were grown to confluence and pre-exposed to the extracts, Cy-3-G, Del-3-G, Cy, Del, GA or PA for 1 h before being treated with TNFα for 16 h. HUVEC were detached from the culture plates and expression of ICAM-1 and VCAM-1 on HUVEC cell surface was examined by flow cytometry. Quercetin, a flavonoid that has previously been shown to effectively inhibit TNFα-induced increases in ICAM-1 and VCAM-1 in HUVECS [1], was included as a positive control.

Results. Quercetin (10 µM) substantially reduced cell surface expression of both ICAM-1 and VCAM-1 in TNFα-treated cells (59% and 79%, respectively; p<0.001). But, there were no significant changes in ICAM-1 or VCAM-1 expression in TNFα-treated HUVECs by any of the 4 plant extracts or isolated phenolics tested.

Conclusions. The data presented here show that it is unlikely that the potential cardiovascular health benefits associated with consumption of these plant foods or anthocyanins are caused by reductions in the expression of cell-adhesion molecules on vascular endothelial cells. This is somewhat surprising in the context of data from previous reports demonstrating polyphenol reductions in cell adhesion molecules expressions.

Acknowledgments. This research was funded by EU FP7 grant number 227118 (‘BaSeFood’) and the Biotechnology and Biological Sciences Research Council (UK).

Compounds and mechanisms responsible for the in vitro release of nitric oxide in endothelial cells treated with a phenolic-rich pomegranate extract

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Introduction. There are numerous reports of the beneficial effects of polyphenols on cardiovascular health when they are consumed in the diet [1]. Pomegranates are polyphenol (PP)-rich fruits widely consumed as fresh fruit and juices and there is accumulating evidence of the benefits of consuming pomegranate PP on human health [2]. Consumption of pomegranate has been shown to improve flow-mediated dilation of the brachial artery (a measure of nitric oxide-dependent endothelial function) [3]. But, the compounds responsible and the mechanisms are not known.

Materials and methods. A bioactive-rich pomegranate extract (PE) was prepared using 70% aq. MeOH and fruit sourced from Georgia. Human umbilical vein endothelial cells (HUVECs) were treated with the PE and effects on phosphorylation of Akt and eNOS, total eNOS protein and secreted endothelin-1 (ET-1) protein were quantified by ELISA or western blotting. Activity-guided fractionation in combination with LC-MS analyses were used to identify the compounds responsible for bioactivity of the PE. The molecular signalling events associated with bioactivity were investigated using (1) an antibody microarray spotted with antibodies complementary for a selection of receptor tyrosine kinases (RTK) that lie upstream of the Akt/eNOS pathway and (2) western blot and enzyme activity assays to determine effects on the phosphatase PTEN (which suppresses activation of Akt and eNOS).

Results. The PE induced phosphorylation of both Akt and its substrate eNOS after short incubations (<1 h), while 24 h treatments reduced intracellular eNOS protein and secreted ET-1. By fractionating the PE, it was shown that the procyanidins in pomegranate (but not anthocyanins or ellagitannins) were responsible for the phosphorylation of Akt/eNOS. The PE was largely ineffective in altering phosphorylation of any of the RTKs. No changes to PTEN phosphorylation or ubiquitination were observed, although PTEN protein decreased after 24 hours. Procyanidins were able to directly inhibit purified PTEN, but no reduction in PTEN activity was observed in 30-minute PE-treated cells.

Conclusions. These data show that the strong PE and procyanidin-induced activation of Akt and eNOS is not due to a direct interaction with one or more RTKs. It has also been demonstrated that the induction of pAKT is not mediated by a rapid inhibition of PTEN activity. Further research is required to establish the mechanisms responsible for activation of Akt and eNOS by pomegranate bioactives.

Acknowledgements. The authors thank Ana B. Lopez for providing the isolated procyanidin tetramer. This research was funded by EU FP7 grant number 227118 (‘BaSeFood’) and the BBSRC, UK.

Chemical composition of essential oil of some local Bulgarian culinary spices

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Materials and methods. Toluene extract is obtained through water distillation on British Pharmacopoeia Aparatus, modified by Balinova and Diakov; 120 min. Chemical composition of essential oils is determined by GC/MS analysis – apparatus Agilent 7890А supplied with a mass detector 5975 C, column HP – 5 MS (30m x 250 µm; film 0.25 µm); temperature conditions: 30 ºC for 3 min, then 5ºC/min to 250ºC for 3 min, total 49 min (for C. balsamita - 40 ºC /3 min, 5ºC/min to 300ºC for 5 min, total 60 min); carrier helium gas flow 1.0 ml/min; split ratio 5:1 (A. bulgaricum and C. balsamita); 10:1 (A. ursinum); 30:1 (A. graveolens).

Results. Essential oil of A. bulgaricum is characterized with 14 identified components (40.89 % of the total composition): 4 of which are above 1% - ethyl benzoate – 1.29%; thioctic acid – 1.14%; benzoaldehyde – 1.13%; 3,5-Disopropyl-1,2,4-trithiolane – 1.12%; and 10 are below 1%. In A. ursinum L. essential oil 15 components have been identified, 6 of which – below 1%. The sulfide compounds predominate (36.75%): diallyl disulfide - 8.81%; methyl 2-propenyl disulfide – 6.83%; diallyl trisulfide – 6.73%; methyl 2-propenyl trisulphide – 6.63%; dimethyl trisulfide – 1.66%; methyl 1-propenyl disulfide– 1.38%; diallyl tetrasulfide – 1.19%; dimethyl disulfide – 0.96%; di-1-propenyl trisulfide – 0.94%; di-2-propenyl trisulfide – 0.86%; dimethyl tetrasulfide – 0.76%. In the A. graveolens essential oil 20 components have been identified (98.37 % of the total composition), 9 of which are above 1% and 11 are below 1%. The terpenes are predominant. The highest in the composition are: α-Limonene - 23.74%; carvone - 34.87%; p-cymene 8.79%; trans-Dihydrocarvone - 7.42%; hexahydrofarnesyl acetone - 6.40%, 3,6-Dimethyl-2,3,3a,4,5,7a-hexahydrobenzofuran - 6.03%. The richest in identified compounds is the essential oil of C. balsamita - 41 components, 15 of which are above 1%. Considerable is the amount of carvone- 47.81%, followed by α-thujone- 12.56%, B germacrene- 5.23%, Benzaldehyde- 3.96%, D germacrene- 3.13%, D limonene- 2.54%, α cadinol- 2.37, β bisabolene- 1.73%, trans-p-Mentha-2,8-dienol- 1.73%, m-Xylene- 1.72%, Apiol- 1.57%, Farnesol- 1.45%, α murolol- 1.33%, eucalyptol 1.31%.

Conclusions. The identification of A. ursinum, A. bulgaricum, A. graveolens, C. balsamita essential oil chemical composition contributes to better understanding of the functional properties and beneficial effect on health of the studied local spices and their application in culinary products or natural medicine purposes.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
Food sensory characteristics of traditional Bulgarian fermented beverages based on wild fruits

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Introduction. The study aims at development of sensory profiles of a fermented lingonberry beverage “ljuto”, made by traditional [L1] and modified technology ([L2] – with 8% sugar in the media and [L3] - with 8% sugar and yeast) to enhance the fermentation process and better preserve biologically active components.

Materials and methods. The research investigated the perceived difference between the new varieties of “ljuto” and the traditional beverage through quantitative sensory descriptive profiles of the three lingonbery fermented beverage samples. Juices are evaluated by a group of trained food beverage sensory experts. Each panelist tested the product and gave “descriptors”, that are put together, and screened to develop a precise lexicon, ensuring that all of the panelists will make the observations in a uniform manner. A vocabulary, that describes the specific characteristics of traditional beverage “ljuto” made by 5 informants from Velingrada and Dospat, where the beverage is still traditionally produced, is considered also. The coded samples are presented, in a different order for each trained panelist. The level of differentiation of L2 and L3 from the traditional beverage is evaluated on the basis of appearance, taste, flavour, and colour profiles. Hunter L,a,b and CIE Lab L*,a*,b* Colour characteristics are defined by the method of Gardner on colorimeter Colorgard 2000, BYK – Gardner Inc. (L –intensity, brightness; L=0 - black, L=100 – white; +a - red, -a – green; +b - yellow, - b - blue). Hedonic scale is used to evaluate the rate of acceptance of the three samples by randomly chosen 88 respondents at a supermarket in Plovdiv on the principle of volunteering. Multiple comparison test by the method of Scheffe is run. Statistic analysis of data is performed, using ANOVA.

Results. The respondents are rather indifferent to traditional “ljuto” beverage (average level of acceptance [AVA] - 5.6), probably due to the fact that few of the respondents are acquainted with the beverage (only 9% have tried it before). Sample [L2], being sweeter, is better accepted (AVA – 6.7). Sample [L3] is characterized with high level of disapproval (AVA – 3.9). Linear correlation between sensory and instrumental analysis of colour characteristics (r=0.8910) there exists.

Conclusions. There is statistically significant difference perceived by the respondents between Sample [L3] and the traditional “ljuto” (P<0.05) while Sample [L2] and [L1] are difficult to be distinguished.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
Content comparison of a natural antioxidant, trans-resveratrol, in a traditional grape-based beverage “hardaliye” and other grape-derived products

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Introduction. Resveratrol is a type of phenolic compound mainly found in grapes and grape products. In animal and human studies, cancer prevention, cardioprotective, and anti-inflammatory effects of resveratrol have been reported. Hardaliye is a fermented grape based traditional beverage mainly consumed in Thrace region in Turkey and produced by the fermentation of raw grapes with addition of mustard seeds and sour cherry leaves. It is reported that trans-resveratrol in wine may have an important role to reduce the risk of heart diseases. The purpose of this pilot-study was to determine trans-resveratrol content of hardaliye samples and compare with the composition of other grape-based beverages.

Materials and methods. Two types of hardaliye were sampled from Kırklareli distinct in Turkey from the production of autumn 2011-2012 and mixed to provide 2 composite samples. trans-Resveratrol profiles of composite samples were determined by using high-pressure liquid chromatography (HPLC) with UV detection. The trans-resveratrol data of other grape-based beverages were provided from scientific literature with a compilation process according to EuroFIR (Network of Excellence, FOOD-CT-2005-513944) quality index guidelines.

Results. The different contents of resveratrol were described previously in wines and grape juices. Hardaliye had an average trans-resveratrol level of 1.90 mg/L (0.25-0.09 mg/L; n=2), in between the trans-resveratrol levels of red and white wine varieties (0.01-36.13 mg/L; n=123) and red grape juice (0.09-1.09 mg/L; n=8). trans-Resveratrol contents of white grape juice (0.03-0.019 mg/L; n=20) were lower than the trans-resveratrol concentrations of hardaliye, wine and red grape juice.

Conclusions. Resveratrol content of hardaliye was similar to the resveratrol content in wines and red grape juice. Thus, hardaliye may be considered as an alternative dietary source to wine for achieving the beneficial health effect of resveratrol. Further investigations could direct to determine the trans-resveratrol contents of hardaliye, and to include the contents of such phenolic compounds of particular traditional foods in food composition databases.

Acknowledgements. The study has been funded by Trakya Development Agency. We give special thanks to Prof. Beraat Özçelik (Istanbul Technical University) for her analytical support to the study.

Ampelographic and chemical characterization of local grapes for ‘saba’ and ‘agresto’ in Reggio Emilia and Modena (Northern Italy)

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Introduction. ‘Saba’ and ‘agresto’ are traditional Italian products both based on unfermented grape juices, that are concentrated by heating. Anyway, they have opposite taste, functions, and history. Grapes are, in fact, harvested at different stages of maturation: green for ‘agresto’, which is extremely sour and represents the ancient alternative to vinegar; at the end of berry maturation for ‘saba’, which is extremely sweet and is used as a sweetener provided with pleasant caramelization flavors in drinks, to garnish sweets, and to season meat and cheese dishes. In Emilia Romagna, both have been produced for centuries, but currently ‘saba’ is still cooked at home and manufactured in small firms, whereas the memory of ‘agresto’ has been locally almost lost and the attempts to resume it have just begun.

Within the framework of the Italian Ager project “An Italian Vitis database with multidisciplinary approach for exploitation and valorization of the regional genotypes”, a survey on grapevine cultivars (cvs) used for ‘saba’ and ‘agresto’ is in progress.

Materials and methods. Knowledge on raw material and uses has been documented by references and interviews to farmers and manufacturers. Grapes of the cultivars used have been sampled in the collection (ITA Zanelli, Reggio Emilia) and characterized by means of ampelographic descriptors, physico-chemical parameters (°Brix, pH, and titratable acidity), total anthocyanin and flavonoid content and main anthocyanin percentage content of red cvs.

Results. Several ancient autochthonous cultivars widely cultivated in the area or with minor diffusion are currently used for ‘saba’, with differences depending on local availability and consumer preferences: in Modena the white grapes Trebbiano di Spagna and Trebbiano modenese, besides the red Lambrusco salamino, Sorbara; in Reggio Emilia, the red Ancellotta, several Lambrusco (salamino, grasparossa) besides the white Spergola. The ancient use of cvs Lugliatica (‘ladga’) and Uva Tosca for making ‘agresto’ has been documented. Degrees Brix, anthocyanins content, and level of titratable acidity differ among cvs and may affect the final quality of ‘saba’: an example is the tasty ‘saba’ of the acidic L. salamino and L. di Sorbara.

Conclusions. The tradition of ‘saba’ is well preserved in the areas of Modena and Reggio Emilia and the effects of morphological and chemical differences among cultivars on sensory quality of the products deserves a more deep analysis. ‘Agresto’ is currently an almost forgotten traditional product, for the recovery of which a more detailed investigation on raw material and processing systems seem appropriate.

Acknowledgements. Research funded by AGER project n° 2010-2014.
Sensory evaluation of edible flowers of wild Allium species used as food in local traditions in Italy

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Introduction. The use of edible flowers is reported since long times in several culinary traditions. The use of some flowers is very popular: in Italy, the most widely employed are courgette male flowers, employed as ingredients in quite a number of dishes, whereas acacia and elder tree flowers are the more widely wild types used in popular traditions. Some restaurants make use of a wider range of flowers, but often only with ornamental purposes. Besides this, however, several flowers can add particular tastes to dishes. The leaves and bulbs of some wild Allium species are used in popular food traditions in Italy. This contribution was aimed at exploring the acceptance of their flowers taste and appearance, and possibilities of use.

Materials and methods. Flowers of Allium triquetrum L., A. roseum L., A. neapolitanum Cirillo were harvested at full bloom, in the Liguria and Emilia-Romagna regions, and preserved at +4 °C until sensory analysed. Sensory analyses were carried out by an internal panel of the Campus of Food Science, Cesena. The flowers were rated for visual, olfactory and gustative acceptance. Besides that, after focus group sessions, the panellist also expressed their perceptions of additional flavour notes, their opinion about the best potential use as food ingredients, and their general knowledge and willingness to try edible flowers.

Results. Panellists expressed a high knowledge and willingness to try edible flowers as food components. A. roseum and A. neapolitanum were rated higher with respect to visual appearance, whereas gustative / olfactory acceptance decreased in the order: A roseum, A. triquetrum and A. neapolitanum. The lower sensory acceptance of A. neapolitanum was associated with a less pronounced garlic and onion flavour and with the perception of sweetish and herbaceous notes. The foods with which Allium flowers were indicated as potentially favourably associated were salads, second courses and side dishes.

Conclusions. As a whole, the flowers of the species considered obtained high visual and sensory acceptance ratings. The panellists expressed a high appreciation for the unexpected strong taste of flowers, although coupled with typical sweet notes. Considering that all Allium species and plant parts are edible, no safety concern should raise from Allium flower consumption. A more widespread use should therefore mainly depend on the acquiring of a consumption habit and on supply, that is presently limited to wild sources, with strong seasonality, restricting availability to few days a year.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
Comparison of leafy kale populations for their bioactive compound content: phenolics, glucosinolates, carotenoids, and chlorophylls

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Introduction. Kales represent leafy forms and primitive types of Brassica oleracea L. They are traditional crops of several European areas (Italy, Netherlands, Portugal, Scotland, Spain, Turkey), rooted in local farming and food systems, and employed in the preparation of traditional dishes. Owing to similar aspects in their utilisation, kales appear a proper subject for a cross-country comparison. Furthermore, kales have gained increased attention due to their high content of healthy phytochemicals such as carotenoids, glucosinolates (GLS) and phenolics. The present investigation is aimed to compare different kale populations, either from local sources or cultivated in a common environment, for their bioactive amounts.

Materials and methods. 25 kale samples were sampled from Italian, Portuguese, and Turkish local crops or markets. For the experimental trial, 15 kale seed samples were obtained from local seed companies or farmers, and planted in nursery. The plants were transplanted in a field located in Cesena (Italy). After freeze-drying, bioactives were extracted by proper solvent systems, quantified by HPLC, and identified by HPLC-mass spectrometry or standard compounds.

Results. Total phenolics, GLS, carotenoids (lutein and beta-carotene), and chlorophylls were in the range 8310-38110, 755-8580, 135-2354, and 1740-16924 mg kg$^{-1}$ d.m., respectively. Growing environment did not consistently influence phenolic content. Both local and experimental Portuguese samples showed higher phenolic levels in comparison to those determined in Italian and Turkish kales. A high variability was noticed within local populations. Even in case of GLS, a remarkable variability was assessed in local populations and higher amounts of these bioactives were determined in Portuguese kales in comparison to Italian and Turkish samples. Aliphatic GLS accounted for 60 and 40% of total GLS in experimental and local Portuguese kales, respectively, whereas indolic GLS were mainly quantified in Italian and Turkish populations. Local samples showed a total GLS amount about twice higher in comparison to experimental populations having the same geographical origin. On the contrary, pigments were significantly more abundant in experimental samples in comparison to local kales, owing to the higher soil fertility level.

Conclusions. The first cross-country comparison of local kale types has been carried out as regards phytochemical amounts. Geographical origin and growing environment appeared as significant factors in determining bioactive levels in leafy kales and then nutritional and sensorial attributes of plants.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
Characterization and quantification of bioactive compounds in primitive wheat populations

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Introduction. The term of “primitive wheats” refers to ancient forms of cultivated wheat species (genus Triticum) that have been replaced, in modern agriculture, by varieties obtained by breeding. Their production survived in several areas of Western Europe where there is considerable interest in the consumption of ancient wheats, especially in organic, specialty, and health food markets. The main species that have been considered during the present work are three hulled wheats, retaining the glume after threshing: einkorn (Triticum monococcum L.) and emmer (Triticum turgidum subsp. dicoccum (Schrank ex Schubler) Thell), together with some other hulled and free threshing primitive wheat genotypes.

Materials and methods. 27 accessions from Armenia, Bulgaria, Georgia, Italy and Turkey, together with 4 commercial durum and bread wheat varieties used as controls, were considered. The analytical samples were obtained from a field experiment conducted in Bologna, under homogeneous environmental conditions, on autumn and spring sowings, to discriminate between winter and spring habit populations. Grain yield and dry matter content were preliminarily calculated. Lipids were extracted by a chloroform/methanol mixture and on this fraction were analyzed: tocols, carotenoids and sterols. Free and bound phenolics were determined.

Results. Lipid content ranged from 1.80 to 2.85 g/100 g d.m. (dry matter), slightly higher in the case of the spring sowing. Total tocol content ranged between 26.6-72.8 mg/kg d.m., with T. dicoccum showing the lower tocotrienol/tocopherol ratio (<2). Lutein resulted the most abundant carotenoid in all the samples (73-78 %) and the sum of this class of bioactives ranged between 1.70-8.48 mg/kg d.m. The total of sterols was higher than 500 mg/kg d.m., except for one commercial type of T. aestivum. In all cases, the bound phenolic fraction contributed to the total phenolic content more than 60%.

Conclusions. The present research represents a further contribution to the available literature of the analytical composition of primitive wheats, including, for the first time, the complete range of relevant bioactives. T. monococcum and T. durum had the highest level of carotenoids. For T. monococcum we obtained the lowest sum of free phenolic compounds, for which the ratio between bound and free phenolic compounds resulted the highest.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
Biologically active components in Bulgarian traditional foods with pumpkin (*Cucurbita moschata*)

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**Introduction.** Health awareness raises attention to products, rich in carotenoids, due to their role both as pro-vitamins and antioxidants. Pumpkin is a basic ingredient of a variety of traditional Bulgarian foods: salads; soups; stews; jams, marmalades; “tikvenik” (layers of pastry, stuffed with pumpkin); tarhana; purees, mashed; and juices. The fruit is boiled, fried, stewed or baked. The paper aims at characterising pumpkin composition, in relation traditional ways of utilization in the Bulgarian diet, thus enriching the existing European practices and healthy diet options.

**Materials and methods.** Carotenoids are separated on a C-30 reversed-phase column and are characterised by HPLC-DAD by the method of Kurts at al. (2008), modified by Obreshkov et al. (2011). Total carotenoids are determined according to the method described by Dini et al. (2010) and the half-life values are calculated as proposed by Herbach et al. (2006). Neutral monosaccharides of the hydrolysed alcohol-insoluble residue and water-extractable monosaccharides are analysed using high-performance anion-exchange chromatography with pulsed amperometric detection (HPAEC-PAD). The IFU method is followed for the total pectin content determination using m-phenylphenol instead of carbazole and the results are expressed as anhydrogalacturonic acid equivalents. Helios Omega UV-Vis spectrophotometer, equipped with VISION/lite and ColorCalc Basic softwares (Thermo Fisher Scientific, Madison, WI, USA), using 1 cm path length cuvettes is used. For the colour analysis, visible spectra from 380 to 780 nm are recorded in a transmittance mode. Bioactive and nutritional components of pumpkin (*Cucurbita moschata* Duch., cv. Muskatna 51-17) and the effect of heating on them are studied.

**Results.** Seven carotenoids and carotenoid esters are indentified: lutein (2,97%); 13-cis-β-carotene (3,97%); a-carotene (29.48%); all-trans-β-carotene (33.01%); 9-cis-β-Carotene (2,71%); lutein-di-laurate (16,36%); lutein-laurate-myristate (11,5%). The total β-carotene content in the pumpkin is 307,22µg/100 g. Trans-β-carotene is 256,11 µg/100 g, while 13-cis-β-carotene is 24,59 µg/100 g . Heating resulted in a reduction of the total carotenoids most significantly after 2h of treatment. Stability of total carotenoids is evaluated through their half-degradation time (4,7 h; R²=0,98). Linear correlation is observed between colour characteristics and total carotene content (Rc²=0,9987; Rc²=0,9712). The total pectin content is determined. Baseline separation of five monosaccharides, including xylose and mannose, is achieved. Glucose accounts for approximately 80 % of the total content of individual monosaccharides, followed by galactose (10 %) and arabinose (5 %).

**Conclusions.** The study on biologically active components of the most used variety of pumpkin, will help in better preservation of Bulgarian traditional foods.

**Acknowledgements.** Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
Analytical characterisation of oilseed raw materials used in production of tahin and halva

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Introduction. Halva is one of the oldest traditional desserts in the Middle East and the Black Sea Area; in its oilseed variant, it is usually made mixing sugar with sesame paste (tahin) Virtually any oilseeds or fatty nuts is adequate to manufacture tahin, and sunflower is mostly used in several countries. Within BaSeFood project some oilseed crops and nuts used in the preparation of halva were sampled and analytically characterised with respect of their bioactive compound content and oxidative quality.

Materials and methods. The experimental raw materials used in production of tahin and halva, were represented by seven different oilseeds (peanuts, almonds, walnuts, hazelnuts, sesame seeds, sunflower seeds and pumpkin seeds) and were supplied by UFT, Bulgaria. Samples were characterised for their lipidic (fatty acids, sterols, tocopherols) and phenolic compounds (polyphenols). Besides, the oxidative status (peroxide value, conjugated diens and triens) and antioxidant capacity (ABTS•+ radical cation assay) of all the seeds were evaluated.

Results. All oilseeds and nuts were characterised by a prevalence of mono and di-unsaturated fatty acids, with oleic and linoleic acid as predominant and linolenic acid present only in walnuts. Sterols and tocols were more abundant in sesame seeds, followed by sunflowers. Nevertheless, β-sitosterol was detected as the most abundant sterol in all samples; peanuts, almonds, hazelnuts and sunflower seeds reported high percentage of α-tocopherol, whereas walnuts and pumpkins had γ-tocopherol as predominant compound. Sesame had different tocol profile, with the prevalence of tocotrienols. Walnuts were by far the richest source of phenolics, followed by sunflowers and peanuts. The same results were also obtained for the ABTS assay, with very high antioxidant activity for walnuts, sunflower seeds and peanuts. Some of the seeds analysed were characterised by high oxidative stress, such as pumpkin seeds with values above the legal limit established for food lipids.

Conclusions. For the oilseed samples analysed in this study, no intra specific variation was explored. However, this work gave a further contribution to the characterisation of the materials considered, that is a pre-requisite for determination of the evolution of these substances during food preparation and processing. Besides, these results allow to stress the importance of monitoring the oxidative status of raw materials to be used for further processing.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
Identification of phenolic and glucosinolate bioactives in kale, dill, annual nettle (Urtica urens), Sideritis scardica, persimmon and pomegranate from the Black Sea region using LC-DAD-MS


Background. Dill, nettle, kale, Sideritis scardica (‘Mountain tea’), persimmon and pomegranate are bioactive-rich plants consumed whole or as ingredients in traditional foods typical of the Black Sea region. It is important to know the composition of bioactives in these plants in order to define the role of bioactives in conferring potentially beneficial effects of these plants on human health.

Methods. Representative samples of the six fruits, vegetables and herb were collected from defined locations in the Black Sea region. Bioactive-rich extracts were obtained from freeze-dried plant material using 70% methanol and the methanolic extracts were analysed using HPLC-DAD-MS [1]. The general strategy for the characterisation of unknown phenolic compounds in the 6 plant extracts included use of the following information: (1) UV-visible spectra, (2) determination of molecular ions using positive and negative polarity mass spectra supported by the presence of adducts generated by the solvent/sodium and by molecular complexes, (3) available literature data for these plants and their bioactives.

Results. The following bioactive compound types were identified for each respective plant extract: Dill - 2 phenolic acids and 9 flavonols; Nettle - 6 phenolic acids, 6 flavonols and 3 anthocyanins; Persimmon - 4 phenolic acids, 5 flavonols, 2 flavan-3-ols and 3 flavan-3-ol oligomeric derivatives; Sideritis scardica - 3 phenolic acids, 5 phenylethanoid glucosides and 16 flavonoids; Pomegranate – ellagic acid, 2 ellagitannins, 6 anthocyanins and 1 flavan-3-ol; Kale - 9 phenolic acids, 21 flavonols and 8 glucosinolates.

Conclusions. HPLC-DAD-MS techniques and the strategy described above were successfully used for the identification of both known and previously unknown phenolic acids, flavones, flavonoids, flavan-3-ols, anthocyanidins, and glucosinolates in extracts of plants typical of the Black Sea region and widely used as ingredients in traditional foods.

Acknowledgement. This research was funded by EU FP7 grant number 227118 (‘BaSeFood’) and the Biotechnology & Biological Sciences Research Council, UK.

Antibacterial activity of some local Bulgarian culinary spices

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Introduction. Two local wild herbs, grown in Bulgaria - “levurda”, ramsons (Allium ursinum L.,) and “samardala” (Nectaroscordum siculum Lindl. Nectaroscordum siculum ssp. bulgaricum (Janka) Stearn, syn.(Allium bulgaricum), have been studied for their antibacterial activity against two Gram (+), and two Gram (-) pathogenic bacteria.

Materials and methods. “Levurda”, known as wild garlic, bear’s garlic, has been collected from the area of Rodopa mountain, town of Krichim. It is used fresh in salads, mixed with dairy products or cooked. “Samardala” is growing along the Black Sea cost (the region of Varna, Strandja), eastern part of Sterdna Gora and in Central and Eastern Stara Planina. It has been collected in the Stara Zagora area. Antibacterial activity of Allium ursinum and Allium bulgaricum is studied against Listeria monocytogenes NCTC 11994, Staphylococcus aureus ATCC 25933, Escherichia coli ATCC 8739, and Salmonella enterica subsp. Enterica serovar Abony NCTC 6017. The media are prepared according to the standards, inoculated with 24-hour suspension of the corresponding bacteria (concentration over over 10^6 CFU/ml). A modified method of Tagg and McGiven is applied to measure the zone of the pathogen’s growth inhibition around the spots of tissue liquids, obtained from fresh leaves of the spices. Gas chromatography-mass spectrometry (GC-MS) analyses are used for chemical composition study of Allium ursinum and Allium bulgaricum extracts.

Results. Both spices shoved inhibition activity against the two Gram (+), and two Gram (-) pathogenic bacteria. The inhibition zones [mm], produced by 0,12 ml tissue liquid of levurda against the respective pathogens were 38/38/14/14 in diameter, whilst inhibition zone of samardala were 38/20/10/12 in diameter. The stronger inhibitor was levurda. The study on the chemical composition of the fresh leaves of Allium ursinum and Allium bulgaricum shows high concentration of sulphur containing compounds, prevailing for Allium ursinum.

Conclusions. Both spices shoved inhibition activity against the studied pathogens. The stronger inhibitor was levurda. We consider the higher antibacterial activity of volatile oil of levurda oil is due to the prevalence of sulfur-containing compounds. These spices could be used in the food industry as natural preservatives.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
Flavonol content and biometrical traits as a tool for the characterization of “Cipolla di Giarratana”, a traditional Sicilian onion landrace

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Introduction. We investigated agronomical, morphological and biochemical characteristics of ‘Cipolla di Giarratana’, a locally cultivated traditional onion landrace, which is listed as an item in the ‘List of Traditional Agro-food Products’ of the Italian Department for Agriculture and itemized as ‘slow food presidium’ by the Slow Food Foundation.

Materials and methods. In order to typify this landrace, nine onion accessions were grown in five experimental fields: two located in the area where this population is traditionally cultivated, two in different areas with similar average altitude, and one in the South East coast of Sicily. Two onion cultivars were adopted as control. High-performance liquid chromatography coupled with diode array detection and electron spray-mass spectrometry (HPLC/DAD/ESI-MS) was used to identify the phenolic profile and quantify phenolic content in bulbs.

Results. Ten different flavonols were identified in ‘Cipolla di Giarratana’, with quercetin (Q), quercetin 3,4’ di-O-glucoside (Q 3,4’ DIGLC) and quercetin 4’-O-glucoside (Q 4’GLC) detected as major components. Differences in term of total and individual flavonol content were ascertained between ‘Cipolla di Giarratana’ accessions (not differentiated between them) and the two control cultivars, where a very low total phenolic content has been detected. The ‘Cipolla di Giarratana’ landrace showed a high values of bulb diameter (11.8±1.5 cm) and weight (502±155 g), and no statistical differences emerged within accessions.

Conclusions. Assuming that the phenolic profile could represent a powerful tool to assess genetic variability, this research allows to achieve useful data when characterization is addressed to obtain protection of geographical indications (PGI) or protection of designation of origin (PDO).

Acknowledgements. The experimental activities were financial supported by the Local Government of Giarratana and technically supported by the “Associazione Cipolla di Giarratana”. The authors are grateful to Ms Chiara Ippolito for her skilful technical assistance.
Investigations of polycyclic A hydrogencarbonate levels in traditional smoked fish and meat

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Introduction. Smoking is one of the oldest technologies for the conservation of meat and fish products. Today it is supposed that this technology is applied in many forms to treat 40-60% of the total amount of meat products and 15% of fish. Smoke not only gives special taste, colour and aroma to food, but also enhances preservation due to the dehydrating, bactericidal and antioxidant properties of smoke. It has been concluded that benzo(a)pyrene is a probable human carcinogen. One significant source of BaP in the human food chain is smoking of meat. Therefore the aim of our investigation was to determine the contents of BaP in industrially smoked different fish and meat products. Results were summarized and compared with maximum acceptable levels set by European Commission regulation (EC) No 1881/2006

Materials and methods. Fourteen different smoked fish and twenty-four meat products samples were taken and packing according to the sampling procedure. Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene and chrysene (PAH4) content in the studied samples were determined. The results obtained in this application were all performed on Waters HPLC system consisting of the Waters 2695 separations module, Waters 2998 Photodiode Array detector, Column: ZORBAX Eclipse PAH, 4.6 mm × 150 mm, 3.5 µm.

Results. The sum PAH4 was the highest 2.09µgkg-1 in hot-smoked fish samples and the lowest – 0.34µgkg-1 in cold smoked saples. The highest content of BaP was detected in a breakfast ham (4.05µg.kg-1) but the lowest BaP content was detected in smoked pork chop (0.11µg.kg-1).

Conclusions. Smoke not only gives special taste, colour and aroma to food, but also enhances preservation due to the dehydrating, bactericidal and antioxidant properties of smoke. This study clearly demonstrates that the production of smoked fish and meat products with BaP levels less than maximum acceptable possible in non-intensively smoked products.
Development of new tahini based products, enriched with biologically active components from local plants

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Introduction. Tahini is a traditional product, mainly used in the production of halva. The paper presents preliminary results on new application of traditional tahini, that will give possibility for better utilisation and popularisation of the product for healthier diet. Two groups of products are developed: paste type (spreads) and bakery.

Materials and methods. Sponge cakes (95 g) are prepared following a traditional technology and formulation with peanut and sunflower tahini. Tahini pastes are mixed with a mash of fresh local plants samardala (Allium bulgaricum), bear’s garlic (levurda, Allium ursinum L.) and jam of rose petals (Rosa Damascena Mill). Four types of tahini (sunflower, almond, hazelnut, walnut) are used. The best ratio tahini/plant paste is chosen on the basis of acceptance test with 12 panellist. Rheological properties are studied on "Brookfield" RV-DV II + Pro viscosimeter. Stability characteristics are analysed through baricentral method. Physicochemical characteristics (specific gravity, volume, porosity, specific volume, water-absorbing capacity, shrinkage, springiness, moisture, ash, pH) are studied by standard methods. Descriptive test for quantitative sensory profiling (ISO 6564 and ISO 6658) is applied to characterise the textural sensory characteristics (shape, colour, cells size and uniformity, odour, sweetness, aftertaste, crumb tenderness) of the sponge cakes, 6 hours after baking. Egg yolk is replaced with 15 and 30 %tahini.

Results. The cake with tahini has less elasticity, less softness of the crumb, and the structure is stable at high loads most markedly expressed with the sample with 30% peanut tahini (54.80 ± 8.23 PU). The cake with 15% peanut tahini has higher water absorption capacity (367,20 ± 1,92%).

The cakes with tahini have light brown crust and crumb with darker shades of yellow and light brown. The color of the sponge cake with 15% peanut tahini is most preferred. The cake with 30% sunflower tahini has the sweetest flavor. The behaviour of the products is pseudo-plastic.

Best correlation between sensory analysis and rheological properties and stability characteristics of the pastes are registered for walnut tahini with 20% “levurda” and sunflower tahini with 10% samardala. Best matching of the taste of the rose jam and tahini is observed for walnut and almond tahini at 20% rose jam, which have shown best stability and rheological characteristics.

Conclusions. Culinary application of the new products are suggested, that can be used to update the food service facilities menus with healthy and interesting products.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
Effect of processing on some biologically active components in selected Bulgarian traditional foods

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Introduction. The arising health concern and the nutritional and bioactive characteristics of oleaginous nuts and seeds make tahini an interesting product for the wellbeing diet.

Materials and methods. The technological scheme for production of tahini involves cleaning of the seeds, separation of the nut from the husk, roasting, cooling and grinding of the nuts to a tahini mass. On the basis of two factor mathematical analysis the effect of temperature and duration of heating is studied. Samples are heated at 100°C, 120°C, 140°C for 2 hours, taking samples at every 30 min. The total oil content is determined by Soxhlet extraction using diethyl ether for 8 hours. The extracted oils are later on dried and weighted to constant weight. Oil content is counted to dry sample. The oils are analyzed for acid, peroxide values in compliance to ISO standards. Fatty acid composition is investigated by gasliquid capillary chromatography of their methyl esters. The esterification was carried out by Metcalfe and Wang (1981) technique. Methyl esters were purified by thin-layer chromatography on plates, covered with 0.25 mm Silicagel 60 G “Merck” and mobile phase n-hexane:diethyl ether 97:3. Determination is accomplished on a Pay Unicam 304 unit, provided with flame-ionisation detector, 30 mm capillar column "Innowax" impregnation and conditions: column temperature 165°C to 225°C, with a change 4°C/min, detector temperature 300°C, gas-carrier (N2). Oxidative stability is measured by Rancimat 679 unit at 100°C and air 20 l/h. Tocopherols are analysed directly in the oil by HPLC with fluorescence detection (15). “Merck-Hitachi” unit fitted with column "Nucleosil" Si 50-5 250x4 mm and fluorescent detector "Merck-Hitachi" F 1000 was used. The operating conditions are as follows: excitation 295nm, emission 330 nm, mobile phase n-hexane : dioxan 94:4, rate of mobile phase 1 cm3/min. The peaks are identified and quantified using authentic individual tocopherols.

Results. Technological parameters of roasting – temperatures and duration of heating effect the sensory and technological properties of the seeds. Significant changes are observed in the taste, colour and friable characteristics.

Conclusions. The study on the changes of the bioactive, and nutritional components contribute for improvement of the process of production of tahini and halva.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
Study on traditional Bulgarian wild fruits fermented beverages

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Introduction. “Ljuto” is a traditional Bulgarian beverage, produced of wild fruits through a process of fermentation. Wild lingonberries (Vaccinium vitis-idaea) are collected in the area of Velingrad. The traditional method of preparation of “ljuto” is recorded in Rakitovo and Dospat. It is reproduced at laboratory conditions at UFT. The effect of technological parameters on the biological activity of the beverage is studied.

Materials and methods. Total polyphenols are determined according to the method of Singleton & Rossi with Folin-Ciocalteu's reagent; anthocyanins - by pH differential method; bioflavonoids and Vit. C - by HPLC on a Merck- Hitachi (Elite La Chrom) instrument equipped with 250 mm x 4.6 mm column Merck Darmstadt, Germany, and Diode Array detector; total sugars - by the method of Shoorl. The dynamics of extraction of total sugars, vit. C and biologically active components are followed through the process of production. Microbiological and quality relevant characteristics are also determined. The effect of modification of substrates (Sample 1 - traditional, ratio fruit:water (F:W) 1:3; Sample 2 - 8% sugar; Sample 3 – 8% sugar and yeasts) on the composition of ljuto is studied.

Results. Bioactive components in the raw material (mg/g): phenolic compounds: gallic acid - 35.4, chlorogenic acid - 173.0, vanillic acid - 26.8, caffeic acid -11.4, p-coumaric acid - 5.6, ferulic acid - 7.9, ellagic acid - 51.1, 3,4- dihydroxy benzoic acid - 22.1, cinamic acid - 4.0; bioflavonoid: rutin - 128.6, myricetin - 66.7, quercetin - 97.3, kaempferol - 3.6; anthocyanins - 428.7 mg/kg. The analysis of Yeast and Lactic Acid Bacteria populations in the substrates showed going on a mild mixed lactic acid/alcoholic fermentation.

Conclusions. The time for fermentation is shortened by a week, compared to the traditional technology. The process of extraction of nutrients and biologically active components is also enhanced, more markedly expressed when sugar and yeasts are added to the substrate. The bioactive components of lingonberries are well preserved in all three variants of beverages.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
Comparative study on food sensory characteristics of traditional and new products based on oleaginous products

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Introduction. Oleaginous products are very characteristic for Bulgaria and Bulgarian food. Nowadays, there is a lot of interest to these products because of their healthy properties.

Materials and methods. Sensory profiles of traditional sunflower (SFH) and sesame tahini (ST) halva are developed by trained panellists. Differences are identified between the flavour, colour and texture profiles of traditional tahini halva and samples made of walnut (WH), hazelnut (HH), pumpkin seeds (PSH), peanuts (PH) and almonds (AH). Hunter L,a,b and CIE Lab L*,a*,b* colour characteristics are defined by the method of Garner on colorimeter Colorgard 2000, BYK – Gardner Inc. (L – brightness; L=0 - black, L=100 – white; +a - red, -a – green; +b - yellow, - b - blue). Statistic analysis of data is performed, using ANOVA. The texture of tahini halva samples is measured on TEXTURE ANALYSER TA.XT_plus, with a 50 kg load cell using a P/5 Cylindric probe 5mm in the penetration depth 5mm. Test results are obtained from 20 halva tests of each type. Effect of the halva compositions on the texture, associated with their hardness are studied. Statistic analysis of data is performed, using Stable Micro Systems software, England.

Results. Colour characteristics of the studied seven samples of tahini halva vary, according to the type of Oleaginous product. The values L* are within the limits of 63.10 (HH) and 76.60 (SH); a* range from -2.77 (PSH) to 7.49 (AH) and b* - from 23.25 (PH) to 31.28 (AH). Texture modifies depending on the oleaginous products. The samples made of almond and pumpkin seeds are substantially harder and adhesive than the traditional sunflower and sesame tahini halva. Tahini halva with walnuts, hazelnuts and sesame have considerably lower characteristics of hardness. It is almost 30% lower that the one with almond. Closer to the hardness characteristics of the sunflower traditional halva is the peanut halva. The samples of halva are arranged, according to hardness characteristics as follows: pumpkin seeds > almond> sunflower> peanut> sesame> hazelnut> walnut. Correlation is established between the sensory panelist perceptions of hardness and the instrumental analysis.

Conclusions. The development of new products based on oleaginous products contributes for their popularization and increasing their usage.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
Study on traditional bread and possibilities of its enrichment with biologically active components

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Introduction. Bread has significant place in the daily menu of the Bulgarians. It is a staple food, which provides major sources of carbohydrates, proteins, vitamins and minerals in the diet. Studies have shown that whole grain cereals contain a range of bioactive compounds - phenolic compounds, phytosterols, dietary fibers (mainly beta-glucan), lignans, alkylresorcinols, phytic acid, γ-oryzanol, avenanthramides, cinamic acid, ferulic acid, inositols and betaine, vit. B1, etc. Most of them are bound and can survive gastrointestinal digestion to reach the colon intact, where they provide an antioxidant properties. Bioactive components are associated with reduced risks of cancer, diabetes, cardiovascular diseases, etc.

Materials and methods. Herbs, typical for Bulgarian consumer like “mashterka” (Thymus serpyllum (T. drucei)), “matochina” (Melissa officinalis; Lemon balm), “rigan”, “ovcharski bosilek” (Origanum vulgare) are used. Earth apple (Helianthus tuberosus; Jerusalem artichoke, sunroot, sunchoke, topinambour) has been a source of dietary fiber. Bread is produced by traditional technology. The bread volume is measured, according to BST (BDS) 3412:1979; the form stability is determined by the H/D ratio; porosity is characterized through image analyzing technique. Phenolic compounds are identified by HPLC. Oxidising activity is studied through DPPH free radical method.

Results. Composition of bread varies according to the characteristics of the geographic region - in Trakia and Dobrudja – it consists mainly of wheat; in the mountainous areas – of rye, millet or later of maize; in the Rhodopi, Rila and Pirin regions - baked potatoes are added. Two basic types of bread are prepared – 1) “presnik”, “blaga pita”, “medenik”, “kolache” (without a starter); 2) “kvasnik”, sour bread with leaven or yeasts. The technology and composition of both traditional breads is studied in the area of Plovdiv, Sliven, Dobrich, Ivailovgrad, Bansco Dospat and Haskovo. Basic steps of processing and compositions of traditional bread are recorded, varieties are described. Investigation is made on the types of leaven and technology of its production. The effect of the fortifying ingredients on the technological and sensory characteristics of the dough and bread are discussed. Compositions are selected that match consumer expectations and favor the antioxidant, antibacterial and health effect contribution. Characteristics of bread with limets are studied.

Conclusions. Some attempts to enrich traditional bread with biologically active components has been made.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
Study on traditional fermented cereal based foods

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Introduction. The increasing wellbeing awareness raises the interest towards cereal based fermented products. Fermentation increases the nutritive value, improves health beneficial composition and the degree of absorption of macro- and micronutrients. Tarhana is amongst the traditional Balkan foods. The paper studies the specific characteristics of the technology and the ingredients of Bulgarian tarhana. It investigates the effect of the fermentation and type of flour on the physicochemical and microbiological characteristics.

Materials and methods. Three samples of tarhana are studied, prepared by traditional technology of the region of Sliven but varying the flour composition: wheat flour (WF); limets (LF) and with earth apple (*Helianthus tuberosus*) (TF). The spice used is “tarhanol” / dill/ (*Anethum graveolens*). Technology includes boiling and mashing of vegetables (tomatoes, red peppers, carrots, apples, quince, salt). The paste is mixed with flour and yeast to prepare soft dough, that is left to ferment at 18-20°C. Every day the dough is kneaded, adding flour. Fermentation lasts 8 days. Small flat loafs are made from the fermented dough 1 cm that are rolled out to help the drying process. The loaves are left to dry on a cloth at 18-20°C for 2-3 days, after they are grated and dried. The development of aerobic and facultative anaerobic mesophylic bacteria is carried out by using the spread plate method on Plate Count Agar, Lactic Acid Bacteria (LAB) are enumerated on MRS - agar, yeasts and molds – on YGC-agar. Physicochemical analysis are by standard methods.

Results. During the fermentation of WF tarhana, the number of LAB ranges between $1.1 \times 10^6$ to $1.9 \times 10^9$ CFU/g., reaching $1.1 \times 10^{10}$ CFU/g after drying. Moisture is reduced from 49.02 to 11.45%. Yeasts reach $2.6 \times 10^6$ CFU/g in the dried product. The final product is characterized with pH value 4.43 and ash content - 1,397 mg/g. LF tarhana shows LAB varying from 1.0, $10^7$ to 1.0, $10^8$ at the end of the fermentation process. The dried tarhana is characterized with LABs, $2.6, 10^9$ CFU/g , pH 4.58; ash content - 3,18 mg/g. The yeasts are reduced from from 4.0, $10^6$ CFU/g in the initial stage to 1.5, $10^5$ CFU/g in the dry tarhana with LF. Adding TF increases the number of LAB from 5.0, $10^7$ at the begining of the process to 1.1. $10^8$ CFU/g at the end of the fermentation. After drying, LAB of tarhana with TF increase more than 3 times reaching $3.7, 10^9$ CFU/g pH value of the dried final product with TF is 4.7; ash content - 2,040 mg/g. Molds in all the studied three samples decrease 2 times during the process of fermentation. The low moisture content (9-11%), low water activity (0.407) of final product, low pH value (4.4-4.7) provide a bacteriostatic effect against growth of pathogenic and spoilage microorganisms and increase product shelf-life.

Conclusions. Tarhana is a good source of protein, vitamins, minerals, and some compounds (lycopene, carotenoides, pectins) possessing functional properties.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
Textural changes during water cooking of emmer whole, pearled and crushed grain

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Introduction. Generally emmer products are consumed after boiling in water, in all traditional growing areas. Several research groups have associated cooking conditions with the textural changes. Cooking qualities as well as textural attributes were found to be affected by degree of milling that exhibited positive effect on water uptake ratio, volume expansion ratio, length expansion ratio, cohesiveness, adhesiveness, and negative impact on optimum cooking time and hardness.

Materials and methods. Whole, pearled and crushed grain of two varieties of *T. dicoccum* from Italy (a winter and a spring variety) were subject to 4 different cooking times (20, 40, 80, 120 minutes for the whole; 20, 40, 60, 80 for the pearled; and 20, 30, 40, 60 for the crushed). After cooking the grain was drained from water and analyzed after 10 minutes. The textural properties were evaluated by using Texture Analyser mod. TA.HDi 500. Test with a Ottowa Cell (A/OTCS) at 5.0 mm/s of test speed with 65% penetration depth and with a 250 kg load cell was performed in order to evaluate the influence of cooking. The maximum force value was used as an indication of the “hardness” of the sample, the linear distance was considered for “crispiness” and total negative area is used for “adhesiveness”. The measurements were carried out at room temperature (22±3 °C).

Results. As expected, the hardness and crispiness of pearled and crushed grain decreased with increasing cooking time. After 20 minutes the highest hardness and crispness were obtained for the pearled of winter variety (242 and 5857 kg, respectively). Considering pearled grain, at the same cooking time, the spring variety showed lower hardness (190-77 kg) and crispiness (3986-2309) respect to the winter one. For crushed grain were obtained the lowest values: 40-10 kg of hardness and 1217-593 of crispiness. Instead whole grain seems to be less sensitive to boiling in water, keeping almost constant hardness and crispness, even after 120 minutes. Adhesiveness was found for all pearled and crushed samples, and for whole winter wheat only after 120 minutes of cooking.

Conclusions. The aim of this research was to evaluate the textural changes of emmer wheat used to realize traditional dishes. Cooking time is useful in order to evaluate seeds cooking quality. Longer cooking times, necessary in the case of whole grain, result in a loss of nutrients and could limit end uses, but don’t affect the textural properties (hardness and crispiness). Rheological properties are important parameters which play an important role in cooking seeds. The consumers and processors prefer varieties with low cooking time and low hardness value, characteristics found, in the present research, in pearled and crushed grains.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
Drying effect on the quality of Lazoul (Allium roseum L.): a Tunisian edible wild plant

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Introduction. Lazoul (Allium roseum L.) is a common spontaneous edible plant that grows in the south-east of Tunisia during rainy season. Its leaves are consumed by the local population because of their distinctive taste and traditional therapeutic properties. Fresh leaves cannot be preserved due to their high water content. However, drying process is expected to affect content, activity and bioavailability of bioactive compounds.

Materials and methods. Fresh Lazoul leaves (water activity from 0.923 to 0.948) were air dried at 40, 50 and 60°C. Volatile sulfur compounds, total polyphenols content (TPC) and total flavonoids content (TFC) were analysed on fresh and dried leaves (Dewanto et al., 2002). Antioxidant activity was estimated by the method used by Miliauskas et al. (2004) and Chan et al. (2009).

Results. All sulfur compounds detected in fresh leaves were detected in dried ones. This indicates a protection of the alliinase activity and a preservation of the reaction precursors (Li et al., 2007). Air drying results in 60 to 69% TPC reduction, which among others, is promoted by polyphenols oxidation (Mrkic et al. 2006). TFC reduction due to drying varied from 17 to 29% and may be due to polymerization (Harbourne et al., 2009). Antioxidant capacity reduction due to drying varied from 72 to 88% and was related with TPC losses.

Conclusions. Drying resulted in some color modifications and preserved the sulfur compounds potential formation. All convective drying treatments resulted in drastic declines in total polyphenols content, total flavonoids content and antioxidant capacity. Drying temperature showed a significant effect on drying rate, moisture loss, water activity, total polyphenols content, total flavonoids content and antioxidant activity of Allium roseum leaves.

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Li Y, Xu S Y and Sun, D-W., Preparation of garlic powder with high allicin content by using combined microwave–vacuum and vacuum drying as well as microencapsulation, J of Food Eng 83, 76–83 (2007).
The influence of raw materials and flow chart modification on characteristics of rye bread

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Introduction. Rye or “black” bread is one of the most popular traditional foods in Russia, until now it is the part of everyday diet of the most of Russians. Bulk of rye bread varieties, producing in Russia now in an industrial scale, use the mixture of rye and wheat flours.

The aim of this study was to establish the possibility of the traditional recipe of rye-wheat bread modifying by substitution of wheat flour by buckwheat one and use of lactic acid bacteria L. delbruckii pure culture instead of mixture of bacteria cultures L. plantarum-A63, L. brevis-B5, L. brevis-B78 and yeast S. minor.

Reasons of these modifications were the next: to increase the biological value of bread due to its enrichment by bioactive metabolites by homofermentative thermophilic lactic acid bacteria; to increase the bioavailability of bread due to its enrichment of bioactive components of buckwheat flour; to improve the organoleptic characteristics of bread.

Materials and methods. At critical points of processes, realized by traditional and modified methods, samples were taken, in which the content of D-and L-lactic acid, starch, vitamin C and diet fibers were determined. In specimens of ready bread specific volume, moisture, acidity, porosity and organoleptic indicators were determined.

Results. The contents of the sum of D-and L-lactic acids, starch and dietary fibers were higher in ready bread, prepared according to the modified recipe. “Traditional” rye-wheat had the following characteristics: specific volume 1.6 cm$^3$/g, moisture 45.3 %, acidity 2.7°, porosity 45 % and organoleptic indicators equal to 75 points. Characteristics of “modified” rye-buckwheat bread were the next: specific volume 1.7 cm$^3$/g, moisture 45.5 %, acidity 5.5°, porosity 50 % and organoleptic indicators equal to 76 points.

Conclusions.
1. Modification of raw materials and the flow chart allowed to obtain final product with higher content of dietary fibers.
2. Modification of raw materials and the flow chart allowed to obtain final product with higher content of lactic acid.
3. Physico-chemical and organoleptic indicators of new sort of bread are the same or a little better than of traditional one.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
Spicing step effects on quality of Kaddid: a Tunisian cured meat

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Introduction. In Tunisia, Kaddid is a typical meat product elaborated traditionally by salting, spicing and sun drying of beef or lamb meat. Kaddid meat spicing, depending upon regions, is realized with different natural aromatic substances aiming mainly to enhance the final product flavor. The purpose of this work was to study the spicing effects on salted meat physicochemical and microbial characteristics.

Materials and methods. Fresh beef meat samples at 48h post mortem were brine salted (21% w/w) during 8h. Salted meat samples were mixed at a ratio of 0.15g spices/1g salted meat with a spicing paste elaborated from red pepper (43%), fresh garlic (33%), coriander (21%) and mint (3%). Cured meat samples were analyzed before and after 24h spicing for their physicochemical and microbial qualities. Physicochemical characteristics were evaluated through pH, water activity, water and salt contents (AOAC, 2000). Microbial analyses (total mesophilic aerobic flora, total and faecal coliforms, yeast and mould, lactic acid bacteria, total staphylococci, sulfito-reducer bacteria, Clostridium perfringens, Staphylococcus aureus and Salmonella spp) of cured meat samples were run according to protocols described by Tomlinson (1995).

Results. Spicing had no significant effect on pH, water activity, water and salt contents of brined beef meat (p<0.05). Results of microbial tests of cured meat samples before and after the spicing step showed lower counts than recommended standard (AFSSA, 2008). All cured meat samples analyzed were free from Staphylococcus aureus and Salmonella spp. Counts of sulfito-reducer bacteria which was initially absent in brined meat reached a value of 2.8 log CFU/g in spiced brined meat samples. Besides, total staphylococci count showed an increase of 26% after the spicing step. In the other hand, faecal coliforms flora count underwent a reduction of 18%.

Conclusions. Physicochemical characteristics of brined beef meat were not affected by spicing during the Kaddid meat processing. However, spicing changed microbial characteristics of the product by sulfito-reducer bacteria growth, increasing total staphylococci and reducing faecal coliforms proliferation.

References.
Spicing step effects on drying behavior of Kaddid: a Tunisian cured meat

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Introduction. Kaddid is a Tunisian meat product prepared traditionally by salting, spicing and drying of beef or lamb meat. The artisanal process of Kaddid meat elaboration is very time consuming since this typical product is still sun dried. Thereafter, to develop a better controlled drying process, a preliminary study of the drying behavior of salted and spiced meat is required. The present work aims to investigate the effect of spicing on salted meat drying behavior. In a first step, isohalic sorption isotherms of salted and salted-spiced beef meat have been established at 30°C. Then drying kinetics at 30°C have been determined for salted meat before and after the spicing step and the resultant apparent moisture diffusivity values have been calculated.

Materials and methods. Beef meat samples were cut into parallelepipeds (5 cm x 2 cm x 0.5 cm). Thereafter meat samples were brined at 21% during 8h and spiced with red pepper, garlic, coriander, and mint (0.15g spices/1g salted meat). Sorption isohalic isotherms were determined gravimetrically according to the COST90 method (Spiess & Wolf, 1987). Moisture contents were determined according to AOAC, (2000). Drying experiments were conducted in a convective air dryer at a temperature of 30°C and air velocity of 1.5m/s.

Results. Isohalic sorption isotherms at 30°C of cured beef meat before and after spicing showed sigmoid curves of type III according to the classification of Brunauer et al. (1938). Besides, spices addition had no significant effect on the sorption behaviour of salted meat (p<0.05). Experimental drying results showed a reduction in drying process time when salted meat was subjected to a previous spicing treatment. Indeed, after 15h of drying the water content in spiced-salted meat reached a value of 32.01%(DB) while salted meat presented a higher moisture content (68.48%(DB)). These results are confirmed by the calculated values of apparent moisture diffusivity which are 5.34x10^-10 m^2/s for spiced-salted meat against 2.57x10^-10 m^2/s for salted meat.

Conclusions. Spicing as a pre-treatment to kaddid meat drying step has no significant effect on the sorption behaviour of salted beef meat. However, it increases the drying rate of the salted meat.

References.
Bioactive compound retention factors as a function of kale cooking time and way: boiling vs. steaming

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Introduction. Kale is a leafy green vegetable belonging to the Brassicaceae family that shows a high nutritive value due to its richness in bioactives such as glucosinolates (GLS), phenolics, and vitamins. Kale leaves represent a characteristic ingredient in the preparation of traditional dishes such as soups or filling of pastries. Boiling in water is a common preliminary step in the preparation of kale leaves. Nevertheless, this process may lead to significant losses and degradation of phytochemicals. Steaming appears as an alternative way of cooking, since it would lead to similar leaf texture and a higher retention of healthy compounds. The object of the present study is to compare the effect of boiling and steaming as cooking methods on the retention factors (RF) of kale leaf bioactives.

Materials and methods. Kale populations were selected from material grown in the same environment (Cesena, Italy). The experimental theses derived from a factorial combination of three kale types (Italian, Portuguese, and Turkish), two cooking methods (boiling and steaming), and four cooking times (5, 10, 15, and 20 min). After freeze-drying, bioactives were extracted by proper solvent systems, quantified by HPLC, and identified by HPLC-mass spectrometry or standard compounds. Analytical determinations were also performed on cooking waters.

Results. Steaming did not cause significant phenolic losses in kale leaves. On the contrary, RF decreased from 1.0 to 0.2 mg mg⁻¹ in the first 5 min of boiling and did not varied from 5 to 20 min. Including phenolics detected in cooking waters, RF determined for boiled samples were not significantly different from those calculated for the corresponding steamed samples. A similar trend in kale leaves was noticed for GLS during boiling. RF fell from 1 to 0.1 mg mg⁻¹ in the first 5 min and then did not consistently change. In steamed leaves, RF decreased at a slow rate at the initial stages but after 20 min RF were similar to those determined in boiled samples. Including GLS lost in waters, RF in boiled kales were about twice higher than RF calculated for the corresponding steamed leaves at the same cooking time. Steaming led to a faster decrease in chlorophyll RF in comparison to boiling. After 20 min, RF ranged from 0.6 to 0.7 mg mg⁻¹ for chlorophyll a and b in boiled samples whereas RF ranged from 0.1 to 0.4 mg mg⁻¹ in steamed leaves.

Conclusions. Neither boiling nor steaming caused a chemical degradation of phenolics. A remarkable migration of hydrophilic bioactives (GLS and phenolics) occurred from leaves to cooking waters during boiling. Steaming led to a faster chemical degradation of GLS and chlorophylls in kale samples in comparison to boiling, owing to the high exposure of leaves to oxygen.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
Retention factors of bioactive compounds during water cooking of emmer wheat whole, pearled and crushed grain

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**Introduction.** Traditional emmer wheat uses as human food are rather specific. In fact crushed kernels are used to prepare soups or porridges. Nowadays pearled and whole kernels are also very popular as ingredients of soups and mixed salads. In all cases boiling in water is the cooking used to prepare the most common dishes. This has therefore been considered as the critical unit operation for bioactive retention.

**Materials and methods.** Whole, pearled and crushed grain of two landraces of *T. dicoccum* from Italy (a winter and a spring variety) were subject to 4 different cooking times (20, 40, 80, 120 minutes for the whole; 20, 40, 60, 80 minutes for the pearled; and 20, 30, 40, 60 minutes for the crushed). After cooking the grain was drained from water, freeze dried and stored at -20°C until extraction of phenolic and lipid associated compounds (tocols, carotenoids and phytosterols); the cooking water was stored at -20°C until the phenolic extraction.

**Results.** Yield factors were calculated for the fresh and the dry matter, considering emmer wheat and the water as well as their sum; the main differences were found for fresh matter in crushed samples whereas, after 60 minutes, we obtained yield factors of 5.0 for the cooked grain, due to water absorption and 0.1 for the water, due to evaporation. For each class of bioactives analysed we obtained the retention factors. Carotenoids retention factors ranged between 0.8-0.9 after 20 minutes, to decrease until 0.6, at the end of the cooking, when considered crushed and pearled grain of the spring variety. Tocopherols retention factors were initially constant for pearled samples, reaching 0.8 between 60-80 minutes; instead for whole and crushed grain they decreased immediately after 20 minutes. The lowest values were showed by free phenolic compounds; in all the samples decreased sharply after 20 minutes (0.40-0.60), to come back to 1 after 80 minutes of cooking, while for bound phenolic compounds and sterols they were maintained around 1. Retention factors, calculated including cooking water, ranged between 0.9-1.3; crushed samples showed the highest value only after 20 minutes, while the same level was reached from whole grain around 80 minutes of cooking.

**Conclusions.** This experiment represents one of the first works about the study of bioactive retention after water cooking of emmer wheat (whole, pearled or crushed grain). Carotenoids and tocopherols were partially affected by the boiling in water, while free phenolic compounds decreased rapidly after 20 minutes. Up to 50% of dry matter was found in the cooking water, when the crushed grain was boiled. Non-polar components weren’t found in cooking water, whereas we could identify various phenolic acids belonging to the bound fraction.

**Acknowledgements.** Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
Yield and bioactive compounds retention factors during hulled wheats traditional processing

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Introduction. Emmer and einkorn wheat are the two hulled wheat species being considered in detail within BaSeFood. Glume removal represents the preliminary essential step to human consumption of hulled wheat kernels. This procedure was traditionally carried out by means of stone mills that, however, also caused the breaking of kernel. As a consequence the traditional end product was dependent on the available technology for this key process. An experiment has been carried out to compare the traditional processes, still used in Turkey and Armenia for primitive wheats, and the updated procedure, found in Italy.

Materials and methods. On-plant samplings were carried out: in Turkey, August 2010, on einkorn wheat bulgur; in Armenia and in Italy, November 2010, on emmer wheat. The individual fractions of processing were accurately weighed to calculate yield factors. The sampled fraction were whole and broken kernels from different sieving fractions, in all plants; in Italy also pearled grains and the resulting bran fractions were sampled from a specific process line. Each fraction was sampled and subsequently used to determine the content and retention of some bioactive compounds (phenolic and lipid associated compounds: tocols, carotenoids and sterols), with respect to whole grain.

Results. For the processing steps we calculated: the yield of de-hulling (0.70-0.80 kg kg\textsuperscript{-1}), the yield of food product with respect to the whole de-hulled kernel (0.82-0.96 kg kg\textsuperscript{-1}), and the technological global yield (0.56-0.95 kg kg\textsuperscript{-1}). Moreover the yield factors of each individual processing fraction were calculated. The lipid content was around 1.80-2.80 g/100 g of sample (7.55 for the waste from pearling). The samples from the Turkish plants showed a very low content in tocols (2.74-5.69 mg/kg), comparing with the values found for the other plants (29.50-45.76 mg/kg). Einkorn had the highest amount of carotenoids and this value increased during the traditional Turkish process (from 2.55 to 3.14 mg/kg).

Conclusions. With the present work have been studied the distribution and the retention factors of bioactives in the different fractions generated during the milling. The kernel breaking of hulled wheat in traditional and modern processing is substantially different. The whole grain was richer in bioactives and it was noticed that during traditional processing, losses in bioactives occurred in the first fractions generated, while in the Italian plant these were more evident at final stages. In the case of the Italian plant were analyzed the wastes from pearling too, that resulted the richest in bioactives, especially considering phenolic compounds and phytosterols.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
Biochemical and baking properties of blends graded flour with different wheat milled products including peripheral parts of grain

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Introduction. Peripheral parts of wheat grains (hulls, aleurone, germ) in the milling process mainly form by-products: bran and shorts. Since the streams are derived from different anatomic parts of grain, they differ in chemical composition, biochemical and technological properties. The main objective of this study was the selection of peripheral parts of grains fractions that would allow improving content of bioactive substances in wheat flour, dietary fiber and its technological properties.

Materials and methods. For obtaining wheat flour with high content of peripheral parts grain we used: 1st graded flour in blends with bran, break and reduction shorts. First grade flour contained 32% wet gluten of the first quality group. Protein content was determined by the standard Kjeldahl method, lipid content by the Soxhlet method (using hexane as solvent), wet gluten content and its quality by the standard method of the determination of gluten quantity and quality. Fatty acid composition of lipids was determined by GLC technique. Electrophoretic separation of enzymes was performed. Densitometry of the gels was performed using "Ultrascan" densitometer.

Results. With increasing amounts of bran or shorts in the flour blends, bread volume yield increases: by 9-14% if mixed with the bran and by 4-9% with the break and reduction shorts. The yield decreases with increasing proportion of bran, break and reduction shorts above 14-17%. The content of dietary fibers and ash increases most intensely with adding bran. Amount of gluten in the flour decreases by 4,6-5,8% at a ratio in the blend of flour and bran 80:20 compared to the amount of gluten in original flour. Improving the baking properties of flour is most pronounced in mixtures with 1st grade flour due to high content of gluten in comparison with the flour of the highest grade for all blends. We also investigated changes in the properties of certain enzymes and storage proteins in blends of graded flour with the peripheral parts of the grain. It was found that the peripheral parts of the grain are characterized by significantly higher activity of proteolytic enzymes and SOD than the grain and flour.

Conclusions. Streams of wheat milled fractions including peripheral parts of grain improve the content of bioactive substances and dietary fiber in blends with wheat graded flour. Dosage of bran, break or reduction shorts lead to increase of gluten; the bread volume yield increases due to increased amount of unsaturated acids in blends. The best biochemical composition and baking properties was obtained for course break bran. The peripheral parts of grain have a higher activity of proteolytic enzymes. The introduction of peripheral parts into the flour leads to increase in activity of hydrolytic enzymes and to significant increase in antioxidant activity that minimizes the negative effect of hydrolytic enzymes on the technological properties of flour.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
Effect of bran enzymes on wheat flour quality

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Introduction. A special role in changing the baking properties of flour belongs to enzymes. The quality of gluten is predominantly influenced by proteolytic enzymes. Increased proteolytic activity leads to the disaggregation of protein molecules, increased levels of soluble nitrogen, the accumulation of free amino acids, decreasing of glutelin and particularly gliadin fractions, resulting in deteriorating of technological properties of flour. In this connection it was interesting to determine enzyme activity in the peripheral parts of the grain that may be related to changes in protein and starch of dough. In this work we determined the activity of proteolytic and amylolytic enzymes, protease inhibitors and the activity of the enzyme system that regulates the intensity of free radical processes: superoxide dismutase (SOD).

Materials and methods. Enzyme separation performed using electrophoresis and isofocusing in the polyacrylamide gel. Densitometry of the gels was performed on the "Ultrascan" densitometer, with computer processing of the results. The activity of proteolytic enzymes was determined by the casein method and inhibitory activity by using the method of A. P. Levitsky, amylase activity, according to A. I. Ermakov, SOD activity by following C. O. Beachamp and I. Fridovich.

Results. The activity of proteolytic, amylolytic enzymes and the content of inhibitors in different products obtained during processing of wheat grain were investigated. The influence of different streams of bran and shorts on the activity of proteolytic enzymes, superoxide dismutase, trypsin inhibitor content and amylolytic activity in flour mixture have been revealed. The influence of bran addition on high-and low-molecular weight fractions of gliadin in flour blends was established. It was found that the peripheral parts of the grain are characterized by significantly higher activity of proteolytic enzymes and SOD than the grain and flour. The activity of proteases inhibitors in different types of bran and shorts streams was significantly lower than in flour. Peripheral parts of the grains are characterized by low amylolytic activity.

Conclusions. 1. The peripheral parts of the grain have 1.7-1.8 times higher activity of proteolytic enzymes, superoxide dismutase and have low amylolytic activity; they also contain less trypsin inhibitor than grain and flour.
2. The introduction of peripheral parts into the flour leads to increasing in activity of hydrolytic enzymes and to significant increasing in antioxidant activity that minimizes the negative effect of hydrolytic enzymes on the technological properties of flour.
3. Increasing the number of peripheral parts of grain in flour reduces its high molecular weight. In this case, quantitative redistribution of protein fractions takes place due to changes in protein fraction of gluten. At the same time, qualitative composition of individual fractions of gliadin remains constant, according to results of gels densitometry.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
Bioactive compounds and dietary fibers in new developed cereal products

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Introduction. Many studies indicate the possibility of enhancing the nutritive value of cereal-based products by supplementation of white bread with minerals, dietary fibers or polyphenols. The main purpose of this study is to analyze three important bioactives for each selected food (total phenolic content, carotenoids, and dietary fibers), master analytical techniques for their determination, and chose the best flour blends and sources of phytochemicals and dietary fibers. In this study we investigated the content of polyphenols, \( \beta \)-carotene, and dietary fibers in composite flour blends based on wheat flour, cereal grains, and bran from different fractions.

Materials and methods. Samples were selected from composite flour blends. There were wheat of four extra class, wheat of four extra class 93 % + wheat bran 7 %, wheat of four extra class 83 % + wheat bran 17 %, wheat of four extra class 90% + barley flour 10 %, wheat of four extra class 85 % + barley flour 15 %, wheat of four extra class 90 % + buckwheat flour 10 %, wheat of four extra class 90 % + wheat bran 2 % + barley flour 2 % + buckwheat flour 2 % + maize flour 2 % + chick-pea flour 2 %, wheat of four extra class 60 % + rye flour 40 %, wheat of four extra class 40 % + rye flour 60 % and breads from these blends. Also were analyzed wheat grains, rye grains and barley grains.

Results. Studies have shown that blends of wheat of four extra class 83 % + wheat bran 17 %, wheat of four extra class 60 % + rye flour 40 % and wheat of four extra class 40 % + rye flour 60 % had the best preventive properties. They contain 0.84, 0.77, 1.155 mg/g of TPC, 0.073, 0.07, 0.108 mg/100g of carotenoids, and 6.68, 0.83, 1.47 % of dietary fibers, respectively. Bread baked from these blends similarly contained the higher amount of the determined compounds than traditional bread. Research on cereal milling by-products has shown them as a rich source of polyphenols, carotenoids and dietary fibers that could be used as dietary supplement in traditional bread production, especially 4-torn system the coarse fraction of wheat bran and breaking 5-system the coarse fraction of rye bran containing 2.11, 2.2 mg/g of total phenolic compounds, 0.123, 1.8 mg/100g of carotenoids, and 46.5, 49.4 % of dietary fibers, respectively. Total phenolic contents was measured using the Folin-Ciocalteu reagent. Analysis of \( \beta \)-carotene in cereals was performed by the spectrophotometric method. Determination of total, soluble and insoluble dietary fibers was carried out by enzimatic and gravimetric methods.

Conclusions. Cereal grains contain great amount of bioactive compounds and dietary fibers, but during wheat milling the level of them reduces almost to zero. Therefore, it is necessary to enrich wheat flour with its native compounds such as polyphenols, carotenoids, and dietary fibers. This can be achieved by producing the composite flour blends based on cereals.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
The influence of a flow chart on characteristics of kvass “Southern”

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Introduction. Kvass is one of the oldest traditional foods in Russia, while remaining popular and consumed by many Russians, especially in the summer. At the same time, most varieties of kvass, produced in Russia now at industrial scale, are variations without adding of any fruit or berries. In this regard, it was important to revive the recipe of kvass made using juniper to obtain the drink with distinctive taste. The aim of this study was to establish the possibility of the traditional recipe kvass “Southern” modifying by substituting rye bread crusts with kvass wort concentrate and use lactic acid bacteria for the fermentation in addition to bakery yeast. Reasons of these modifications were the next: simplifying of kvass preparation; concentrate of kvass wort now is usual raw material in kvass production at any industrial scales; commercial concentrates of kvass wort now are habitual raw materials for kvass preparation in households as opposed to dry crusts; enrichment of ready kvass with lactic acid bacteria metabolites; formation of typical, sourish-sweetish taste of kvass; - suppression of undesirable microflora in the production process and in ready kvass due to lowering of medium’s pH.

Materials and methods. At critical points of processes, realized by traditional and modified method, samples were taken, in which the content of D-and L-lactic acid, vitamin C and dietary fibers were determined. In specimens of ready kvass dry matter, ethanol, acidity, coloration and organoleptic characteristics were determined.

Results. The sum of D-and L-lactic acids increase in the process realized according to the traditional recipe was 213 mg/l, and according to modified recipe 243 mg/l. Dietary fiber content in kvass produced according to the traditional recipe was equal to 0.28% and according to the modified recipe 0.37%. Dry matter in the ‘traditional’ kvass equaled 3.7%, in the “modified” 2.1%, coloration was equal to 0.7 and 1.2 cm$^3$ of iodine solution (with concentration equal to 0.1 gram-equivalent/l ) on 100 cm$^3$ of kvass, respectively. Ethanol content in both cases was the same: 0.9% by volume.

Conclusions. 1. Kvass produced according to modified flow chart has higher coloration that is more habitual to consumers in Russia.
2. The results indicate that in modified flow chart culture of lactic acid bacteria especially introduced in the technological process is growing more intensively than lactic acid bacteria which are naturally present in traditional flow chart.
3. Kvass produced according to modified flow chart has lower content of dry matter that means lower energetic value of ready kvass; that is important for some consumers in Russia.
4. Consumer’s characteristics of both sorts of kvass are similar, but new sort of kvass has more mild taste.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
Quality comparison of sun dried and microwave dried cherry tomato

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Introduction. Sun dried (SD) tomatoes are traditionally used in culinary Tunisian habits. Currently, a high national and international demand for this product exists. However, sun drying may encounter control and quality problems from weather conditions, dust and insects. Hence, combining microwave (MW) to convective drying (CD) may give an acceptable energy consuming solution and a better quality dried tomatoes. Here, a dried cherry tomato quality comparison is conducted between SD and combined CD and MW.

Materials and methods. Cherry tomatoes (Lycopersicon esculentum cerasiforme) at maturity stage have been traditionally sun dried and dried by CD (60°C, 4h) followed by MW (230W). Titratable acidity, lycopene, vitamin C, colour (CIE L*a*b*), total mesophilic flora and mold and yeast were analysed.

Results. No significant difference was found between the titratable acidity and vitamin C content of SD and CD+MW dried tomatoes. A better preservation of lycopene content was observed for CD+MW (21.33mg/100g) than for SD (7.33 mg/100g) which may be explained by the much longer exposure time to oxidation agents during SD. Microbial analysis shows a very important reduction in all flora for both drying conditions which is essentially due to the decrease of tomato water activity from 0.95 (fresh) to 0.60 (dried). Colour analyses show a decrease in each of L*, a* and b* values as compared with fresh tomato, which may be explained by enzymatic browning occurring at the cut surfaces of the samples. However, CD+MW allows a better preservation of tomato colour (ΔE=13.67 against ΔE=20.48 for SD).

Conclusions. The shorter drying time needed with CD+MW ends up with a better biochemical and colour quality of dried cherry tomatoes. In addition, this drying procedure allows controlling drying conditions. However, further analysis have to be run in order to take into account organoleptic quality of SD and CD+MW dried tomatoes.
High pressure homogenization to increase probiotic and quality features of the Italian traditional cheese “caciotta”

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Introduction. High Pressure Homogenization (HPH) is one of the most promising alternatives to thermal treatment for food preservation. Moreover, recent papers underlined its effectiveness, when applied at sub-lethal levels, both to change Lactic Acid Bacteria (LAB) proteolytic patterns and to positively modify their in vitro functional properties, without detrimental effects on their viability. In this perspective, principal aim of this work was to assess the potential of a HPH treatment, at 50 MPa, on the performances of probiotic Lactobacillus paracasei A13, when co-inoculated with the traditional starters, for the production of Caciotta cheese.

Materials and methods. For this purpose, three types of Caciotta were performed according to the cheesemaking protocols of a local dairy farm: cheese type 1 (control, manufactured with the traditional starters), cheese type 2 (caciotta added of not-HPH treated Lb. paracasei A13), cheese type 3 (caciotta added of HPH-treated Lb. paracasei A13). The probiotic strain was added five minutes before the addition of rennet. The three types of Caciotta were stored at 4°C. Viability of starters and Lb. paracasei A13 as well as cheese proteolytic and lipolytic patterns were monitored after cheesemaking and after 1, 2, 3, 4, 5 weeks of ripening. Physicochemical and organoleptic analyses, at the same time of storage, were carried out. To evaluate the effect of the applied sub-lethal HPH treatment on Lb. paracasei A13 functional performances, when used as co-starter, its gastric acid resistance was monitored over ripening both in cheese type 2 and 3.

Results. Results obtained showed that Lb. paracasei A13 maintained high levels of viability (9.2 and 9.1 log cfu/g) up to the 14th day of storage in both the Caciotta types. The organoleptic properties evaluated and the SDS-page profiles underlined a faster proteolysis in Caciotta cheese containing HPH-treated Lb. paracasei A13 with respect to the cheese type 1 and 2. Moreover, the Lb. paracasei showed an highest gastric resistance in Caciotta cheese when previously treated at 50 MPa.

Conclusions. Data obtained showed that HPH, applied to the probiotic strain, contributed to the modification of the sensorial features of Caciotta cheese, although maintaining high strain viability and resistance to gastric stress conditions in the product. Therefore this technique opens interesting possibility for the production of high functionality cheeses (with a potential beneficial effect on the organism), also endowed with improved organoleptic characteristics.

Acknowledgements. The Authors acknowledge the cheese producer “Caseificio Mambelli” (Bertinoro, Italy) for the support in cheesemaking.
Introduction. Salama da Sugo is a traditional fermented sausage produced since the 15th century in Ferrara area. A few months ago, the producers requested the "Protected Geographical Indication" (PGI) label and this kind of product has been characterized from a technological, microbiological and chemical point of view. This sausage is made with minced pork meat and fat, mixed with salt, KNO₃, NaNO₂, sugars, spices (black pepper, cloves, nutmeg) and almost 15% of red wine. The mixture is often added with starter cultures (S. xylosus and L. sakei), stuffed into pork bladder casing, inoculated with mould and left to age for 4-6 months at 15°C. It can be consumed as ripened sausage or cooked in a pot of boiling water in order to obtain the traditional soft juice to be served with.

Materials and methods. This product has been studied during the whole ripening and after the cooking step. In particular water loss, aw, pH and microbial populations were monitored during aging. Moreover, the sausages were evaluated by a trained panel group and the results were compared with the analyses of volatile compounds characterizing each sausages, performed by SPME-GC-MS. In addition, the sausages were sampled to determine the biogenic amines accumulation.

Results. These studies showed that this traditional sausage is characterized by a strong, spiced and intense flavor due to spices and wine compounds (and their degradation products) detected with SPME-GC-MS and confirmed by the panel test. Coliforms and coagulase positive cocci were always below the detection limit. Staphylococci counts were always lower (1-2 log units) than the initial amounts (6 log cfu/g), while lactobacilli rapidly increased during all the ripening period. Moreover the tested sausages had a good record of safety thank to the low amount of biogenic amines: in fact, the most abundant amine detected was taurine, found at a maximum level of 200 mg/kg. This amount has to be considered safe and acceptable when compared to the amounts normally occurring in other fermented sausages.

Conclusions. The results confirmed the important role played by lactic acid bacteria starter cultures which determined a rapid pH decrease. Staphylococci seems not able to colonize the product, probably because of the lack of pH increase observed in this production. The pH behavior could be the results of the inoculated mould inability to penetrate inside the sausage (due the high ethanol content). Moreover, the wine used for manufacture affected aromatic profile of sausages having a marked effects on product volatile molecule profiles even after 120 days of ripening. In addition, the use of the starter cultures was able to avoid the accumulation of dangerous concentrations of biogenic amines.
Oxidation and bioactive compounds evolution and retention during oilseeds tahini and halva shelf life

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Introduction. Oxidation is the most relevant problem affecting in particular lipiddic foods and it is associated mainly to unsaturated lipids and some minor compounds, as sterols and tocopherols. Oxidation may occur during production and storage, especially in oxygen-rich, high temperature and light conditions, that are likely to occur in traditional production schemes. For these reasons the shelf life evaluation and bioactive retention of tahin and halva from different oilseed raw materials was evaluated in this work.

Materials and methods. Tahin and halva samples obtained from different oilseeds, supplied by UFT (Bulgaria), were stored at typical conservation conditions, in the dark, up to a period related to the maximum shelf life reported for traditional procedures. At time distances (1.5, 3, 6, 9, 12 months) allowing 2 samples for each products during the shelf life cycle, the following determination were carried out: peroxide value, conjugated diens and triens, tocopherols, polyphenols and antioxidant activity.

Results. Peroxide value shows different trends for the tahin and halva obtained from the various oilseeds. Most of the samples increase the peroxide content after 3 months of shelf life and halva usually has lower value respect its corresponding tahin. Besides, products made by sunflower and pumpkin seeds reach the legal limit for food lipid. The same trend is reported by the conjugated dienes with a slight increase of this index during storage. Conjugated trienes show different trends in the samples, but halva values were always higher then its corresponding tahin for all the shelf life steps. The antioxidant capacity, by ABTS method, shows a big variability depending on the kind of raw material and probably due also to the presence of interferences. In general the antioxidant activity seems to decrease after roasting and grinding, whereas became higher in the final halva. Walnuts show the highest values for all the products.

Conclusions. These results highlight how the duration of storage is an important factor that should be investigated in all lipiddic foods. Besides the storage conditions, like temperature and light, very important is also the raw material quality. In our case, the raw oilseeds didn’t show good chemical parameters and this affected the oxidation quality of the final product (tahin and halva). Also the packaging plays an important role and in this work samples were collected with not suitable and undamaged boxes.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
Oxidative reactions, and bioactive compound evolution and retention in oilseeds during the traditional processing from raw materials to halva

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Introduction. Process optimisation and improved retention of key bioactive components identified in traditional foods is one of the objectives of BaSefood project. In particular, the purpose of this study was to evaluate the impact of processing on tahini halva. Tahini halva is a common traditional product of the Black sea countries and it is on the first place among the most nutritious and preferred food among the Bulgarians. The traditional technology of production consists in mixing roasted and grinded oilseeds with sugar syrup (white mass) whipped with a foaming agent. This technology can vary depending on the type of raw material (sesame, walnuts, sunflower, etc). Tahini halva is known to be rich in bioactive compounds (tocopherols, sterols, phenols, mono- and poly- unsaturated fatty acids) that may be however affected by processing.

Materials and methods. The samples analysed were seven different raw seeds (peanuts, almonds, walnuts, hazelnuts, sesame seeds, sunflower seeds and pumpkin seeds), the same roasted seeds and tahini and halva obtained by them. All the samples were supplied by UFT (Bulgaria) and were characterised for their lipidic and phenolic bioactive compounds. The oxidation and antioxidant capacity of all the samples were also evaluated. The analyses were carried out at all steps of processing: native seeds, roasted seeds, seed paste, and halva.

Results. The obtained results are very different depending on the kind of seed utilised. In general, the fatty acid profile is the same from raw seeds to halva samples with a small increase of polyunsaturated fatty acids for many oilseeds. Also sterols and tocopherols don’t show particular differences during processing. Some halva samples have a small increase of sterols content probably due to the liberation of bound sterols during heating and grinding. The oxidation evolution differs from seed to seed and most of the samples show more peroxides after roasting and a decrease of them in halva. Nevertheless pumpkin seeds showed high oxidation values for all the products. Except for pumpkin seeds, the antioxidant activity was higher in halva products, probably because of a contributions of the Maillard reaction products.

Conclusions. Until now no experimental evidences support bioactive compounds content and health benefit of halva, so this research is a first study of the principal phytochemicals present in tahin and halva obtained from different oilseeds and nuts. Depending on the seeds, the traditional processing affects in part the bioactive compounds content, where roasting and grinding are the main unit operations responsible for some losses. These steps are also the main cause of the oxidation increase of these products.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
Selection of lactic acid bacteria strains as potential starters for the production of Milano Salami with healthy characteristics

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Introduction. The objective of this research, developed within the Project Industria 2015 Bando Nuove Tecnologie per il Made in Italy “MIAO” (Decreto di Concessione n.00088MI01 del 22 Maggio 2012), is to select strains of lactic acid bacteria (LAB) able to improve the organoleptic and total antioxidant properties over ripening of a typical Italian product: Milano Salami. The effects of the addition of selected LAB strains (L. casei, L. sakei, L. fermentum and L. rhamnosus) or commercial starters (S. xylosus and L. sakei) on the physico-chemical and sensory characteristics, and unsaturated fatty acids, lipid and protein oxidation contents of Salami Milano were investigated.

Materials and methods. The samples were compared over ripening on the basis of the evolution of the microflora (plate counts and PCR-DGGE), volatile compounds (GC-MS/SPME and electronic nose), Aw, pH, colour and proteolysis (SDS-PAGE electrophoresis), lipid and protein oxidation products.

Results. The starters L. fermentum, L. rhamnosus and L. casei interfered with the oxidation of lipids and production of carbonyls. In the initial ripening phase a significant accumulation due to peroxidation of aldehydes deriving from unsaturated fatty acids was detected, while the saturated and unsaturated aldehydes were converted to their corresponding alcohols due to specific alcohol dehydrogenases by the LAB strains. Salami produced by using L. fermentum, L. casei and L. sakei showed the highest concentrations of benzeneacetaldehyde at 30 and 45 days of ripening. The same strains produced also 3-methylbutanal and benzaldehyde deriving from leucine and phenylalanine, respectively. Heat map analysis of the proteolytic profiles of salami inoculated with the LAB strains or the commercial starters and in vitro meat protein hydrolyzates by L. casei, L. fermentum, L. rhamnosus or L. sakei created five different clusters related to the fermentation agent. When inoculated in salami, L. casei showed proteolytic profiles different from those produced by with the other strains. On the other hand the peptides produced by L. casei in vitro were the same as those found in the salami.

Conclusions. The use of selected LAB can positively affect the quality and organoleptic characteristics of a traditional food such as Milano Salami resulting in a healthier product having lower contents of lipid and protein oxidation products. The protein oxidation may lead to a significant decrease in their nutritional value in terms of availability of essential amino acids and digestibility of oxidized muscle proteins.
Microbiological and qualitative characterization of two commercial Tofu types obtained with different processes

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Introduction. Tofu, a fundamental part of Asian food culture, is a traditional oriental soybean food composed principally of proteins and lipids. Tofu products can be divided into two main categories: a) Fresh Tofu—produced directly from soymilk; b) Transformed Tofu, produced from fresh Tofu and characterized by a longer shelf life. In this study, two types of fresh Tofu, with a shelf life of 7 days, and two types of fermented Tofu and subsequently cured, with a shelf life of 2 years, have been compared in order to determine the microbiological and physico-chemical differences related to the production processes.

Materials and methods. The dominant microbial population was determined by plate counting and cell isolation. The products were characterized by the: a) volatile microbial metabolites (GC-MS/SPME), b) proteolysis degree (SDS-PAGE electrophoresis), c) the presence of oxidation compounds (TBARS) and d) microbial characteristic population.

Results. The GC-MS/SPME analysis revealed that, at the beginning of the shelf life, the two fresh Tofu can be well differentiated on the basis of the total content of alcohols, aldehydes and ketones. The molecules that exhibit the greatest variations were hexanal and hexanol, as well as acetic acid and 1-octen-3-ol. The use of \textit{Mucor} spp. as fermenting agent in the transformed Tofu, has been identified by the pool of volatile molecules compared with those released in the fresh products. The use of \textit{Saccharomyces cerevisiae} and \textit{Fermentum rubrum} in the transformed Tofu was markedly reflected on the characteristics of the finished product particularly by the presence of phenylethanol and 2-methyl butanal, which contribute to the sensory features of the products. A very interesting finding of this research regarded the oxidative stability of the products. In particular, the long shelf life Tofu showed the higher malondialdehyde content; nevertheless the level of peroxidation decreased during storage. This phenomenon was probably due to the use of \textit{F. rubrum}, a historic component of traditional Chinese medicine, used for the treatment of hyperlipidemia, associated with the risk of atherosclerosis. Another aspect of differentiation of the two types of product concerned the protein component. In fact, preliminary analyses evidenced that fresh Tofu samples were characterized by a higher protein content in comparison with the long shelf life product.

Conclusions. The results showed that the specific process adopted and the fermenting agent used to produce the two Tofu types are strictly correlated with the organoleptic and nutritional characteristics of the final product.
Bioactive lipids in butter chain production from the Parmigiano Reggiano cheese area

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Introduction. Bovine milk contains hundreds of diverse components. Particularly, the complex composition of milk lipids and their specific structural organisation in the form of fat globules of various sizes need to be further investigated to take advantage of their properties for nutritional and health applications. The lipidic composition has been influenced by different variables such as: breed, feed and technological processing. To this end the fatty acid and phospholipid composition of different typology of samples were determined.

Materials and methods. All the samples were collected in the protected designation of origin Parmigiano Reggiano cheese area. Cream, butter and buttermilk from two different farms were analyzed. The raw material was represented by cream samples obtained by outcrop natural creaming. The first group of samples (IS) was recovered in a farm where the cows were raised with a mix of unifeed and forage and the butter was produced with industrial Fritz method; the other group of samples (TS) were obtained from Reggiana cows breeding, raised only with forage and the butter was obtained with a traditional churn. The fatty acids methyl esters and phospholipids were determined in the cream, butter and buttermilk samples.

Results. The results about fatty acid composition showed that all the TS samples reported a higher content of MUFA and PUFA and, consequently, a lower SFA/UFA ratio. The CLA content in cream, butter and buttermilk of TS samples was about 30 % higher than IS samples. As reported for CLA, also the omega-3 fatty acids content was significantly higher in Reggiana cow’s samples; consequently, the n6/n3 ratio was higher in the IS samples. The phospholipids composition varied between IS and TS. PE was the first phospholipid in IS-cream, IS-butter and IS-buttermilk samples, instead PE was the first phospholipid in TS-cream and TS-buttermilk, but PC was the first phospholipid in TS-butter. It can be due to the different churning process that causes a different membrane disruption. The total phospholipid content was higher in TS samples. TS-butter phospholipid content was 33 % higher than IS-butter.

Conclusions. The sampling represents the two typologies of products that are present in the Parmigiano Reggiano cheese area. The industrial samples are produced in higher quantities compared to the Reggiana derived products. Effectively, the Reggiana cow milk production is lower compared to other breeds. Moreover, the traditional churn process is time consuming and economically disadvantageous. However, its products contain more bioactive lipids than others obtained from different breeds and industrial process.
Multi-component mixtures of flour with increased nutrition value

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**Introduction.** Enriching wheat flour with vitamins, minerals, and essential amino acids is relevant today when interest is increasing in "healthy" food. Use of flour from different cereal crops in the composite mixtures can improve the nutritional value of wheat flour due to use of natural supplements. The main objective of the study was developing multi-component mixtures of flour with increased nutrition value.

**Materials and methods.** Corn, triticale, barley, oats, rice, buckwheat, wheat flours and mixtures based on wheat flour were investigated. Flour samples were obtained either from industry, or using «Buhler» MLU-200 laboratory mill. Organoleptic properties, glassiness of grains, ash content, properties of gluten, physical properties, content of protein, content of free lipids, fractional composition of proteins, the amino acid composition of the proteins, Ca, Mg, P and K have been determined.

**Results.** Processing of wheat into flour leads to destruction of its vitamins. When corn and rice flours are added, mixture is enriched with vitamins E, B6, biotin. When buckwheat and barley flour are added, vitamin PP increases. Fe content in triticale and buckwheat flour 3-5 times higher than in other cultures. Two-component and multi-component composite mixtures were developed. The use of additives in two-component mixtures without worsening of baking qualities is possible in the amount of 10-15% by weight of wheat flour; while 15-30% of triticale flour can be added. Formulation of multicomponent mixtures is given. Fe content in a mixture no. 1 by 70% higher than in wheat flour, Ca by 72%, vitamin E by 45%. The lysine content is 15% higher with triticale, buckwheat, barley, oats flours and wheat bran. Content of salt- and water-soluble fractions of protein in compositions by 34% higher than in the reference sample. Use of buckwheat and triticale flour (recipe no. 2) by 38% increases Fe content; lysine by 15%. Content of protein fractions increases by 25%. Ca content is 61% higher than in wheat flour. Use of oat and triticale flour by 30-35% increases Fe content, lysine by 10-15%. Content of protein fractions increases by 20-30%. Ca in the mixture 60-65% higher than in wheat flour (recipe no. 3). It was found that wheat flour must contain at least 25-26% of gluten. Wheat bran in the mixture must have particle size <350 µm, ash <4%, moisture <4.5%, ash <0.55% for mixtures with triticale flour, <0.65% with rice, <0.75% with buckwheat, <0.95% with oat flour. In multi-component mixtures, amount of gluten must be >22%. In the baking trial, there was no deterioration of organoleptic quality of bread. Bread was well-developed, had uniform porosity, smooth surface; crust was without cracks and tasted good.

**Conclusions.** Composite flour mixture of high nutritional value can be produced by dosing and mixing certain types of flour according to the developed formulation. The optimum mixing parameters are \( n = 100 \text{ min}^{-1} \) and \( \tau = 5-7 \text{ min} \).

**Acknowledgements.** Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
A mini concept based analysis of health promoting traditional food potential, on the basis of expert judgement and consumer expectations

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Introduction. Traditionality and health promotion are two food information characters that must be trusted by consumers to be credible. Food stakeholders try to exploit health promotion to create new market potential. One BaSeFood aim was the exploration of Black sea area traditional foods as promising health promoting foods. Literature references, although addressed at innovation, rather than at traditional foods, built a conceptual framework to cross consumers’ and experts’ evaluations to highlight promising combination of foods, health claims and active ingredients.

Materials and methods. 165 binary combinations obtained by crossing categories of three different concepts (carriers, health claims and functional ingredients) were rated by consumers and food experts (marketing experts, nutritionists and food technologists), according to different attributes, on a five point scale. The results were analysed by means of ANOVA, multiple regression and principal components.

Results. Consumers’ ratings of binary combinations were significantly different, with also effects of partners, age and level of education. The most promising binary combinations were the carrier “spice or herb” in combination with health claims “strengthens the natural defence of body”, “reduce certain types of cancer”, or with functional ingredients “rich in antioxidants” and “in vitamins”. The latter functional ingredients were also promising in combination with health claims: “reduces the risk of certain types of cancer and heart diseases”, “keeps your arteries healthy” and “strengthens the natural defence of the body”.

Conclusions. Food market experts were rather well interpreting consumer preferences. Some traditional food and health claims combinations were positively rated with most combinations in the “opportunity agreement quadrant” of the consumers and experts crossing. The high between partner variability suggests to consider these results as preliminary, to be verified with more specific investigation.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
Generic traditional food perception and specific traditional food attribute rating by consumers of the Black sea area countries

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Introduction. The attitudes of western European consumers towards traditional foods have been the subject of recent research, bringing out a series of perceptual dimensions of traditional foods, the more simplified of which included health promotion, convenience/habit and sensory characters. This report represents, to our knowledge, the first attempt to monitor the Black Sea area consumers attitude towards their own traditional foods, and how they associate these with health promoting, sensory and convenience characteristics.

Materials and methods. 25 selected attributes, were rated by consumers of Black Sea area countries and Ukrainian migrants to Italy. For the concept of a generic traditional food, an ordinal scale was used. With reference to traditional foods of specific areas, a binary scale (agree / disagree) was used; the binary data were preliminary log-transformed by means of logistic regression, for further analysis.

Results. Principal component analysis of the generic traditional food rating indicated that specific descriptors connected to their identification are mainly associated with familiarity, not sophistication, and sensory properties. Among health promoting traits, attributes with a primary role were those directly perceivable. Demographic characters such as age, ethnicity and education affected the perceptions. The principal components extracted for specific traditional foods indicate that traditional foods of common consumption were associated with health perception, and being simple and cheap to prepare. The ratings of the same foods in different contexts (e.g Ukrainians) were very consistent, supporting the efficacy of the analysis.

Conclusions. A good correspondence was detected between the directly perceivable health promoting and sensory traits in the specific food set and in the characterisation of a generic traditional food. On the contrary, the aspects of a generic traditional food more linked to a modern way of life seemed to be in contrast with the perceptions emerged by rating specific traditional foods.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
Gastronomic tourism in Ukraine

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Introduction. Throughout the world, culinary tourism is now very popular and rapidly growing. Gastronomic tourists are traveling to various places to get acquainted with local culinary traditions and characteristics of national or regional cuisine. The main objective of vacationers, who choose gastronomic tourism, is the tasting of unique foods and dishes peculiar only to the area, as well as visiting famous restaurants of a country. Gastronomic tourism can be divided into four types: 1) Rustic gourmet tourism (green), 2) Food and drink offerings (or urban gastronomic tourism), 3) Master classes on cooking ethnic foods, 4) Visit the gastronomic festivals. The main objective of this review is to show the state of the gastronomic tourism in Ukraine.

Results. In Ukraine, culinary tourism has not yet been widely adopted, but this kind of travel is rapidly growing. Mostly, it is represented by the wine routes and "green" gastronomic tourism. The undisputed center of the wine tourism is the southern coast of Crimea. Wine tours usually include a visit to a factory of sparkling wines and other wineries with wine tasting. Another tour includes visit to the "Cultural center of wine" in Odessa region located directly on the site of the industrial complex "Chabot", one of the oldest wine regions of Europe, whose traditions were established in ancient times. This is the only Ukrainian Cultural Center, bringing together existing high-tech enterprise, the ancient wine cellars, tasting room, exhibition of contemporary sculpture and architectural art, as well as a unique museum of wine and winemaking. Center for the "green" gastronomic tourism in Ukraine is its western regions, in particular, Transcarpathia. One of the most developed regions of Ukraine to restaurant tourism is Lviv. This is one of the oldest cities in Ukraine characterized by a unique flavor and atmosphere. Here, various festivals and fairs are held, and city authorities in every way help to attract tourists and promote the history and culture of this unique city. One of the distinguishing features of Lviv is a huge number of original restaurants, many of which became famous throughout the world. In addition to the original restaurants, Lviv is famous for its coffee and chocolate. Many tour operators offer tours, in which tourists visit Lviv cafes and even participate in the process of making chocolate. Most of gastronomic festivals are held also in Lviv and Transcarpathia, but, unfortunately, still not many tour operators offer organized tours to these events. As examples one can mention the "Feast of Mirgorod pig" every autumn in Mirgorod, the "Festival of borsch" in town Borshchev, the festival of culinary art "Carpfest" in the village of Koropets (Ternopil region), the "Salo festival" held annually in Lutsk, "Odessa kitchen yard" festival in Odessa, the annual "Festival of deruny" in Zhytomyr, "Festival of mussels and Crimean wine" in Balaklava in the Crimea, the festival "Hutsul cheese." in Rakhiv.

Conclusions. In Ukraine, culinary tourism is still a rare phenomenon, in spite that there are a lot of thoughtful gastronomic routes. However, in Ukraine, more and more people realize advantages of this direction in the travel business.
Traditional food products and consumers in Western Balkans Countries

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Introduction. Balkan countries have a strong heritage of culinary tradition maintaining the consumption of traditional food in close connection with the cultural habits of their inhabitants. The consumption of traditional and local food products remains still important (Bernardoni et al., 2008). The objective of this work is to analyse the consumers’ attitudes, expectations and behaviours toward traditional food in six Balkan countries: Bosnia and Herzegovina, Croatia, Macedonia, Montenegro, Serbia, and Slovenia.

Materials and methods. Different methodologies have been used to measure consumers’ attitudes, expectations and behaviours towards traditional food. A qualitative survey was carried out. This step was followed by a conjoint analysis (Gustafsson et al., 2003). 1200 consumers were interviewed about their perceptions of traditional food and their purchasing and consumption behaviours.

Results. Consumers do not have a precise view about whether a food is traditional. They perceive it as a large array of products and dishes. Analysis at the aggregate level of Conjoint Analysis was not sufficient to comprehend consumers’ behaviour clearly. Consumers were clustered to identify segments with different preferences, and groups of consumers having similarities in cognition and behaviour were analysed. a cluster more focused on local origin, a cluster more demanding on method of production, a cluster presenting strong rejection of high prices despite the quality of the product, a cluster preferring high prices and industrial processes.

Conclusions. Generally, Balkan consumers express a positive attitude towards traditional food. If we try to explain consumers’ behaviour towards traditional food, we can say that there are different types of consumers giving more or less importance to components considered as traditional. This study put emphasis on the need to protect the Balkans culinary heritage as much as possible, for tourists but also, and especially, for the domestic populations. The protection of traditional products could also be interesting for countries entering the EU.

Acknowledgements. This article is issued from the research project FOCUS BALKANS, Food Consumer Science in the Balkans, grant 212579, supported by the EU Commission, DG Research, 2008-2011.

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Consumer’s perception of sustainable wine: a literature review

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Introduction. Over the last years wine sustainability grew in popularity and seems to be a message that has potential to gain growing consumer attraction in the future. Currently there is no officially and universally definition of sustainable wine. This abstract wants to highlight how consumers perceive sustainable wine in order to understand whether the adoption of sustainable practices will be a value added in the wine marketplace.

Results. From the review of the literature we see that consumers are confused by the different terms used to describe sustainable viticulture and wine making. Currently consumer awareness of sustainable winegrowing and winemaking is low and product and processes are confused with vague terms such as organic and green, but as consumer awareness grows, the market will see growing acceptance and demand for wine produced from sustainably farmed grapes and made in certified sustainable wineries. (Zucca et al, 2009). Most consumers associated organic wines to sustainable wine. This is not proper considering that organic agriculture consists in several practices well defined from the legislation. On the other hand sustainable wine practices should consider all aspects of farming. In California the Sustainable Winegrowing Practice (SWP) project defines sustainable winegrowing as growing and winemaking practices that are sensitive to the environment (Environmentally Sound), responsive to the needs and interest of society-at-large (Socially Equitable) and are economically feasible to implement and maintain (Economically Feasible) (Dlott et al., 2002, p.1-2).

Conclusions. Even if price and grape’s variety are still the main drivers for choosing a wine, sustainable aspects could become an important attribute for wine products. But sustainable wine should be communicate and perceived different respect organic wine if they want to achieve visibility and importance in the wine market. The industry will need to cooperatively develop and support appropriate marketing programs that help the consumer identify and distinguish these products from others. (Zucca et al, 2009).

References.
Innovation disclose consumers’ preferences

**SPES GEIE** – Spread European Safety GEIE, **SETBIR**, **SEVT**

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b SETBIR - Union of Dairy, Meat, Food Industrialists and Manufacturers of Turkey  
c SEVT - Federation of Hellenic Food Industries

Introduction. The Food and Drink Industry (F&D) is the largest manufacturing sector in the EU (€ 952.2 billion Euros turnover); at the same time, it is extremely fragmented with 274000 companies, 99.1% of which are small or medium-sized. The producers of traditional food represent a particular typology of manufacturers, often believing that food must remain the same and that only small improvements and adaptation to current rules are required. Their concept of food production is based on continuity with the past.

Materials and methods. a questionnaire has been developed. It was addressed to traditional food producers of the Black Sea Area and was conceptually divided in three main section. The first section defines the typology of respondent, the second section specifies the innovation capacity of the firm, and the third one tries to clarify what is the point of view of the respondents about the relation between consumer preferences and innovation of the firm.

The questionnaires have been submitted to enterprises in different ways: by direct mailing to the network of Food and Drink Federations, during meetings, fairs and conferences. Responding was on a voluntary basis, anonymous and was not subject of any form of payment.

Results. The Countries involved are Greece (25), Turkey (36), Bulgaria (3), Romania (2), and the total collected questionnaires are 66. The enterprises involved were all producers of traditional food products.

Conclusions. Enterprises, managers, technicians know that being aware of the consumers’ preferences and needs can influence a product or service innovation at any stage of a product’s development. The rapid changing in consumer preferences require an alerted, flexible and competitive food sector. The modern consumer, without give up traditions, is asking for new guarantees concerning food safety, long term health effects, sustainable production, social responsibility, animal welfare etc. Customers’ ideas and preferences should be a primary source of innovation for companies. Some organisations are ready to use customer demand to influence their own internal innovation.

With respect to the survey results, not such a strong link between consumer preferences (from the stakeholder point of view) and innovation choices exists since, as an example, the major part of respondent consider attributes such as taste, spicy, flavour, smell extremely important to the success of their products, but only 4% of them innovates in the area of Product sensorial properties. When innovations are applied to TFP, the main objective should be to avoid abrupt changes and provide relevant benefit to consumers.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
The dark side of the Romanian fruits and vegetables market. Considerations regarding the commercial frauds effects on consumer health.

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**Introduction.**
The fruits and vegetables business in Romania have been evolving under complex and dynamic conditions, issued from institutional and political auspices touched by both the economic crisis tensions and specific negative drivers’ influences. Between its main disturbance factors acting at local level we outline the Romanian horticulturists’ low capabilities to cope with the increased competition from the European Union Single Market and the local authorities’ lack of effectiveness in cutting down the gray and the hidden market of such industry.

**Results.**
This paper intends to demonstrate that overbearing tax system as shaped nowadays encourages tax evasion and commercial fraud in the horticultural business. Large quantities of low quality and unmonitored products with high possibilities to jeopardise consumers’ health on the long run have been identified in the Romanian market. Their effects have started to show the catastrophic side, beyond the economic level, both at medical-demographic and social level too. The study palliates the dark side of the local market and its producers, acting upon the Romanian products’ credibility, especially on the organic market segment, and giving few ideas to carry off unfair competition of large amounts of cheap fruits and vegetables of low quality, being imported from outside the European Union.

**Acknowledgements.** This research was co-financed through the “Sustainable exploitation of bioactive components from the Black Sea Area traditional foods-BASEFOOD” funded by the European Commission within Theme 2: Food, agriculture and fisheries, and biotechnology of the Seventh Framework Programme

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An inquiry into the market potential of traditional foods in developing economies: evidence from the Romanian consumers

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Introduction. Concurring to Maslow’s theory of needs, individuals eat for survival before progressing to eat for status and self-actualization. Thus, people initially address the nutrition demand at the base of the hierarchy. Nevertheless, food can become, in certain instances, the manifesto of rank, social belonging and deep personal beliefs.

Traditional food can act as a twofold factor. From one perspective, it represents the basic source for satisfying crucial yet ordinary needs for isolated rural communities that have little to no access to other types of food. At the other end of the need hierarchy, from a second perspective, traditional eating and cuisine is attributed to self-esteem, status as a member of an established community or providing a leisure and exotic pastime.

Results. Without governmental help, businesses specialized in traditional food production and consumption could find it difficult to expand the activity on the market above a certain threshold, as a significant part of the population could prove hesitant in paying extra for their products. That being said, the price feature proves to be the only main factor hindering the development of traditional cuisine in Romania, as all other aspects are viewed in a positive light by the majority of respondents. Hence, if measures or solutions to standardize traditional ingredients and cooking methods are introduced, the large scale production of these products can reduce the unitary costs; such approach bring off the average price to a more affordable and attractive level.

Conclusions. The results of the study indicate a situation in which two thirds of respondents consume traditional foods and would be interested in new traditional restaurants, while only one third expresses the willingness to pay extra for such products compared with generic food items. Concurrently, a very weak correlation exists between the consumption of traditional foods and factors such as age or gender.

Acknowledgements. The preparation of this article was co-financed from the European Social Fund through Sectoral Operational Programme Human Resources Development 2007-2013; project number POSDRU/107/1.5/S/77213 „Ph.D. for a career in interdisciplinary economic research at the European standards”. The research and data collection for the current work was achieved through the “Sustainable exploitation of bioactive components from the Black Sea Area traditional foods-BASEFOOD”.

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An overview of Portuguese traditional foods with quality product designations

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Introduction. Traditional foods constitute an important part of the culture, history, identity, heritage and local economy of a region or country and they are key elements of the dietary patterns of each country [1]. These foods are commonly perceived as foods that have been consumed locally or regionally for a long time and the methods of preparation of such foods have been passed from generation to generation [2]. The Portuguese cuisine is characterized by a variety of rich, filling and fully-flavoured dishes. It is a Mediterranean cuisine, with Atlantic characteristics (high consumption of fish and seafood) and influence from different places around the world. The cuisine across Portuguese regions and islands is varied [3]. In 1992, the European Union (EU) created quality product designation systems, including Protected Designation of Origin (PDO), Protected Geographical Indication (PGI) and Traditional Speciality Guaranteed (TSG), which protect registered traditional foods and enable producers to market distinctive high-quality regional products [4, 5]. In this study a review of Portuguese traditional foods with quality product designation has been carried out.

Results. Our results show that up to now 116 traditional foods have been registered in the EU, of which 58 are PDO and 58 are PGI (Table 1). With respect to TSG until now only 1 traditional food has applied for this denomination. According to the DOOR database (http://ec.europa.eu/agriculture/quality/door) foods are divided into classes.

Table 1. Portuguese traditional foods with quality product designations.

<table>
<thead>
<tr>
<th>Food classes</th>
<th>PDO</th>
<th>PGI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh meat (and offals)</td>
<td>15</td>
<td>12</td>
</tr>
<tr>
<td>Meat products (cooked, smoked, salted, etc)</td>
<td>2</td>
<td>34</td>
</tr>
<tr>
<td>Cheeses</td>
<td>11</td>
<td>1</td>
</tr>
<tr>
<td>Other products of animal origin (eggs, honey, dairy products, etc)</td>
<td>10</td>
<td>---</td>
</tr>
<tr>
<td>Oils and fats (butter, margarine, oil, etc)</td>
<td>6</td>
<td>---</td>
</tr>
<tr>
<td>Fruit, vegetables and cereals (fresh or processed)</td>
<td>14</td>
<td>10</td>
</tr>
<tr>
<td>Bread, pastry, cakes, confectionery, biscuits and others</td>
<td>---</td>
<td>1</td>
</tr>
</tbody>
</table>

Conclusions. A great variability of Portuguese traditional foods has been already registered as PDO or PGI. Nevertheless, some of these foods have never been characterized with respect to the nutritional composition and bioactive compounds content. This review aims to compile and up-to-date information of the Portuguese traditional foods with quality product designations and to increase interest among food researchers, manufacturers and consumers on these foods.

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Bulgarian street foods – characteristics, traditions, development and concerns

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Introduction. Street food (SF) is part of out-home consumption of food, that is defined as ready-to-eat foods and beverages that are sold, purchased on the street and consumed, usually walking or standing in public places. SF has old, historical roots with complex social-economic and cultural implications. Despite the development of modern fast food, traditional SF persists and is further enriched by the influence of other cultures, technological development and health care awareness.

Materials and methods. Structured face to face interviews; 600 randomly chosen consumers of SF and SF.

Results. Basic groups of traditional SF are characterized and some examples are given. Nutritional and healthy aspects of SF are discussed. Classification is given on the traditional SF, according to the basic ingredients, technology of production and contribution to the diet. A study on traditional Bulgarian street foods is presented, investigating the local cuisine and the influence of other cultures upon its development. Results show that all of the respondents at least once a day buy SF (including food or drink). About 20% of the respondents rely on SF 3 times per day. The most consumed traditional SF for breakfast are the pastry products – “banitza” (40%), “kifla” (25%) and “tutmanik” (15%) combined with “boza” (45%), “airian” (22%) and soft drinks (20%) for the teenagers; coffee (80%) for the older respondents. The traditional SF menu for lunch favours pastry products (40%) and grilled meat (35%), preferred for dinner also. Amongst the new SF, introduced as a result of the influence of the other cultures, most favorite are pizza, “hotdog” and “duner kebab”. Significant correlation is found between SF consumption and the income of the respondents, although the first factor influencing the choice of SF foods is the convenience concerning the fast service and saving of time which is more important for the men, than for the women. The low price is a decisive factor for 47.2% of the respondents. Men being more sensitive to food costs than women. SF is more preferred by the age group 10-35 years. The negative perceptions of most of the respondents (68%) about SF are connected with “chunk, dry, bad, unhealthy, unhygienic, filling out heavy on the stomach, difficult to digest”. The positive opinions of SF are “fast, easy-to-eat, clean, fills you in; easy to buy; available everywhere, low price”. A survey on 50 SF stalls show that in 70% of them good hygiene and production practice is implemented, according to the existing Food Law; 20% - not fully; 10% - not at all.

Conclusions. With the expansion of SF in the last 20 years, basic concerns are for food safety and health effect. Globalization and fast invasion of foreign cuisines tend to uniform SF offer and threaten the identity and attraction of traditional street food.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
Characteristics of traditional Bulgarian foods

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Bulgarian traditional foods reflect dietary habits developed over more than 1330 years of history. They have been affected by geographic and climatic conditions, agrarian practices, product availability, technology and communications, way of life, cultural exchange, invasions, religious beliefs, habits. Although they differ from one region to other, some basic and common features give them Bulgarian accent. Some peculiarities of Bulgarian cuisine are underlined. The methods of cooking are confined to boiling, stewing and roasting or baking. Grilling is applied to young meats and vegetables. The cooking process takes place at considerably low temperature for a longer period of time which leads to soft “almost falling apart” products. All the ingredients are put together and jointly cooked, which develops a specific characteristic harmony of flavours.

Bulgarian traditional foods are healthy, because they are based mainly on plants. The national cuisine respects seasonality of fruits and vegetables, grown either in the garden or wild. Most of the dishes include vegetables (fresh, dried, pickled or marinated) that are cooked alone or together with the meat. "Fast" and meatless periods prevail in the traditional diet. Meat is available only on celebrarions like New Year (pork), St. George (lamb) or very special occasions (hen or cock). Vegetables like beetroot, leek, onion and garlic are regularly on the table. Characteristic for the tradional dietary habits is the start of the meal with a salad (fresh or pickled). Yougurt (natural or in the form of “airian”), “matenitza” (fermeted daity product) are consumed. Bulgarian cuisine uses vegetable oil, although in the past, oil made of walnuts, sesame or olives has not been available in great quantities (sunflower oil is used since 1918); consumption of animal fats (lard and tallow) is restricted by the “fast” religious requirements. Meats are cooked in their own fats and juices. Although pork is the main meat source, the frequency of consumption as well as the physical activity and way of life of the ordinary Bulgarian, it does not have negative effect on health. Butter is cooked with vegetables like nettle, sorrel, dock or cereal based dishes like polenta, “kasha” (porridge), etc. or with poultry, and lamb. Milk and yogurt are used in cooking. Sharp, spicy and acidic foods are not characteristic for Bulgaria. Herbs are used as a condiment (“chubritza”, thyme, “samardala”, “kaloferche”, spare mint, parsely, dill, etc.) or as an essential ingredient of the dishes: nettles, dock, sorrel, “levurda”, etc. Herbal infusions are applied in folklore medicine.

Basic ingredients of traditional foods are presented and characteristic representatives are described. Special attention is paid to the cereal products “kasha”, “kachamak”, “mesenitza”, “parenitza”, etc.; bread and bakery products like “pita”, “banitza”, “mlin”, “klin”“tikvenik”, “zelnik”, “tutmanik”, , “kolache”, “gevrek”, etc.; dairy products as “kiselo mliako”(yogurt); white brined cheese, “katak”, yellow cheese, etc. Fermented drinks as “boza”, “ljuto”, beer and wine are also presented. Specific meat products as “lukanka”, “babek”,“kjufte” and “kebabche” are described.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
Street food in the Black Sea regions of Ukraine

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Introduction. The Black Sea washes mainly two regions of Ukraine: Crimea and Odessa region. In the 18th century, 95% of the population of the Crimea were Crimean Tatars. At the beginning of 20th century in Odessa lived 35% of Jews. Now the Crimea and Odessa area are multi-national regions. In the Crimea live 2.4 millions, of which 62% are Russians, 24% Ukrainians and 12% Crimean Tatars. In the Odessa region there are also 2.4 millions, of which 63% are Ukrainians and 12% Russians. Some traditional street foods of these two Black Sea regions of Ukraine are presented reflecting the multi-nation structure of the regions population.

Results. The following foods are presented as the main street foods in the Black Sea regions of Ukraine: Shashlik is a shish-kebab cooked over a wood fire; Lyulya-kebab is a minced mutton chop cooked over a wood fire; Chebureki are meat pies filled with lamb or beef and deep-fried in oil; Lagman is a rich, thick lamb soup with vegetables and long homemade noodles; Fried sunflower seeds; Fried pumpkin seeds; Kvass is a fermented beverage made from black or regular bread; Thick pancakes (olad’y) with sour cream or honey; Pancakes (bliny) with sour cream or honey; Pancakes (blinchiki) with meat, or cottage cheese; Vertuta is a spiral dough roll filled with apples, cottage cheese, meat, or onions; Plachinte (platsinda) is a traditional pastry filled with pumpkin, cabbage, cheese, potatoes, meat, or apples; Dumplings (vareniki) with filling: of potatoes, sauerkraut, mushrooms, sour cherries, fish or meat, home cheese, millet or buckwheat porridge, spinach, onion, apples, etc.; Round fried meat pies (belyashi); Baked pies (pechenie pirozhki) with filling: of meat, cabbage, potato, eggs and onion, rice, or apples; Fried pies (zharenie pirozhki) with filling of meat, cabbage, peas, potato, eggs and onion, jam, mushrooms, rice, apples; Sweat cooked (boiled) salted corn (pshonka); Salt-dried vobla (Caspian roach) (taran*), a common Ukrainian snack that goes well with beer; Paklava is thin layers of homemade dough, deep-fried and covered with nuts and honey; Small boiled shrimps (rachki).

Conclusions. Traditional street food is still underdeveloped in the Black Sea regions of Ukraine and requires further development. National traditions are suppressed by the dominance here of foreign products, especially Turkish ones.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
Street foods in Georgia – Tradition and modern trends

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Introduction. As the street foods are always market driven and consumer oriented, they are easily influenced by different tendencies of modern times. As a rule, different foods originated from abroad first gain their place on streets and only after this - in the family kitchens. On the other hand, often traditional foods receive a new shape, character or are enriched by new ingredients according to modern tendencies. Other important characteristic of the street foods is that the street foods in the large cities, rural areas and sea or mountain resorts significantly differ from each other. The poster presents the outcomes of the survey of the traditional street foods of Georgia in pictures.

Materials and methods. The survey of the modern tendencies in preparation of traditional street foods was conducted based on the information collected though field trips in the main cities and summer resorts of Georgia.

Results. The survey showed that in rural areas, as well as in sea and mountain resorts, traditional street foods still have the leading place, sometimes with little changes in ingredients, as illustrated by increased use of sugar for the preparation of the traditional fruit leather - “tklapi” (to make them sweeter to comfort most of consumers’ taste), or even experimenting with completely new fruits – kiwi for example. In large cities introduced street foods are almost dominating and there are also significant differences between the traditional and modern recipes of the traditional street foods.

Conclusion. In spite of the increasing popularity of introduced street foods, traditional foods have their leading place on Georgian market, sometimes with slight changes from traditional recipes. The dominant street foods are khachapuri (bread filled with cheese) and churchkhela (walnuts in condensed grape juice) that are sold on every corner in Georgia. It is very interesting that there are about 8-10 different forms of khachapuri which were developed in last years through market competition.

Acknowledgements. The working group wants to express its gratitude for providing the photos to Mr. Tamaz Dundua, Ms. Ia Ebralidze and Ms. Lela Khartishvili.
Traditional Foods of Georgia

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Introduction. Georgians are very proud of their rich cuisine, which kept its uniqueness though millennia in spite of significant Asian and later European influences and gained its place among world cuisines. The diversity and richness of Georgian dishes is stipulated by diverse climates of the country (23 soil-climate zones) and ancient agricultural traditions (6th-5th millennium BC.): a variety of local and introduced vegetables and fruits, cereals and legumes, wild plants harvested for food, livestock, as well as mushrooms and fish give the opportunity to prepare large number of different dishes. The poster presents the results of the research of the traditional recipes and their main characteristics in different regions of Georgia.

Materials and methods. The recipes of the traditional products investigated in the frame of the research were collected from cook books first published before 1945 and through field visits & face to face interviews with farmers’ families in different regions of Georgia.

Results. In the frame of the research old recipes were collected, the main characteristics of the key plant and animal based traditional foods were investigated and clustered. As a result, a map of traditional Georgian foods was developed which shows the diversity of Georgian cuisine and the differences region by region.

Conclusions. The main specifics of Georgian cuisine lays in the wide use of large variety of greens, walnuts/nuts, spices, garlic and vinegar for the preparation of both - plant and animal based foods, as well as in the use of sour-sweet spicy sauces prepared from different fruits and barriers (wild plum, blackberry, cornelian cherry, mulberry, grapes, green grapes, etc.); it is traditional to serve varieties of fresh fruits and greens during regular meals, as well as pickled vegetables and wild herbs. Fresh barberries, red currants or pomegranate seeds are often used as food relishes. It should be also mentioned that Georgian cuisine is not homogeneous: it can be divided in west, east and high mountainous cuisines, of which the West Georgian cuisine is most famous for its uniqueness and diversity; high mountains are more characterised by diverse meat based and unique dairy products as well as by use of seasonal wild greens, some of which are also preserved for wintertime; East Georgian cuisine is partly influenced by Asian cuisine (mainly Iranian, Turkish and Armenian), however is famous for its delicious and unique breads, fresh and processed and fruit & herbs based foods, soups and meat or fish dishes.

Acknowledgements. Hotels and Restaurants Management Group – mlgroup, Elkana member farmers.

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Traditional food in the Black Sea regions of Ukraine

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Introduction. Black Sea waters wash South of Ukraine: Odessa, Mykolaiv, Kherson regions and Crimea. Due to specific climate and people of many nations living there, foods in these areas differ from the rest of Ukraine. In Odessa region with total population of 2.5 mln there are 1.5 mln of Ukrainians and 0.5 mln of Russians. There are also a lot of ethnic Bulgarians, Moldavians, Gagauz, and Jews. In Crimea apart from Ukrainians and Russians live 0.2 mln of Crimean Tatars and many Armenians. Interaction of national cuisines in the South of Ukraine led to formation of specific and unique combination of different foods in this region. Here we present a short review of traditional food in the Black Sea regions of Ukraine.

Results. Many traditional foods one can find only in the Black Sea regions of Ukraine. Only in the Crimea there are such plants, as blackthorn, figs, Cornelian cherries, hazelnut, Crimean onion, cherry plum, which are widely used by local people as foods. In the southern areas of Ukraine one can find eggplants and peppers, of which such traditional foods as eggplant spread and stuffed peppers are produced locally in many households. Very popular different kinds of porridge (kasha), especially buckwheat kasha, baked millet kasha, pumpkin kasha. Ukrainian borsch is the traditional staple food for all Ukraine including its Southern Black Sea part. Cabbage and red beet are specific plants very popular in the Ukrainian cuisine. Out of 26 registered in BaSeFood by ONAFT foods the following 10 foods contain cabbage and/or red beet: Ukrainian borsch, green sorrel borsch, dumplings with cabbage or sauerkraut filling (varenyky), stewed cabbage, sauerkraut, white cabbage soup (kapusnyak), cabbage rolls (golubtsi), plain cakes with cabbage filling (mlyntsi), vinaigrette salad, beet kvass. Other vegetables such as onions, garlic, carrots, turnips, radishes, and cucumbers are frequently eaten raw. Sunflower and pumpkin seeds are usually roasted. Naturally, at the area there are a lot of traditional local dishes from fish, such as pike roe, salted mullet, freshly-salted or stewed mackerel, Black Sea sprat, smoked trout, Crimean red mullet, Odessa style fried gobies, Black Sea flatfish, fried mullet, grilled mackerel, trout from tandyr. Due to Jewish part of the population, became very popular and traditional in the area such specific dishes as eggplant paste, stuffed chicken neck, stuffed fish, baked pepper with salted sheep cheese (brynya), forshmak (a dish from minced herring, baked potatoes with sour cream, onions and peppers). Due to Moldavian and Gagauz population, maize sweet bread (malay) and maize porridge (mamalyga) became traditional in Odessa region.

Conclusions. Ukrainian cuisine is varied and rich in taste and nutritional value. The exceptional fertility of Ukraine's soil and its climate were favorable to the development of agriculture, which had a marked influence on the type of food eaten in the Black Sea regions of Ukraine.

Acknowledgements. The research leading to these results has received funding from the EC Seventh Framework Programme (FP7/2007-2013) under grant agreement n. 227118, project BaSeFood.
Street food in Russian Federation

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Introduction. Throughout most of the XX century, street food in the Soviet Union, and later in the Russian Federation, was not too diverse and plentiful. People ate mostly at home or in canteens at work (in factories, institutions, etc.). However, even during this period there were street foods available to everyone and very popular. In the last 15 - 20 years situation with street food has changed appreciably.

Results. One of the most popular street food during Soviet period was ice cream. It was sold in specialized stalls installed in a great number in large and small towns. Children especially loved ice cream and, to the great surprise of foreigners, eat it in the summer and winter, even during extreme frosts. Assortment of ice cream was not particularly large, typically 5-7 varieties, but each of them had its own, peculiar flavor. There were many stalls for kvass selling, but often to buy this drink, it was necessary to stand in a queue for it. The alternatives were vending machines with carbonated water with or without syrup.

Puff and baked cakes were very popular. Doughnuts were sold only in a few places in the city, and for them fans of the sweet always crowded. It was easier to buy chebureks, rolled pancakes and fancy cakes, but the latter are usually bought to eat them at home on the occasion of holydays or the arrival of guests. Pancakes were sold in specialized snack bars, but were eaten indoors, not on the street.

In the southern regions of Russia local population and people came to rest willing to buy fried sunflower seeds, cooked corn and churchkhela, that are often sold directly on the beach, and shish kebabs, too.

After a period of total shortages, which lasted from 1989 to 1993, the market of street food changed significantly. Consumers' attention shifted to the new for the Russians food: burgers, kebabs, hot dogs and sandwiches.

To date, this foods maintain sufficient popularity, but they began to compete with recently introduced products, which are an updated versions of a long time familiar pies, pancakes, doughnuts and chebureks.

And ice cream throughout all turbulent period of changes did not lose its popularity, and its range has expanded - now at any kiosk you can find at least 20 - 25 varieties of sweet delicacy. Some of these varieties repeated, at least by name, grades which were produced in the Soviet Union.

Conclusions. To date, the street food market in Russia is quite dynamic. Some traditional products lost popularity and are replaced by new, borrowed from other countries, both western and eastern. Besides its some foods based on traditional recipes (such as baked potatoes) appear, but manufacturers are adapting its to modern consumer needs.

Acknowledgements. Research funded by FP7 EU project BaSeFood, grant agreement n. 227118.
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