TRUEFOOD

Traditional United Europe Food

Resultaten TRUEFOOD
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Instrument: Integrated Project
Thematic Priority: Food Quality and Safety (# 5)

Inleiding

Via het project TRUEFOOD wordt het verbeteren van de kwaliteit en het stimuleren van innovatie voor traditionele voedingsproducten in 11 verschillende Europese landen beoogt. Het project heeft een wetenschappelijk en industrieel luik.

De focus van het wetenschappelijk luik is:
- consumentenverwachtingen voor traditionele producten in kaart brengen
- voedselveiligheid van traditionele producten verbeteren
- voorspellen van modellen/risk assessment
- verbeteren nutritionele kwaliteit van traditionele producten

Het industriële luik is gericht op:
- verbeteren marketing en organisatiemethodes binnen de keten van traditionele producten
- demonstraties in pilootinstallaties
- analyse van projectimpact op sociale en omgevingsfactoren
- training en informatieverspreiding.

In het kader van dit project wordt in elk land een 'trainings- en verspreidingsunit' opgericht. Doordat in Vlaanderen Flanders' FOOD reeds deze rol vervult, zijn de projectactiviteiten geïntegreerd in de Flanders' FOOD activiteiten. Flanders' FOOD (Fevia) staat dus in voor de verspreiding van de resultaten (kennisontwikkeling, kennisverspreiding, opleidingen, ...) van dit project in Vlaanderen. In Wallonië wordt deze taak ingevuld door Wagralim.

Het TRUEFOOD-project werd afgesloten op 30 april 2010. De belangrijkste resultaten zijn beschreven in het Engels in dit document. Individuele fiches (ook info-sheets genoemd) stellen de resultaten per werkpakket voor:

- WP1: Het in kaart brengen van de verwachtingen, percepties en houdingen van de consumenten
- WP2: Innovaties ter verbetering van de microbiële voedselveiligheid, controle van biologische en procesgeïnduceerde chemische gevaren
- WP3: Voorspellende modellen en risico-evaluaties
- WP4: Verbetering van de voedingswaarde, overeenkomstig de verbruikersvraag
- WP5: Marketing en organisatie van de toeleveringsketen voor TVM
- WP6: Proefevaluatie, demonstraties en kennisoverdracht aan de industrie
- WP7: Milieu, sociale en economische effecten van innovatie
- WP8: Verspreiding, opleiding en kennisoverdracht

Meer info vindt u op de TRUEFOOD website : www.truefood.eu. Indien u meer informatie wenst kan u contact opnemen met:

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WP1 – Determination of consumer perception, expectations, and attitudes

INFO-SHEET on TRUEFOOD main research results

A consumer driven definition of Traditional Foods, and information about consumers' image of Traditional Foods

Prepared by (name of TDU / TSM and research partners) :
Matforsk AS (Norwegian Food Research Institute)[1], FEVIA (Belgian Food and Drink Federation)[2], TDU FI (Danish Food and Drink Federation)
Contact persons: [1]Margrethe Hersleth, margrethe.hersleth@matforsk.no ; [2]Anne-Christine Gouder, acg@fevia.be

Needs / challenges:

The overall objective of Work Package 1 (WP1) is to determine consumer perceptions, expectations, and attitudes towards Traditional Food Products (TFP) and innovations acceptance related to TFP. As a first step a definition is presented for the concept of traditional products.

Possible solutions / Improvements through research activities:

A preliminary definition was elaborated, based on focus groups in six different European countries (Belgium, France, Italy, Norway, Poland and Spain). Different statements based on 1) this definition, and 2) discussions with the supply chain of TFP, were presented to a total of 4,828 consumers through a web based survey in the same six countries.

The following consumer driven definition was made:

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.

In addition, the survey gave information about the general image of traditional food. All countries revealed a very positive general image of TFP, with a mean score of 5,8 on a 1-7 scale (1 = very negative, 7= very positive). The top three drivers of positivity were "good taste", "high quality" and "consistent quality".

Expected benefits/Impact of the results and possible application by SMEs:

Can your product be considered as a traditional one? It might be difficult to apply the global definition to your food product, as the survey also demonstrates some differences between the different countries (and products). However, to get an idea of traditionalism for your product, the starting point may be these major attributes that were identified by the European consumers.

More information on the survey and the results can be obtained by Margrethe Hersleth (*margrethe.hersleth@matforsk.no*).

WP1 – Determination of consumer perception, expectations, and attitudes

INFO-SHEET on TRUEFOOD main research results

Which innovations do European consumers accept in Traditional Food Products?

Prepared by (name of TDU / TSM and research partners)
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Needs / challenges:

The overall objective of Work Package 1 (WP1) is to determine consumer perceptions, expectations, and attitudes towards Traditional Food Products (TFP) and to gain insights in innovation acceptance in traditional food products. The innovation acceptance in TFP was tested through a survey among 4,828 consumers in six European countries. Conclusions are drawn to gain a general insight in attitudes towards TFP and innovations related to TFP.

Possible solutions / Improvements through research activities:

Regarding to a list of 23 possible innovations in TFP consumers were asked 1) to what extent this innovation would increase their intention to consume traditional food products as a proxy of acceptance and 2) to what extent they perceived the innovation to be harmful for the traditional character of the food.

The 23 possible innovations are described below:

1. Label that guaranties authenticity
2. Using organic raw materials
3. New process improving safety
4. Reduction of fat content
5. Packaging preserving sensory quality
6. Reclosable packaging
7. Reduction of sugar content
8. Reduction of salt content
9. Individual portions
10. Availability all over the year
11. More variety in the offer
12. Packaging that can be used in (microwave)-oven
13. Frozen food
14. New combinations of ingredients
15. Pre-cooked food, ready-to-eat
16. Diversification of shapes/texture
17. Can be bought in vending machines
18. Can be bought via home-delivery
19. Introduction under strong brand name
20. Addition of ingredients providing health benefits
21. Can be bought for take-away from specialty shop
22. Package deal
23. Can be bought from the manufacturer

The innovations with the highest rates of acceptance are: labels that guarantee the origin of the raw material (1); using organic raw materials (2); new process improving safety (3); reduction of fat content (4); packaging that preserves the sensory quality; (5); recloseable packaging (6); more variety in the offer (11) and the possibility to buy the traditional food from the manufacturer (23).

On the opposite, the possibility to buy traditional food in vending machines (17) is not well accepted by consumers. Innovations that may be perceived somewhat harmful for the traditional character are: new combinations of ingredients used to create a new flavor (14), pre-cooked food (15) and diversification of shapes and/or texture (16).

Expected benefits/Impact of the results and possible application by SMEs:

The results reflect European consumers' voice. Although respondents may react differently according to the type of product and type of innovation, these global results may support your choices for type of innovation in your TFP. Innovations that provide consumers with relevant benefits without producing substantial changes in the products are generally well accepted. Information to consumers may be "the magic key" for successfully introducing innovations in traditional food products.

More information on the survey and the results can be obtained by Margrethe Hersleth (margrethe.hersleth@matforsk.no).

WP1 – Determination of consumer perception, expectations, and attitudes

INFO-SHEET on TRUEFOOD main research results

Awareness of the consumers to the European labels PDO, PGI and TSG

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Needs / challenges:

The overall objective of Work Package 1 (WP1) is to determine consumer perceptions, expectations, and attitudes towards Traditional Food Products (TFP) and innovations acceptance related to TFP.
As a part of this work knowledge about consumers' awareness and image of PDo, PGI and TSG is achived.

PDO: Products with Denomination of Origin, PGI :Products with Geographical Identities, TSG: Traditional Specialty Guaranteed Products.

Possible solutions / Improvements through research activities:

The awareness and expectations on the European labels PDO, PGI and TSG were tested on 4,828 consumers.

Results show that the PDO-label appears as the most known label among the three. The majority of consumers that have already heard about European labels declare that the PDO-label represents 1) a high signal of better quality (up to 93% of consumers); 2) a high signal of distinctive character (up to 92% of consumers) and 3) highly impacts the consumer's choice (up to 84% of consumers).

Differences between countries appear with regard to the awareness of the labels: *e.g.* for the PDO-label, the awareness is very high for France (98%), Spain (96%) and Italy (95%). It is rather limited in Belgium (47%), Poland (39%) and Norway (35%).

The PDO-label is the most preferred information source about TFP in France, Spain and Italy. In Belgium, Poland and Norway, a guarantee of authenticity, a quality label on the pack or a seal of certification emerge as most preferred ones.

Expected benefits/Impact of the results and possible application by SMEs:

More information on the survey and the results can be obtained by Margrethe Hersleth (margrethe.hersleth@matforsk.no).

More information on the European labels can be obtained on: http://ec.europa.eu/agriculture/quality/

WP1 – Determination of consumer perception, expectations, and attitudes

INFO-SHEET on TRUEFOOD main research results

Norwegian consumers appreciate a healthier smoked salmon

Prepared by NOFIMA (Norwegian Food Research Institute)[1], SPES TDU FEVIA (Belgian Food and Drink Federation)[2]
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Needs / challenges:

An innovation was provided to process a healthier smoked salmon by combining a new process method (brine injection) with salt content composed of Potassium Chloride (KCl) and Sodium Chloride (NaCl). Different salt solutions with NaCl and KCl were brine injected into the fillets. The innovative product was tested technologically and microbiologically. The best results were obtained with 1%KCl and 2% NaCl (the traditional product contains 3% NaCl).

A trained sensory panel described the sensory profile. It was then evaluated by 104 Norwegian consumers before a possible commercialization.

Possible solutions / Improvements through research activities:

Results for the smoked salmon showed that:

- The new salt type had no effect on the sensory properties of the salmon. The brine injection method had some effect, especially on the texture of the salmon which became less firm.
- The information about the type of salt or processing methods did not affect the consumer accept or willingness to pay for the salmon.

Expected benefits/Impact of the results and possible uses for food producers:

The sensory properties were not affected by the (innovation) new salt type. Results confirmed that a healthier smoked salmon was appreciated by the consumer panel.

Benefits for a SME by reducing salt content in products is to fulfill nutrition claims mainly (Regulation EC n°1924/2006).

A second interest for the food industry is an increase in weight by 10 % as a consequence of using the brine injection method. When using brine injection the salt is more evenly distributed in the fillets, whereas dry salting results in large variations in salt content over the fillet.

Please contact your national public body or your national food federation for additional information on the regulation, its possible amendments and the national recommendations for salt.

More details on the consumer survey can be read at www.truefood.eu. Please contact Britt Signe Granli for details.

WP2A – Innovation for improving microbial safety of TFPs origin

INFO-SHEET on TRUEFOOD main research results

Innovation for improving microbial safety of traditional food products origin Study of microbial consortia with antagonistic activities

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Needs / challenges:

The overall objective of Work Package (WP) 2A is to improve microbial safety of Traditional Food Products by developing new innovations that could be introduced into the traditional food industry.
Microbial consortia or strains with antagonistic activities have been studied in order to propose to small cheese producers, complex consortia that guarantee the safety of their cheese (inhibition of Listeria monocytogenes) without affecting their sensorial properties (flavour, aspect).

Possible solutions / Improvements through research activities:

- ✓ Different microbial consortia able to inhibit L. monocytogenes at the surface or/and in the core of cheese were found.
- ✓ Two microbial consortia from rinds of Livarot and Saint-Nectaire cheeses having antilisterial properties have been obtained in WP2A and their simplification (reduction of the amount of strains) for industrial use is in progress.
- ✓ With particular reference to Greek Graviera cheese, it was found that L. monocytogenes/L. innocua can not grow, but survive well for long times, either in the core of cheeses during ripening or at the surface of fully-ripened cheese. The natural presence of bacteriocin producing (Bac+) Lactic Acid Bacteria (=LAB) (such as strains of Enterococcus faecium and Lactobacillus plantarum) and/or the use of anti-listerial LAB strains in Graviera cheese may offer an additional hurdle to Listeria inhibition.
- ✓ Microbial consortia or strains naturally present in raw milk show antilisterial activities (for example Lactococcus lactis in raw milk for Graviera cheese); then, a “natural bioprotection” can exist to contribute to the global antimicrobial system of cheese against Listeria.

Expected benefits/impact of the results and possible application by SMEs

➔ Improvement of safety and sensorial qualities of cheeses by proposing antagonistic microbial consortia and/or bioprotective cultures, which can be used as adjuncts with starter cultures for cheese preparation

A demonstration on this topic leaded by INRA and ACTIA (ADRIA Quimper, ADRIA Normandie) for making raw milk Saint Nectaire cheese and Pont Levêque cheese is scheduled in WP6.

WP2A – Innovation for improving microbial safety of TFPs origin

INFO-SHEET on TRUEFOOD main research results

Innovation for improving microbial safety of traditional food products origin – Bio-preservation of raw pork meat by lactic acid bacteria (LAB)

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Needs / challenges:

The aim was to select antagonistic lactic acid bacteria (LAB) strains to inhibit pathogenic strains (*Listeria monocytogenes* and *Staphylococcus aureus*) in order to bio-preserve the raw pork meat using in the dry fermented sausages manufactures.

Possible solutions / Improvements through research activities:

Among a collection of 8 LAB strains, 4 of them (3 *Lactobacillus sakei* -IM8, DM2 and DM3- and 1 *Lactobacillus farciminis*) inoculated around 6 log/g proved effectiveness to reduce *Listeria monocytogenes* in raw pork meat due to bacteriocins' production.
The 3 *Lactobacillus sakei* were chosen to biopreserve fresh pork meat for the pilot scale manufacturing process of dry fermented sausage products.

For trials carried out with *Listeria monocytogenes*, data concerning the antagonistic effect of the IM8, DM2 and DM3 LAB strains are coherent with results obtained in previous tasks on fresh pork meat. A better *Listeria* population decrease was obtained with the IM8 LAB strain because trials enhanced a 1 log10/g reduction as against 0.5 log10/g with the DM2 and DM3 LAB strains.

The three parameters measured (pH, weight loss, a_w) had no negative impact on the dry sausage technology, which proves that these LAB strains can be used as bioprotective cultures.

Concerning sensorial qualities (for trials without any pathogenic germ), products biopreserved with the *Lactobacillus sakei* DM3 gave a similar or superior taste compared to the control. For products biopreserved with IM8, the color can be improved by optimizing the technological parameters. These two LAB strains will be lyophilized for further experiments as part of the 'Pilot scale evaluation, demonstration and transfer of innovation to industry' planed in WP6.

Expected benefits/impact of the results and possible application by SMEs

For a potential industrial application of bioprotective cultures, the objectives of the work done in the WP6 consists in doing a pilot scale manufacturing of biopreserved dry fermented sausages (with and without *Listeria*) in order to:

a. Validate the anti-*Listeria* effect of the 2 *Lactobacillus sakei* (IM8 and DM3) selected in WP2A
b. Make industrials taste biopreserved products once dried (1 month after the manufacturing)
c. Parallel to the tasting session, to show them the method of biopreservation

Following demonstration and tasting session, if industrials are interested, a technical support for an industrial transfer and a commercialization procedure will be considered. For the commercialization, two ways are possible: either a transfer of exploitation rights to the supplier with whom we work (confidential agreement) or a patent on the biopreservation process with the 2 selected LAB strains.

WP2A – Innovation for improving microbial safety of TFPs origin

INFO-SHEET on TRUEFOOD main research results

Innovation for improving microbial safety of traditional food products origin
Improvement of monitoring of cheese ripening room

Prepared by : INRA – Georges Corrieu / ANIA – Françoise Gorga
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Needs / challenges:

The overall objective of Work Package (WP) 2A is to improve microbial safety of Traditional Food Products by developing new innovations that could be introduced into food industries elaborating traditional products.
The monitoring of cheese ripening room has been studied in order to improve its efficiency and to ensure cheeses quality and safety

Possible solutions / Improvements through research activities (WP and task):

- A new air monitoring strategy (based on sequential air ventilation) allowing a reduction of energy consumption in ripening rooms has been tested at the pilot plant scale.

Sequential air circulation (ventilation cut off more than 50% of the total ripening time) allows saving of electric energy, without any negative effect on cheese quality.

- The on-line measurement of cheese respiratory activity during ripening was made possible. It is based on the measurement of CO_2 production and of O_2 consumption.

Expected benefits/impact of the results and possible application by SMEs

➔ Increase of cheese ripening process efficiency based on energy economies (reduction of the air ventilation time, between 50 to 70% of total ripening time)
➔ The knowledge acquired will be used to design an innovative respiratory cell to characterise cheese ripening (packaged and unpackaged cheeses).

These results have to be confirmed via a demonstration.
From these results coming of WP2A, two demonstrations leaded by INRA are in progress in WP6.

WP2B – Control of biologically-derived and process-induced chemical hazards in TFPs

INFO-SHEET on TRUEFOOD main research results

Terpinen- 4- olo: a pharmacologic & innovative tool to prevent and cure mastitis

For further information:
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Needs / challenges:

Terpinen- 4-olo inactivates mastitis responsible bacteria without altering milk organoleptic and technological characteristics

Where is Research right now?

Mastitis is one of the most expensive pathology afflicting milk production; it represent the main cause of antibiotics use in veterinary. Antibiotic resistance is a shared problem both at human and veterinary level, therefore the necessity to synthesize new molecules and/or adopt new solutions is pressing. Those actions are fundamental to fight mastitis infection.
Essential oils could be an effective solutions to the problem.
In vivo and in vitru case studies showed that the terpinen-4-ol is very efficacious on a large spectrum of bacteria causing mastitis without modifying at all milk quality along with its derived cheeses.

How can producers benefit…

Optimizing alternative solution to prevent and treat mastitis for milking breed could limit antibiotic related use.

WP2B – Control of biologically-derived and process-induced chemical hazards in TFPs

INFO-SHEET on TRUEFOOD main research results

Active packaging

Prepared by: SPES TDU FFDI Jan Pivonka (jan.pivonka@vscht.cz) in cooperation with ENEA Raffaele Lamanna (raffaele.lamanna@trisaia.enea.it), ICT Jaroslav Dobias (jaroslav.dobias@vscht.cz), ESB Tim Hogg (tahogg@esb.ucp.pt), ACTIE – LNE Catherine Loriot (catherine.sauvageot-loriot@lne.fr).

Needs / challenges:

Active packaging refers to the incorporation of additives into packaging systems with the aim of maintaining or extending packed product quality and shelf-life. Active packaging systems discussed include oxygen scavengers, carbon dioxide scavengers and emitters, moisture control agents and antimicrobial packaging technologies.

Possible solutions / Improvements through research activities:

Different types of preservatives incorporated to the packaging foil of cheese and evaluating effect to the final product were tested. The results are showing that active packaging with incorporated nisin and natamycin, are effective to control the growth of pathogens on the surface of ripened cheese. Now the kineticts of migration are verified for different types of foils.

Expected benefits/Impact of the results and possible uses for food producers:

The main benefit for SME is the possibility of shelf life extension without the need of direct supplementation of preservatives to the product. This method is easily and safely protecting the product in the distribution chain and is protecting the traditional manner of product. Of course it can be available also for other types of products. The migration kinetics is temperature dependent so in the case of interruption of cooling chain the foil is releasing more preservatives than normally. This aspect is very important for enhancing the distribution chain safety.

The partners developed also the method for control of migrating substances in the product and now are describing the influence of migrating substances to the cheese.

Estimated resources / costs and time for applicability:

The price of the foil with incorporated preservative is not much higher than the price of common foil and the packaging system do not need any difficult modification.

List of suppliers:

The production of foil could be managed by ICT (Institute of chemical technology Prague).

Possible benefits for the consumers:

The consumers are profiting from the longer shelf life of products and lower levels of preservatives present in the product at the time of consumption.

WP2B – Control of biologically-derived and process-induced chemical hazards in TFPs

INFO-SHEET on TRUEFOOD main research results

Mycotoxin

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Needs / challenges:

Mycotoxins can appear in the food chain as a result of fungal infection of crops, either by being eaten directly by humans, or by being used as livestock feed. Mycotoxins greatly resist decomposition or being broken down in digestion, so they remain in the food chain in meat and dairy products. Even temperature treatments, such as cooking and freezing, do not destroy mycotoxins. The mycotoxins are very often found in cereals. For this reason beer is one of potential risk beverage.

Possible solutions / Improvements through research activities:

The partners are trying to develop sensitive diagnostic tools for mycotoxins detection in traditional food products based on grains (i.e. beer as first model) and to define a related HACCP for traditional beer production system. Till now they developed high sensitive HPLC-MS/MS analytical technique to detect fusarium mycotoxins in beer production including conjugated “masked” mycotoxins. Engineered antibody library is in course and the critical control points are identified in Italian and Czech beer production chains.

Expected benefits/Impact of the results and possible uses for food producers:

The results are focusing mainly to improvement of food safety. The mycotoxin incidence in food is the problem of whole production and distribution chain. For the company are easy and available detection methods the big step forwards to enhanced safety of the food.

Estimated resources / costs and time for applicability:

The detection systems are estimated to be very easy for use. The main problem is the availability of test kits for different type of foods and especially for conjugated “masked” mycotoxins. The price for immunochemical test is estimated to be approximately 10 euro per one test.

Possible benefits for the consumers:

The consumers are profiting from better-assured food safety.

WP2B – Control of biologically-derived and process-induced chemical hazards in TFPs

INFO-SHEET on TRUEFOOD main research results

Organochlorine pesticides (OCP)

Prepared by: SPES TDU FFDI Jan Pivonka (jan.pivonka@vscht.cz) in cooperation with UL Matevz Pompe (matevz.pompe@guest.arnes.si)

Needs / challenges:
Organochlorine pesticides (OCP) are mostly used as insecticides. Organochloride pesticides are typically very persistent in the environment, and are known for accumulating in sediments, plants and animals. Organochlorines have a wide range of both acute and chronic health effects, including cancer, neurological damage, and birth defects. Many organochlorines are also suspected endocrine disruptors. The knowledge of OCP distribution in the food chain is very important for producer to establish procedures to decrease its level in the final product.

Possible solutions / Improvements through research activities: The partners are trying to monitor and describe the transfer of OCP along the production chain of traditional meat products. Till know the standard improved method for detection of OCP was developed.

Expected benefits/Impact of the results and possible uses for food producers:
The results are focusing mainly to improvement of food safety. The better knowledge of OCP distribution along the production chain of traditional meat products can help producers to select and better monitor the presence of OCP in raw material and final product.

Estimated costs: The price of OCP detection is approximately 500 euro.

Possible benefits for the consumers: The consumers are profiting from better-assured food safety.

WP2B – Control of biologically-derived and process-induced chemical hazards in TFPs

INFO-SHEET on TRUEFOOD main research results

Process induced contaminants

Prepared by SPES TDU FFDI Jan Pivonka (jan.pivonka@vscht.cz) in cooperation with ICT Jana Hajslova (Jana.Hajslova@vscht.cz), UNIPG Luigi Montanari (gigimont@unipg.it), KTU Sevim Kose (sevimk@ktu.edu.tr).

Needs / challenges:

Nitrosamines are produced from nitrites and secondary amines, which often occur in the form of proteins. Their formation can occur only under certain conditions, including strongly acidic conditions such as that of the human stomach. High temperatures, as in frying, can also enhance the formation of nitrosamines. These cooking styles may be responsible for thousands of cases of colon cancer per year across the world.

Biogenic amines are low molecular weight organic bases mainly produced by the decarboxylation of certain amino acids by microbial action. Some of them play a major role in many human and animal physiological functions, such as regulation of body temperature, stomach volume, stomach pH and brain activity. However, if these compounds are consumed in high quantities they could give rise to different alterations in the organism.

Acrylamide was accidentally discovered in foods in April 2002 by scientists in Sweden when they found large amounts of the chemical in starchy foods, such as potato chips, French fries and bread that had been heated. Production of acrylamide in the heating process was shown to be temperature-dependent.

Furan has occasionally been reported to be found in foods. This discovery is likely a result of our ability to detect compounds at exceedingly low levels with the latest analytical instruments rather than a change in the presence of furan. The scientists think the furan forms in the food during traditional heat treatment techniques, such as cooking, jarring, and canning.

Possible solutions / Improvements through research activities:

The partners are trying to set-up and optimise innovative analytical methods and technologies, in terms of production chain analysis, sampling and extraction methodology, biochemical analysis to monitor nitrosamines, biogenic amines, acrylamide and furan in beer and fermented fish. Also the proposal of HACCP system referring to biogenic amines and nitrosamines in beer was developed.

Expected benefits/Impact of the results and possible uses for food producers:

The results are focusing mainly to the improvement of food safety. The presence of processing contaminants can be influenced mainly by selection of raw material and by setting of process conditions. To control the process it is necessary to develop methods for quantification of these components in the final product. The partners developed methods for the quantification of these contaminants. Finally in cooperation with laboratories offering this method will be possible to optimize the process condition and selection of raw material. For beer production the proposal of HACCP including biogenic amines and nitrosamines was developed within the project.

Possible benefits for the consumers:

The consumers are profiting mainly from better-assured food safety.

WP3 – Predictive modeling and risk assessment of traditional foods

INFO-SHEET on TRUEFOOD main research results

Predictive Modelling and Risk Assessment of Traditional Foods

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Needs / challenges:

At the level of the industry, many decisions concerning microbial food safety have to be made within a limited time frame and need to be based on the best use of complex and fragmented available information. This means that industry must have the tools and knowledge to decide and to be responsible for decisions regarding food safety. There is **need** for simple, quick decision support techniques. These techniques have to be based on structuring the available information using microbiological risk assessment in a simplified form, supported by predictive modeling. This way SMEs can identify the priority issues for a specific traditional product. Mapping the food chain of traditional food products with a quantitative approach allows better management of the safety of these products.

Possible solutions / Improvements through research activities:

A microbial database has been developed with 548 datasheets on traditional European food products (fermented meats, dairy and plant products) to quantify the presence/absence of food-borne pathogens and the results have been introduced in a prevalence database to facilitate use by the industry.

- Huge variations in the mapped food supply chains (smoked sausages, ham, cheese, yoghurt, green olives, beer) in terms of time-temperature, chemical composition of the products and determination of critical control points have become available.
- An industrial risk profiling information system has been developed based on a simple questionnaire that contains the elements of risk assessment to be employed by the industry.
- Predictive modeling can provide significant help to estimate safe food shelf-life relatively quickly and cost effectively through a procedure that has been developed for the industry.
- Data generated in TRUEFOOD are being used for improving the accuracy and reliability of already existing models.

Expected benefits/Impact of the results and possible uses for food producers:

- The amount of quantitative data will be made accessible to the food industry by means of user-friendly software that will allow the development of practical safety management decision tools.
- The outcome of modeling work will result in the improvement (if necessary) of already existing software packages (e.g. Combase, Sym'Previus) that are already available in the internet.
- Concerning risk assessment, a simple risk profiling sheet has been developed that can be adapted directly by the industry. The user will have to provide the information for risk analysis in the form of qualitative statements and/or quantitative data concerning factors that will affect the food safety risk to a specific population, arising from a specific food product or hazard, during the steps from processing to consumption. Risk profiling provides a relatively simple practical tool for structuring fragmented data available at company level to significantly improve the reliability of the evaluations on safety of the products.

WP3 – Predictive modeling and risk assessment of traditional foods

INFO-SHEET on TRUEFOOD main research results

Development of a simple risk profiling technique for risk assessment in traditional smoked fermented meat products

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Dr F. Salta, TSM, Federation of Hellenic Food Industries (SEVT)

Needs / challenges:
At an industrial level, many decisions regarding microbial food safety have to be made within a limited time-frame and need to be based on the best use of complex and fragmented available information. This means that industry must have the necessary tools and knowledge to make decisions regarding food safety. Consequently, there is need for the development of simple, quick decision support techniques. These techniques have to be based on structuring the available information using microbiological risk assessment in a simplified form.

Possible solutions / Improvements through research activities:
A simple risk assessment approach has been developed by Campden and Chorleywood Food Research Association based on a questionnaire that helps to structure the available fragmented data and highlights gaps to identify where additional tests/information (e.g. challenge tests, etc.) are necessary. The risk profile sheet is a quick, simple paper-based approach to Risk Assessment that allows the user to recognize the features of the process and the product exerting the biggest influence on the level of risk.

Expected benefits/Impact of the results and possible uses for food producers:
This Risk Profile will allow the user to recognize the features of the process and product exerting the biggest influence on the level of risk, to distinguish between the seriousness of various hazards and visualize the 'risk' of the product under examination. The information provided may help risk managers to make decisions and apply control measures, within the framework of a Food Safety Management System, with ultimate objective the food hygiene assurance and the production of safe foods.

WP3 – Predictive modelling and risk assessment of traditional foods

INFO-SHEET on TRUEFOOD main research results

Quantitative predictive models for the growth of Listeria monocytogenes *in traditional pasteurized vanilla cream*

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Needs / challenges:
In the field of predictive food microbiology, quantitative estimations of the growth, survival and death of microorganisms in foods can be produced using mathematical modelling. However, the majority of these models has been developed under laboratory media and thus has a tendency to overestimate microbial growth as they do not take into account additional factors such as the food matrix, microbial competition, substrate availability, and minor food constituents (e.g. antimicrobial compounds).

Possible solutions / Improvements through research activities:
The ultimate test for predictive microbiology models would be the comparison of their predictions with observations from microbial behaviour in real food and the evaluation of their performance in product-specific models. Within the project, the Agricultural University of Athens has developed a product-specific model for predicting the growth of *L. monocytogenes* in traditional pasteurized vanilla cream. The model was developed under isothermal conditions, but as temperature in real situations is hardly isothermal in refrigerators, the model was further validated under dynamic (fluctuating) temperature scenarios. The final model has been prepared in an Excel spreadsheet file that can be used by anyone who has no specific knowledge on predictive microbiology.

Expected benefits/Impact of the results and possible uses for food producers:
The developed product-specific model could be used directly by the industry and become an additional tool for effective risk assessment by providing more realistic estimations of safety risks related to the consumption of this product.

INFO-SHEET on TRUEFOOD main research results

Data on physicochemical properties (a_w, % moisture and pH) of Traditional Foods

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Needs / challenges:
Traditional European Foods were analyzed at various time intervals to determine the changes in the physicochemical (pH, a_w, moisture) and microbiological attributes in Greece, Portugal and Hungary. Greece focused on green and black olives, vanilla cream, sliced heat processed ham, fermented sausages, ready-to-eat fishery products, acid-curd soft cheese and dry salted olives. In Portugal analyses were carried out in 111 cheese samples from raw sheep milk from different lots produced by different producers located in different regions of Portugal, as well as in traditional smoked fermented sausages from the North of Portugal. Finally, a retail survey was conducted in Hungary and provided data about traditional Hungarian sausages.

Expected benefits / Impact of the results and possible application by SMEs:
The traditional European food products surveyed presented a great variability in their intrinsic physicochemical parameters (pH, a_w, moisture, NaCl content, $NaNO_2$ concentration). Certain levels of these intrinsic parameters could suppress the growth of pathogenic microorganisms in certain foods (e.g. Portuguese and Hungarian sausages), whereas in other cases no inhibitory action was observed (e.g. some Portuguese cheeses). The data produced could be taken into account by SMEs for the improvement and re-estimation of the shelf-life of these products as well as in the estimation of the potential risk associated with their consumption.

D3.1.6

WP3 – Predictive modelling and risk assessment of traditional foods

INFO-SHEET on TRUEFOOD main research results

Data on time-temperature profiles consumer practices during certain food chains of traditional foods

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Needs / challenges:
Data on time-temperature profiles in selected parts of the food supply chain were monitored in Greece and Hungary. The actual temperature history was recorded in computer downloadable data loggers in order to determine the current practices and identify any temperature abuse points that could pose a risk in the safety of selected traditional products.

Research activities:
Greece obtained information:
the temperature profiles in certain retail outlets (supermarket refrigerators) for meat products in different cities of Greece,
the time temperature fluctuation profile on the transportation trucks in the area of Athens,
the temperatures in household refrigerators,
the consumers practices.
Hungary studied:
the time temperature profiles of the total supply chain (from farm to fork) of different cooked, chilled meat products in Hungary, including factory storage, distribution, retail cabinets, home transportation and home storage,
the consumer practices.

Expected benefits / Impact of the results and possible application by SMEs:
Significant deviations were observed from the legally required temperatures in some steps of the cold chain. Consumer practices are far from ideal, and as a consequence, perishable foods are kept frequently at wrong (warmer) places in the refrigerators. In Greece, temperature abuse was observed mainly in transportation trucks and household refrigerators, whereas in retail outlets there was generally good temperature regulation. Similar results were obtained in Hungary where significant deviations in proper storage temperature were evident in certain retail cabinets and household refrigerators. These findings have to be considered when establishing safe shelf-life time for food commodities. The data collected on time-temperature profiles and consumer practices of the food chains of TFP were used for assessing the risks associated with the consumption of the products.

WP3 – Predictive modelling and risk assessment of traditional foods

INFO-SHEET on TRUEFOOD main research results

Risk profiling for selected European traditional food products

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Needs / challenges:
A risk profiling for fermented table olives was developed by AUA for the following pathogenic bacteria: pathogenic *Escherichia coli,* and *Listeria monocytogenes.* The risk profile was developed with the use of a simple risk profiling sheet developed by CCH in Hungary that embodies established principles of food safety risk assessment, i.e., the combination of probability of exposure to a food-borne hazard, the magnitude of hazard in a food when present, and the probability and severity of outcomes that might arise from the level and frequency of exposure. Scores for both pathogens were low for the low risk population while moderate risk scores were obtained for the high risk population.

Expected benefits / Impact of the results and possible application by SMEs:
The risk profile sheet is a quick, simple paper-based approach to Risk Assessment that allows the user to recognize the features of the process and the product exerting the biggest influence on the level of risk. This method consist a well applicable tool for the industry for the assessment of the risks presented by the production process and the chill chain. Although it contains hazard identification, hazard characterisation and exposure assessment steps the Risk Profile will not give a detailed results as obtained by a formal Risk Assessment.

D3.3.5

WP3 – Predictive modelling and risk assessment of traditional foods

INFO-SHEET on TRUEFOOD main research results

Assessment of quantitative predictive models and validation under dynamic temperature profiles.

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Needs / challenges:
The aim of the study was to develop models that quantify the behaviour of pathogens in selected traditional food products under isothermal conditions, and subsequently validate the performance of these models under dynamic (fluctuating) temperature profiles. For this purpose:
Greece focused on the responses of *Listeria monocytogenes* in pasteurised vanilla cream after post-processing contamination and quantified the responses of the pathogen in two dynamic temperature scenarios.
Hungary focused on traditional Hungarian ready-to-eat meat products with emphasis on un-sliced flamed sausages and sliced dry fermented sausages.

Expected benefits / Impact of the results and possible application by SMEs:
Predictive models are quick, easy-to-use decision support tools, which can be used for evaluation of food safety. These models went through a great improvement in the past few years, which helped the application by professional users.

The model developed herewith was able to describe satisfactorily the growth pattern of *L. monocytogenes* in vanilla cream (a non acidic dairy product) samples during post-processing contamination under both isothermal and fluctuating (dynamic) temperature conditions. Challenge tests were undertaken under isothermal and dynamic temperature profiles typical to the Hungarian chill chain and the results were compared with the predictions provided by Sym'Previus and Combase.

The results indicated that the meat products under consideration did not support the growth of the pathogen and most of the traditional meat products that were surveyed seemed to be safe because a reduction in microbial counts was observed probably due to the intrinsic factors (pH, a_w) in these traditional foods. On the other hand, the growth of *L. monocytogenes* in the pasteurized cream could not be suppressed by storage temperature (both static and dynamic), posing thus a health risk in the case of post-processing contamination of the product.

D3.3.6

INFO-SHEET on TRUEFOOD main research results

Improvement of the already existing software package

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Needs / challenges:
A number of existing software packages (e.g. Pathogen Modelling Programme, Combase, Sym'Previus) is available today to predict the growth/survival of spoilage and pathogenic microorganisms in foods. Two different approaches are being developed in the available softwares, i.e. polynomial and cardinal modular simulation tools.

Expected benefits / Impact of the results and possible application by SMEs:
Predictive microbiology knowledge is nowadays available in operational softwares for industrial applications which allow the simulation of microbial behaviour for more and more species in order to identify and control microbial hazards. Two of these softwares (Combase and Sym'Previus) were employed to predict the growth responses of *L. monocytogenes,* inoculated on pasteurized vanilla cream and stored under two different fluctuating temperature profiles. Results showed that there could be overestimation of the responses of the pathogen with Combase software in both temperature scenarios assayed. However, the new probabilistic module developed by Sym'Previus decision making tool could provide more realistic predictions of the pathogen taking into account batch and intraspecies variability.

D3.4.2

WP4 – Improving nutritional quality of traditional products in line with consumer demand

INFO-SHEET on TRUEFOOD main research results
(Effect of vegetable lipids and antioxidant supplementation on the nutritional composition and sensory properties of milk and cheeses)

Improvement of traditional hard uncooked cheese from a nutritional point of view through cow's diet supplementation

Prepared by (name of TDU / TSM and research partners):

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Needs / challenges:
Traditional cheeses produced with standard milk have a nutritional composition, which could be improved, increasing value to both consumers and producers. The challenge is to decrease the milk content of saturated fatty acids (SFA) without negatively affect the sensory characteristics of a traditional hard uncooked cheese.

Possible solutions / Improvements through research activities:
(A short description on the solutions produced by the WP/task. Description on what we've learned from the task that can be applied by SMEs)
The supplementation of maize silage-based diets both with extruded linseeds (oil addition corresponding to 5% of the cow intake) and antioxidants (7500 IU/day of vitamin E) was evaluated.
The supplementation with extruded linseeds does not reduce the milk yield, improves the dairy fat composition (23% of reduction of the total SFA) and does not have a significant negative impact on sensory properties of a traditional hard uncooked cheese.
Vitamin E supplementation has a limited effect on both nutritional and sensory quality of milk and cheese and, therefore, no additional benefit is expected.

Expected benefits/Impact of the results and possible application by SMEs:
(Description on the benefit for the company from an economic and qualitative point of view. Description on how to apply the results / tools to use)
The use of this improved milk by the producers of hard-uncooked cheese will increase the nutritional quality of this product. This product will have an added value, which can be translated to the price or can be used as a differentiation factor, increasing the competitiveness of the company.
The extra benefits of the cheese producer should be translated to the price of the milk to promote the use of this supplemented diet.

WP4 – Improving nutritional quality of traditional products in line with consumer demand

INFO-SHEET on TRUEFOOD main research results
(Development of analytical methods and/protocols to assess the salt distribution in salted ham and fish products)

A computed X-ray tomography system (CT) to optimize salting treatment of salmon fillets

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Needs / challenges:
To measure the distribution of salt within the product with non-destructive methods would facilitate the optimization of salting methodologies.

Possible solutions / Improvements through research activities:
(A short description on the solutions produced by the WP/task. Description on what we've learned from the task that can be applied by SMEs)
A computed X-ray tomography system (CT) has been calibrated for distributional NaCl analysis in salmon fillets. The average local prediction error was 0.34 % and the correlation between predicted and reference values was 0.95.

Expected benefits/Impact of the results and possible application by SMEs:
The computed X-ray tomography system (CT) could be used in the optimization of salting methodologies at pilot plant scale or to validate the methodologies at industrial scale.

WP4 – Improving nutritional quality of traditional products in line with consumer demand

INFO-SHEET on TRUEFOOD main research results
(Development of analytical methods and/protocols to assess the salt distribution in salted ham and fish products)

A non-contact instrument to classify online salmon fillets according to the fat content

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Needs / challenges:
To optimize the salt content in all parts of a salmon fillet, one needs to know the fat content in all parts of the fillet prior to salting. This should be measured with a non-destructive methodology at high speed in order to be used online.

Possible solutions / Improvements through research activities:
A prototype non-contact NIR interactance imaging instrument, developed in MATFORSK for analysis of water in codfish, has been adapted for distributional fat analysis in salmon fillets. The average local prediction error was 1.74 % and the correlation between predicted and reference values was 0.96. With this prototype in one second approximately 3000 NIR spectra were obtained from the salmon fillet passing on the conveyor belt.

Expected benefits/Impact of the results and possible application by SMEs:
The non-contact NIR interactance imaging instrument can be used for salmon classification on the conveyor belt at high speed before salting. This will allow the producers to adapt the best salting method according the fat content, reducing the problems associated with excessive or insufficient salt contents.

Possible benefits for the consumers:
A classification of salmon fillets according to the fat content will allow the producers to give additional nutritional information to the consumers. If this classification system is used together with different salting process (adapted according the fat content) the product will have a more precise salt content, avoiding products with excessive salt content.

WP4 – Improving nutritional quality of traditional products in line with consumer demand

INFO-SHEET on TRUEFOOD main research results
(Investigation of the effect of elicitor treatments and ripening stage at harvest on yield and the nutritional composition of brassica)

Variety of Cauliflower, elicitor and fertilizer treatment to increase nutritional contents at primary production

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Needs / challenges:
There is a rising consumer demand for minimum use of fertilizers and/or higher nutritional (and sensory) quality in vegetables (for instance, cauliflower). Moreover, farmers will obtain "added value" cauliflower if appropriate technologies at primary production could be developed in order to satisfy this demand.

Possible solutions / Improvements through research activities:
Results from Truefood experiments showed that green varieties of cauliflower had the highest levels of nutrients (vitamin C, total sinapic acid derivatives and total glucosinolates). In addition, elicitor applications (chitosan 1%) on green varieties of cauliflower have shown an important increase of Glucosilanates and magnesium contents. Moreover, the substitution of mineral fertilizer by organic fertilizer for all varieties increased the levels of vitamin C and decreased levels of folates.
Therefore, the solution proposed for producing cauliflower with higher nutritional quality and with lower use of mineral fertilizers is:

- Selection of a green variety (Trevi or Panther),
- Weekly elicitor applications (chitosal 1%) from October to December and
- organic fertilization with cattle manure (60 t ha^{-1}year)

Expected benefits/Impact of the results and possible application by SMEs:
The proposed solution is expected to have positive effects on contents of antioxidants (glucosilonates and sinapic acid derivatives) and vitamin C.
Environmental benefit can be highlighted by producers to obtain an "added value" for their products: higher nutrient content with lower use of mineral fertilizers.

Possible benefits for the consumers:
Benefits are linked to those consumers sensitive to nutritional quality and/or environmental problems.

WP4 – Improving nutritional quality of traditional products in line with consumer demand

INFO-SHEET on TRUEFOOD main research results
(Effect of crop protection innovations on crop quality and yields)

Effectiveness of flower resources to enhance levels of biological pest control in lettuce

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Needs / challenges:
Based on current knowledge, there is potential for developing "added value" vegetable crops through introduction of innovations at primary production, which allow farmers to satisfy consumer demand for minimum pesticide use and/or higher nutritional (and sensory) quality.

Possible solutions / Improvements through research activities:
Providing plant resources in the field and avoidance of pesticide treatments ensured the presence of key predators: adult hoverflies were attracted and aggregated on flower patches, and predatory bugs did establish in the insectary plants. Being highly mobile, both predators will establish on lettuce plants unless limited by pesticide treatments. As a result of predator establishment, prey populations were reduced below the economic threshold. Moreover, no other pests were recorded from the lettuce crops as a result of adding the insectary plants. Plant yield and quality was not reduced by this pest control strategy.

Expected benefits/Impact of the results and possible application by SMEs:
(Description on the benefit for the company from an economic and qualitative point of view. Description on how to apply the results / tools to use)
Flower margins with Lobularia companion plants can be used in lettuce crops to enhance existing levels of biological control. The incorporation of those results into Integrated Pest Management programs would satisfy the consumer demand for sustainable crop protection procedures with minimum pesticide use without decreasing neither the yield nor the nutritional quality of lettuces.
The environmental benefit can be highlighted by producers enhancing existing levels of natural enemies for other crops in their farm, and may also contribute to obtain an "added value" for their products.

Possible benefits for the consumers:

Access to quality products produced under more sustainable crop protection procedures that will also contribute to the maintenance of biodiversity in agricultural ecosystems.

WP4 – Improving nutritional quality of traditional products in line with consumer demand

INFO-SHEET on TRUEFOOD main research results
(Investigation of the effect of elicitor treatments and ripening stage at harvest on pest and the nutritional composition of tomato fruit)

Foliar treatment of tomato crops with Milsana® or Chitoplant® to reduce sulphur use at primary production

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Needs / challenges:
Based on current knowledge, there is potential for developing "added value" tomato through introduction of innovations at primary production which allow farmers to satisfy consumer demand for minimum pesticide use and/or higher nutritional (and sensory) quality.

Possible solutions / Improvements through research activities:
Foliar treatments with milsana or chitin by spraying a volume of approximately 150 ml per plant at different doses: Milsana® at 3 ml L-1 and Chitoplant® at 0.5 g L-1; at 7 days intervals, do not have any negative or positive impact on plant growth and yield. In most cases, the two foliar elicitors have a positive effect against powdery mildew disease of tomato. The vitamin C and flavonoid contents are higher or similar to those detected for treatments using Sulphur. Furthermore, treatment with Milsana seems was able to maintain the carotenoid levels also in fruits produced by plants affected by disease.

Expected benefits/Impact of the results and possible application by SMEs:
Milsana treatment can be used in tomato crops without Sulphur treatment, which would satisfy the consumer demand for minimum pesticide use, without decreasing the nutritional and sensory quality of tomatoes.
The positive effect against powdery mildew disease will reduce the extra cost that these kinds of products normally have.
The environmental benefit can be highlighted by producers to obtain an "added value" for their products.

WP5 – Improved marketing and food supply chain organization methods for traditional food products

INFO-SHEET on TRUEFOOD main research results

A tool for improving effectiveness of food chains, importance of networking and collaboration

Explorative research on determinants of bottlenecks and success factors of traditional food chains

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Chain management*: the management of multiple relationships focusing on harmonizing the use of competencies, resources and capabilities along the entire food chain (instead of focusing on the individual steps) to deliver enhanced customer service and economic value through improving trust and collaboration between supply chain partners.*

Needs / challenges:

Major bottlenecks, identified related to networking and collaboration along the supply chains of traditional food producers, especially SMEs :

- The lack of collaboration, trust and confidence between chain members and peers ;
- The improper use of the existing networks because of the lack of understanding ;
- The inefficient use of alternative distribution channels (like specialized shops or HORECA).

Possible solutions / Improvements through research activities:

Below is a brief summary of the newer results achieved by October 2009.

- A Guideline for carrying out questionnaire surveys with food supply chain members is under preparation.
Objective: development of a guideline including a procedure based on the practical experiences of interviews carried out with companies within selected food chains.
Background: Collection and synthesising the practical experiences collected during the different surveys with the chain members.

- A report on the similarities of views of producers and consumers (and support organisations) is under preparation.
WP5 developed a definition, which was intended to be used for the research in the WP5. This was tested with the supply chain members during focus group discussions, and WP1 developed a definition, which was checked with consumers in 6 countries. A comparison of the two approaches has already been made by WP5 for a conference presentation, which showed that they are in line and complementary to each other. The amalgamated definition was discussed with Hungarian stakeholders on 21 October. It has to be emphasized that the definition of WP5 serves for research purposes only, and it is not the intention of the WP5 to develop a definition for legal purposes.

- Recommendations to SMEs are under preparation.
Objectives: To summarize the main results of the WP5 for all stakeholders, to improve the competitiveness and market access of SMEs producing, processing, distributing traditional foods, through improved marketing and food chain organisation methods.

- **An inventory of successful solutions for food supply chains** was developed to improve access to market and the efficiency of using resources of traditional food manufacturers, and to demonstrate the

benefits of supply chain management of SMEs (67 case studies).The partners of WP5 are continuously collecting examples for the inventory of best practice case studies in order to prepare the final version forthcoming in the beginning of 2010.

Conclusions stress the importance of networking and collaboration between partners along the supply chain and peers in innovation, marketing management and distribution. Also networking and collaboration can be enhanced by sharing information, common thinking and joint use of the resources. The complete reports are available on the Internet (www.truefood.eu, Reports D5.1.1, D5.1.2, and D5.1.13). Please refer also to the specific info-sheet on inventory of best practices.
Contact person : Andras Sebok, a.sebok@campdenkht.com.

Expected benefits/Impact of the results and possible application by SMEs:

In terms of the value for companies, the research results on supply chain management are being spread through a modular training package. The courses provide up-to-date real life business cases, best practice studies, information across different food sectors and self-application tools. Three sessions:

- Introduction – Definition of a chain management and understanding of its benefits ;
- Chain Performance – Exploring the critical success factors relative to the overall chain performance and providing a framework for the development of an overall chain performance assessment tool ;
- Chain Strategies – Understanding different distribution chains, identifying distribution problems, developing innovative distribution strategies, understanding the determinants of high and weak performing chains and developing innovative chain strategy to enhance chain performance.

In the remaining months of the Truefood project, the partners of WP5 continue to provide training courses on chain management, chain strategies, and chain performance. These trainings have been given in six countries already. Participants of all experience levels are welcome. More information at : www.truefood.eu.

The guideline can help mostly the support organizations in finding the right way to get up to date information and develop their knowledge for example on activities of food businesses in the traditional food sector related to chain management and innovation practices.

The recommendations will provide a simple source of advice for all stakeholders to improve their practices (SMEs, support organisations), services (support organisation, governments, research providers), overview, approach (all stakeholders), policy development (governments, support organisations), and strategies (all stakeholders).

The successful examples in the Inventory demonstrate that there are several ways how SMEs can improve the performance of their chains and networks and demonstrate also the benefits of implementing the chain management approach. The best practice case studies should motivate SMEs to exploit their chain and marketing management capabilities and to implement innovation activities along the chain.
More information : SPES food federations ; UGent (Belgium).

Other relevant information related to this research result (if available):

All deliverable reports are accessible on the Internet : www.truefood.eu.

WP5 – Improved marketing and food supply chain organization methods for traditional food products

INFO-SHEET on TRUEFOOD main research results

Chain goals, chain performance and chain strategies - ***Indicators of overall traditional food chain performance***

Prepared by (name of TDU / TSM and research partners) : CCH (Hungary), PEG (Italy)[2], TDU FEVIA (Belgium), TDU FHFI (Hungary), TDU SETBIR (Turkey)[1], UGent (Belgium)
Contact persons : [1]Y.Iki Yakin yudumiki@setbir.org.tr, E. Yucel elifyucel@setbir.org.tr ; [2]M. Contel, michele.contel@pe-group.it.

This info-sheet provides summarized information about the opportunities involved with managing multiple relationships (food manufacturer and its suppliers and customer) along the products, services, finances, knowledge and information flows. It builds on the idea of combining resources, capabilities and competencies along the food chain for higher added value. It claims that that such higher value can be achieved by improving the quality of chain relationships.

Needs / challenges:

- Rapid response to end-consumer demands
- Competition between chains
- Recognize the performance potential of chains
- A chain strategy and collaboration

Possible solutions / Improvements through research activities:

Chain strategies in order to enhance performance of traditional food chains in the problematic areas :

- Product improvement strategies (Pls)
- Product modification strategy (PMs)
- Improving the quality of the production process throughout the chain (PPls)
- Improve the Value-For-Money in your purchases (VFMs)
- Reformulate logistics (RLs)
- Increase the flexibility of operations (IFOs)
- Increase the reputation of your firm in the chain (IRs)
- Branding traditional food production (BTFs)
- Enhance and take advantage of your networks (ETANs)
- Make your finance more robust (MFRs)
- Improve the environmental, ethical and traditional compatibility of your business (CLAIMs)
- Make your communication effective (MCE)

Benefits and Impacts for SMEs:

Modular Training Packages will improve the understanding of food companies about how to manage their chains. Trainings topics are :

- Chain management and benefits
- Critical success factors and framework development for Chain Performance
- Developing innovative distribution strategies for solving problems by Chain Strategies
-

More information : The complete reports are available on the Internet (www.truefood.eu). Contact: *SPES food federations ; UGent (Belgium).*

WP5 – Improved marketing and food supply chain organization methods for traditional food products

INFO-SHEET on TRUEFOOD main research results

Innovative distribution strategies for traditional food products

Prepared by :
CCH (Hungary), PEG (Italy), TDU FEVIA (Belgium), TDU FHFI (Hungary), TDU SETBIR (Turkey)[1], UGent (Belgium)[2]
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[2]*X. Gellynck, Xavier.Gellynck@UGent.be*

This info-sheet provides distribution strategies of the marketing decision process, involving all links in the distribution chain regarding decisions about the distribution of the traditional food products to the end user. All enterprises should pay attention to the organization and optimization of the distribution process of its products to the consumer.

Needs / challenges:

- The choice of the right distribution channel in order to achieve competitive advantage in the market
- In order to solve problems of SMEs short channels do not always provide success. Producers of Traditional Food Products need to adopt to different distribution channels in different countries

Possible solutions / Improvements through research activities:

- Innovative distribution strategies for SMEs:
- All-in-one packaging
- Regional corner
- Network facilities
- Joint promotion
- Involvement of consumer
- Agro-tourism
- Fast food chains
- Small-area territorial penetration
- Specialty shops
- Joint distribution
- E-commerce B2B & B2C
- Moving outlets

Benefits and Impacts for SMEs:

For most of the innovative distribution strategies the cooperation of the suppliers, customers and the food manufacturers will contribute to successful implementation of these innovative distribution strategies.

More information is available on the Internet (www.truefood.eu, Contact person: Xavier Gellynck, Xavier.Gellynck@Ugent.be, SPES Food Federations, UGent (Belgium).

WP5 – Improved marketing and food supply chain organization methods for traditional food products

INFO-SHEET on TRUEFOOD main research results

How can you reduce bottlenecks and promote success factors in your traditional food chain? An inventory of best practice case studies

Prepared by: CCH (Hungary)[1], SPES TDU FEVIA (Belgium)[2], SPES TDU FHFI (Hungary), SPES TDU SETBIR (Turkey), UGent (Belgium)
Contact persons : [1]A Andras Sebok, a.sebok@campdenkht.com; [2]A.-C. Gouder, acg@fevia.be

Sixty-seven case studies provide methods and solutions for SMEs to reduce or eliminate bottlenecks in their traditional food chains. Cases are fully described in Report D5.1.13 (www.truefood.eu).

Chain Management : *The management of multiple relationships (accompanying products, services, finances, information and/or knowledge flows) – focusing on harmonizing the use of resources, capabilities and competencies along the entire food chain (instead of focusing on the individual steps only) to deliver higher added value by improving the quality of chain relationships.*

Networking :
- Quiz contest between village pubs
- Sharing costs through local associations of growers and product marketing organisations
- Innovation networks for SMEs
- Preparation of national production and sales statistics in a sector
- Development and maintenance of best practice guides

Chain approach – collaboration :
- Traceability system on a whole chain
- Integrated chain management “Vitaproject” (meat products)
- Integrated full chain safety / quality management systems
- Peeling, cutting and packing pineapples and mangoes on industry scale in Central and Southern America for significantly lower labour cost than in Europe
- Collaboration between food manufacturers and caterers on drink hygiene and quality
- Extra payment for the higher quality of raw green peas
- Product development with the assistance of the ingredient suppliers
- Packaging development with the assistance of the suppliers of innovative packaging
- Organisation of growers contests
- Integration of the animal breeding or plant growing activities and the food processing
- Individual coffee making solution
- Gyermely Plc.: integrated chain management

Resources :
- One-stop shopping for catering professionals “ISPC”
- High innovation capability of the SMEs based on the motivation and skills of the owner
- Exploitation of the dock area of the cold sore

Institutions :
- Association of Hungarian Pálinka Knights’ Order
- Wine ”orders” and wine trails
- Port Wine Institute
- Hungarian “Pálinka” Marketing Association
- “Local Marketing” in the bakery sector

- QUALIVITA foundation- Web portal of PDO, PGI atlas
- Industry research associations and joint institutions for provision of collective research and/or marketing service
- Food federations for improving the technology transfer
- Association of Premium Hungaricum
- National Association of Small and Medium Sized Food Entrepreneurs
- Jam museum ”Lekvárium” on the plum trail at Penyige

Marketing strategy :
- COOPAIM/COPAIM (seafood and vegetable products)
- ARNALDO CAPRAI (wine products)
- Mozzarella cheese making experience with the involvement of consumers
- House of Gastronomic Pleasures of county Somogy in Hungary

Marketing for product assortment :
- Distribution of smaller quantity of wine to catering
- Product assortments in one pack
- Meat products as savoury snacks
- Different quality grades of Port wine
- Importance of typical national flavours/products
- Wine regions
- Fresh meat and processed products made of Mangalica pork
- From wine to cosmetics: innovation in the final use of a valuable resource

Marketing for distribution :
- Distribution of small quantities of several brands through specialised wholesalers and speciality shops
- Help yourself selection of traditional foods offered at Portuguese country style restaurants
- ”Bock” bistro for traditional Hungarian meals and wines
- Stadler traditional meat production
- Social shops network – improving the success of the Hungarian products

Marketing for product advertising, promotion :
- Promotional centres for regional products
- House of Hungarian Wines
- Showing of history of Port wine/Guinness beer in a cellar / breweries or Scottish whisky distillers
- Showroom for advertising traditional products
- Seminars about use of olive oil
- Whisky trail
- Upgrading of the product to gift for special occasion(s)
- Gambero Rosso TV
- Feature restaurants as marketing tools “Al pesce azzurro” and “Scimitar” for traditional product
- Local own label products of a small delicatessen shop
- “La musette” – A delicatessen shop having its own private brand of traditional food products in France
- Specialised distribution for small outlets – Lekkerland
- Beer special shop and beer restaurant “De Heeren van Liedekercke”
- Regional promotional platform “Eifel-Ardennen-Tisch”
- Joint initiative of Gueuze and Kriek devotees and breweries
- Regional tourist promotion initiative
- Association of the Breeders of Hungarian Simmental Cattle
- The Association of Hungarian Grey Cattle Breeders
- Free-range poultry- branded: Red Master

WP5 – Improved marketing and food supply chain organization methods for traditional food products

INFO-SHEET on TRUEFOOD main research results

Self-evaluation of marketing management capabilities - ***Benchmark for evaluating marketing management capabilities of traditional food producers***

Prepared by:
CCH (Hungary), PEG (Italy), TDU FEVIA (Belgium TDU FHFI (Hungary)[1], TDU SETBIR (Turkey), UGent (Belgium), UMIL (Italy)[2]
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Marketing: *a social and material process by which individuals or groups succeed in having what they need, or desire, through the creation, offer, and free exchange of products and services of value (Kotler, 2004).*

Marketing management *: the realization of marketing on the part of firms is achieved through this process, that consists of analyzing market opportunities, researching and selecting market objectives, and developing marketing strategies that should than be realized and controlled (Kotler, 2004).*

Needs / challenges:

Major bottlenecks, identified related to the marketing resources of traditional food producers, especially SMEs :

- The satisfaction imbalance due to the huge bargaining power of the supermarket/hypermarket chains and their low price policies ;
- The difficult access of traditional foods to the international market.
- The low marketing budget due to the limited financial resources which hampers the use of systematic marketing and market research activities.
- Two main weaknesses:
  - control and evaluation of the marketing activities
  - planning and implementation of the marketing activities

Possible solutions / Improvements through research activities:

Below is a brief summary of the newer results achieved by October 2009.
Based on an EU-wide on-line survey on the marketing management with more than 400 SMEs a targeted action plan is developed in order to increase the marketing management capabilities of SMEs.

Proposed solutions:

A) Managerial implications:

- Investigation of the needs of the consumers
- Analysis of information about supply chain agents
- Definition of objectives and strategy by establishing a final mission and a more organized work (define roles, tasks, and liabilities within the firm), for example, periodical deadlines and meetings should be planned
- Monitoring the results, and application of appropriate corrective actions
- Establishing money incentives to the employees, reaching particular sale objectives

B) Policy implications:

- Dissemination of information regarding the market by federations, European Commission, etc

- Training courses to improve MMC of firms
- Marketing consulting desk at local level to support the firms
- Competition among firms -> award prize to firms able to reach some fixed goals
- Helping the micro and small enterprises in entering the EU research programs
- Stimulation of academic research in developing marketing models focused on SMEs
- Focus groups among marketing managers -> to make them informed about the possible strategies of the firms in the market

These implications suggest that it is important to identify the latent needs of SMEs. When looking for solutions to a specific problem of SMEs, a multidisciplinary approach should be followed. Establishment of a marketing consulting desk at local level to support SMEs is encouraged.

Currently, in a next step a more extended case study interview guide is developed for investigating the competitiveness of traditional food SMEs. Therefore, more aspects of resources, capabilities and competences of SMEs in the traditional food sector are included. The case study interviews start in January 2010.

Contact person: Alessandro Banterle, alessandro.banterle@unimi.it.

Expected benefits/Impact of the results and possible application by SMEs:
The on-line benchmark tool made for the SMEs possible to evaluate their marketing capabilities and current position in marketing effectiveness. Taking into account the proposed solutions, SMEs can improve the effectiveness of their marketing management, and by doing so, their competitiveness. URL : http://users.unimi.it/truefood.

More information : SPES food federations ; UGent (Belgium).

Other relevant information related to this research result:

All deliverable reports are accessible on the Internet : www.truefood.eu.
More surveys will be conducted with SMEs, and national SMEs are welcome to participate and give their advice on chain and logistics.

WP5 – Improved marketing and food supply chain organization methods for traditional food products

INFO-SHEET on TRUEFOOD main research results:

"Yes, you can"... *increase your marketing management capabilities as a SME*

This info-sheet provides several solutions to increase the marketing management capabilities of micro-sized and small firms producing traditional food products.

Prepared by FEVIA, Anne-Christine Gouder (acg@fevia.be), FHFI, István Pauer (pauer@efosz.hu) and UNIMI, Laura Carraresi* (laura.carraresi@unimi.it). *Contact person.

Needs / challenges:

Two global weaknesses were observed in the marketing management of SMEs :

- Control and evaluation of the marketing activities ;
- Planning and implementation of the marketing activities.

It means that most of the food companies formulate a marketing strategy, but they do not apply it properly.

Possible solutions / Improvements through research activities:

Five aspects were taken into account with the description of the SMEs themselves:

	Marketing capabilities	**Proposed Actions**
1	*Marketing research*	*Get information on your suppliers, retailers, competitors, market, consumers*
2	*Marketing strategy*	*Having objectives, actions of tailoring, differentiating, pricing, placing, promoting*
3	*Organizational skills of the firm's marketing activities*	*Planning, implementing, budgeting*
4	*Control and evaluation of the firm's marketing activities*	*Reviewing, checking marketing costs, checking competitors' promotion*
5	*Importance of innovative developments*	*Improving product, searching new markets, developing innovative distribution channels*

Among the managerial implications, SMEs should know better the market where they operate. In particular, SMEs are invited to focus on these critical points:

- investigate the needs of the customers and final consumers, by carrying out surveys on consumers through strict connection with retailers which are closer to consumers and could have more information about them, and through buying reports from specific organizations ;
- investigate the strategy of the competitors, by paying more attention to the new products delivered by competitors, the price made by them, the target of consumers where they are directed, etc.;
- investigate the skills of the suppliers, by informing yourself on your suppliers in order to select the best ones ;
- investigate the situation of the market place, by carrying out market analysis to obtain information on market trends ;
- set clear objectives and a concrete strategy to follow by fixing periodical deadlines, by organizing internal meetings involving all functions of the firm.

Expected benefits/Impact of the results and possible application by SMEs:

The on-line benchmark tool made for the SMEs possible to evaluate their marketing capabilities and current position in marketing effectiveness. Taking into account the proposed solutions, SMEs can improve the effectiveness of their marketing management, and by doing so, their competitiveness.

National conclusions are at your disposal (D5.2.8, D5.2.10). Contact now your national federation.

Do you want to go further? Twelve strategies are now settled to distribute and promote your products differently. You are asked to evaluate these strategies. The questionnaire is open online in three countries: Belgium (www.wagralim.be / www.flandersfood.com), Hungary (http://www.efosz.hu/truefood/truefood_en?lang=uk) and Italy (http://www.federalimentare.it/formazione/index.asp).

WP6 – Pilot scale evaluation, demonstration and transfer of innovation to industry

INFO-SHEET on TRUEFOOD main research results

Improvement of dry sausage safety using Lactic Acid Bacteria

Prepared by TDU ANIA (Françoise Gorga: fgorga@ania.net) and Marina Rivollier (ADIV - marina.rivollier@adiv.fr)

Needs / challenges:

The scope of the task 6.1.3 is to reduce and/or to inhibit the development of *Listeria monocytogenes* in dry fermented sausages. The main goal is to select active Lactic Acid Bacteria strains with an antimicrobial action in order to biopreserve raw meat and consequently meat products.

Possible solutions / Improvements through research activities:

Work already performed within the Truefood project:

- the antagonistic effects of LAB strains on raw pork muscles have been tested in dry fermented sausages
- 2 strains of *Lactobacillus sakei* (IM8 and DM3) have been selected for their bioprotective action against *Listeria monocytogenes* in dry fermented sausages

Work implemented within Truefood WP6:

- ❖ Validation of the anti-*Listeria* effect of the 2 *Lactobacillus sakei* strains (IM8 and DM3) after lyophilization of these strains (to work closely to industrial conditions)

A pilot scale production of dry sausages has been implemented.
Microbial and physicochemical analyses have been performed during ageing of the products.
The results showed an **antimicrobial activity** of the selected strain compared to the control.
Moreover, the use of the bioprotective strains highlighted **no negative effect on the technological parameters (pH, water activity…).**

- ❖ Sensorial evaluation of the biopreserved products

The biopreserved dry fermented sausages were evaluated by a panel made of French manufacturers.

The sensorial evaluations of :

- the control dry sausages and
- the products biopreserved with *L. sakei* DM3

showed similar results.
Contrariwise, the addition of the *L. sakei* IM8 strain gave to products a negative flavor ➔ This strain was not selected for future trials.
To date, some dry fermented sausages productions made with meat naturally contaminated by *Listeria monocytogenes* were carried out in 2 French agro-food industries. Microbiological results confirmed that the starter culture DM3 permits to inhibit this pathogenic bacteria during the process.

Expected benefits/Impact of the results and possible application by SMEs:

The aim is to select a LAB strain to be used for their bio protective qualities during dry sausages production process with no negative sensorial consequences on the product.

Other relevant information related to this research result (if available):

All deliverable reports are accessible on the Internet: www.truefood.eu.

WP6 – Pilot scale evaluation, demonstration and transfer of innovation to industry

INFO-SHEET on TRUEFOOD main research results

Set up of a "respiratory cell" for the determination of cheese respiratory activity during ripening and under packaging

Prepared by TDU ANIA (Françoise Gorga: fgorga@ania.net), Catherine Sauvageot-Loriot (LNE - Catherine.Sauvageot-Loriot@lne.fr), Cédric Lyathaud (LNE - cedric.lyathaud@lne.fr) and Georges Corrieu (INRA - corrieu@grignon.inra.fr)

Needs / challenges:

The main objective of this action is the set up of a small ripening respiratory cell allowing a fast and accurate characterisation of cheese respiratory activity during ripening. This will also permit the comparison of different packaging for cheeses, and their effect on cheese ripening.

The aim is to help cheese industry
(i) to get a better design and monitoring of ripening rooms,
(ii) to improve their management of cheese packaging.

Possible solutions / Improvements through research activities:

A 3 steps work programme has been implemented:
1- Respiratory cell design, realisation and testing
2- Cheese ripening trials
- unpackaged and packaged cheeses,
- 2 cheese models,
- active packaging
3- Definition of a commercial prototype. Presentation of results to cheese industry

Cheese ripening trials
Work already performed within the Truefood project:
1/ Comparison of unpackaged and packaged cheese ripening, with the 2 chosen traditional cheese models (Camembert, Saint Nectaire)

2/ Monitoring of the active compound in the Packaging system in 2 steps:
→ Washing of the surface of the food
→ Amount in the food (rind and core)

Expected benefits/Impact of the results and possible application by SMEs:

The ripening cell appears as a new tool for monitoring cheese ripening, determining their respiratory activity and their changes in biochemical and sensory characteristics. It can be especially fruitful to study the effect of packaging (wraps with different permeability to gas and water) on ripening kinetics and cheese final quality.
New knowledge about cheese ripening under packaging was obtained. The water mass loss appeared as a key factor to control cheese quality and to design new wrapping films especially those with biodegradable (compostable) properties.

Other relevant information related to this research result:

All deliverable reports are accessible on the Internet: www.truefood.eu.

WP6 – Pilot scale evaluation, demonstration and transfer of innovation to industry

INFO-SHEET on TRUEFOOD main research results

Application in cheese of microbial consortia with anti listeria activity

Prepared by TDU ANIA (Françoise Gorga: fgorga@ania.net) and Marie-Christine Montel (INRA - Marie-Christine.Montel@clermont.inra.fr)

Needs / challenges:

➔ **Improvement of safety and sensorial qualities of cheeses**

To propose to small cheese producers complex consortia which guarantee the safety of their cheese (inhibition of *Listeria monocytogenes*) without affecting their properties (sensorial such as flavour, aspect).

Possible solutions / Improvements through research activities:

1. **First step : choice of 2 dairy plants**
    1. A farm producing PDO Saint-Nectaire cheese
    2. A plant producing pasteurised Pont-L'Evêque cheese

2. **Second step**: **formulation of a microbial consortium on the basis of Truefood WP2A results**
   The preparation of the consortium and the inoculation in milk is done according to:
   - the requirement of the SME,
   - the EFSA "Qualified Presumptive Safety" (QPS) concept.

3. **Third step : Application of this consortium in the 2 dairy plants**
4. **Fourth step: measurement of the effect**

Expected benefits/Impact of the results and possible application by SMEs:

Results of the test on Saint Nectaire

Sensorial aspects:
The effect of the use of the consortium on sensorial characteristics has been evaluated by a trained panel. Thay had to express their opinion on the cheese Aroma, Flavor, Texture and Visual aspects characteristics. This evaluation has shown **no negative effect of the use of the consortium.**

Safety aspects:
The tests have shown that:

- Inoculation of consortium induced :
    - **a delay or an inhibition** of *L. monocytogenes* growth
    - **higher levels** of *Lactobacillus* and *Leuconostoc*
    - **higher content** of lactic and acetic acids

- At the cheese surface, difference in **ripening conditions** and cares during ripening **affect the Gram + catalase +, Gram - and yeasts counts inducing differences in acetate content.**
- By comparing these data with previous experimental results, it's seems that the **natural consortium present in** the farm **raw milk** may already have an inhibitory activity against ***L. monocytogenes.*** So it was difficult to evaluate the efficiency of the selected consortium.

Other relevant information related to this research result:

All deliverable reports are accessible on the Internet: www.truefood.eu.

INFO-SHEET on TRUEFOOD main research results

Sym'Previus : an online tool to improve effectiveness, reliability and performances of your safety management system

Prepared by ADRIA Développement (France)[1], SPES TDU FEVIA (Belgian Food and Drink Federation)[2]
Contact persons: [1]Florence Postollec, florence.postollec@adria.tm.fr; [2]Anne-Christine Gouder, acg@fevia.be

Needs / challenges:

- You are assessing the shelf-life of a traditional food product regarding EU regulation 2073/2005
- You are developing new formulation and study the impact of food physico-chemical modifications (increase or reduction of salt, addition of organic acid) in shelf-life
- You are evaluating the impact of poor production conditions ? (breaking of the cold chain)
- You are scientifically testing the determination of critical limits, the microbiological risk and the critical control points (CCP) of your traditional food product

Possible solutions / Improvements through research activities:

Sym'Previus is a decision-making tool dedicated to food quality and safety which has been developed with food industrials, for food industrials. Information and simulation available with the simulation tool and associated database, has been obtained in real food and take into account bacterial strains variability yielding a reliable and recognized tool answering the European food law requirement: regulation (EC) N° 2073:2005 on microbiological criteria for foodstuffs.

Sym'Previus also allows a tailor-made approach using your own parameters, *ie* cardinal value characterizing the targeted microorganisms (contaminants or positive flora) in your food products.

Expected benefits/Impact of the results and possible uses for food producers:

URL : www.symprevius.org (in English and in French).

Specific access to Sym'Previus tool has been provided for deleguates assisting several workshops organised with Belgium, French and Turkish industrials.

ADRIA Développement is looking for stakeholders linked to industry (consultant, R&D centers or university laboratories) which could promote Sym'Previus software and assist SMEs to use this predictive software. Interested people should contact ADRIA Développement and ask for further documents or presentations in predictive microbiology. ADRIA Développement also offers training activities, workshops or software demonstration.

WP7 – Environmental societal human and economic impacts of innovation

INFO-SHEET on TRUEFOOD main research results

The potential health impact of innovations for traditional foods FRESH FRUITS and VEGETABLES

Federalimentare Federica Scotto di Tella (scottoditella@federalimentare.it), Alessandro Cordelli (cordelli@federalimentare.it)
Istituto Nazionale di Ricerca per gli Alimenti e la Nutrizione Dr. Giuseppe Maiani* (maiani@inran.it), Dr. Laura Rossi* (rossi@inran.it), Dr. Federica Intorre* (intorre@inran.it)

*on behalf of INRAN TRUEFOOD study group: dr. Elena Azzini, dr. Giovina Catasta, sig. Maria Stella Foddai, sig. Lara Palomba, dr. Anna Raguzzini, dr. Elisabetta Toti, dr. Eugenia Venneria

Possible benefits for the consumers

It is important to expand the discussion and cooperation between research and industry about both valorisation of traditional food products, in the framework of market globalization, and production of innovative products. Consumers need to have information about determinants of food global quality in order to make appropriate selections in terms of certified quality products of controlled origin and production. The dissemination of information should be committed to all the stakeholders of the food system.
The application of innovation treatments for optimizing food nutritional quality and safety is a challenge for industry that would to meet consumers' requests in terms of both functional and ready-to-use products.
In the light of this consideration, the potential health impact of innovations for traditional products was evaluated by randomized clinical case-control trials on healthy volunteers, selecting physiological parameters as biomarkers of risk for chronic degenerative diseases.

Impact of the results and possible application by SMEs:

After harvesting, fresh fruit and vegetables are subject to nutritive losses due to ageing; refrigeration is the most common used procedure for extending their shelf life and storage temperatures are important aspects governing stability of foods, causing an improving or a worsening of bioactive compounds bioavailability. **The results of this trial showed that bioactive compounds bioavailability could be affected by their content in the food, i.e. food quality;** moreover bioactive compounds content and total antioxidant capacity were affect by domestic storage conditions, with different effects depending on the bioactive compound considered. These differences could be implicated in their healthy properties.

WP7 – Environmental societal human and economic impacts of innovation

INFO-SHEET on TRUEFOOD main research results

Reduction of the environmental impact of the hard cooked cheese preparation

For further information:
Federalimentare Federica Scotto di Tella (scottoditella@federalimentare.it), Alessandro Cordelli (cordelli@federalimentare.it)
University of Ljubljana Prof. dr. Romana Marinšek Logar, Assist. Ilja Gasan Osojnik Crnivec

Expected benefits

- Reduction of environmental burden and optimization of resource use (material and energy consumption reduction).
- Better marketing position – more and more consumers are demanding that environmental issues are taken into account in the production - added value to the product (environmentally balanced production).
- Additional products (e.g. whey cheese), higher aesthetic and quality value of the primary production environment.
- Basis for the development of a decision support tool that allows the selection of different production alternatives from the ecologic and economic point of view. Life Cycle Assessment – like approach

Needs / challenges:

A selected traditional food product (TFP), hard-cooked cheese, is being investigated from the environmental impact point of view.

The evaluating process:

1. identification of environmental impact potential in *current* productions TFPs,
2. identification of environmental impact potential in *future* productions of TFPs,
3. formulation of a comparative assembly suitable for the distinction of environmental impacts of traditional and novel production steps,
4. formulation of a basis for reduction of possible additional environmental impacts of innovative TFPs production lines.

Generally, the reduction of the environmental impact in the primary production phase can be achieved by altering the feeding regime in a low emission barn and applying proper manure storing and application times and techniques: adjusting the feeding regime (nutrient balanced rations, supplements to reduce energy loss for ruminants …); employing a low emission barn; proper manure storing (frequent removal of the excreta outdoors, covering open manure stores, compaction of farmyard manure, slurry lagoons with low surface to volume ratio) and application (slurry application in narrow bands or by injection, incorporation of farmyard manure within a few hours after application) times and techniques (slurry application in narrow bands or by injection, incorporation of farmyard manure within a few hours after application); reduce energy and nutrient-related emissions by combining inorganic fertilizers with organic manures. In organic agriculture enhance the effect of organic fertilizers with green manure; biogas production offers large amounts of energy in gas and high quality organic fertilizer. This strategy is effective in lowering the environmental load of manure when the process is correctly planned, constructed and monitored.

Improvements through research activities

Alternative use of surplus whey as a animal supplement in feeding, processing to albumin cheese or pulverizing to several high quality nutritional products.
Reducing energy consumption with heat recovery from whey and reduction / optimization of ripening times.
Traditional food products are reported to employ a vast range of packaging materials. Where packaging can not be avoided, low density polyethylene (LDPE) is the least energy intensive material, which contributes significantly to the lower impact of the product packaging production. Also, promising results are reported in connection with biodegradable packaging materials based on cellulose (e.g. cellophane) and starch polymers (e.g. PLA).

WP7 – Environmental societal human and economic impacts of innovation

INFO-SHEET on TRUEFOOD main research results

Reduction of impact in dry cured ham

For further information:
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University of Ljubljana Prof. dr. Romana Marinšek Logar, Assist. Ilja Gasan Osojnik Crnivec

Expected benefits

- Reduction of environmental burden and optimization of resource use (material and energy consumption reduction).
- Better marketing position – more and more consumers are demanding that environmental issues are taken into account in the production - added value to the product (environmentally balanced production).
- Additional products (e.g. whey cheese), higher aesthetic and quality value of the primary production environment.
- Basis for the development of a decision support tool that allows the selection of different production alternatives from the ecologic and economic point of view. Life Cycle Assessment – like approach.

Needs / challenges:

A selected traditional food product (TFP), the dry-cured ham, is being investigated from the environmental impact point of view.

The evaluating process:

1. identification of environmental impact potential in *current* productions TFPs,
2. identification of environmental impact potential in *future* productions of TFPs,
3. formulation of a comparative assembly suitable for the distinction of environmental impacts of traditional and novel production steps,
4. formulation of a basis for reduction of possible additional environmental impacts of innovative TFPs production lines.

Generally, the reduction of the environmental impact in the primary production phase can be achieved by altering the feeding regime in a low emission barn and applying proper manure storing and application times and techniques: adjusting the feeding regime (nutrient balanced rations, supplements to reduce energy loss for ruminants …); employing a low emission barn; proper manure storing (frequent removal of the excreta outdoors, covering open manure stores, compaction of farmyard manure, slurry lagoons with low surface to volume ratio) and application (slurry application in narrow bands or by injection, incorporation of farmyard manure within a few hours after application) times and techniques (slurry application in narrow bands or by injection, incorporation of farmyard manure within a few hours after application); reduce energy and nutrient-related emissions by combining inorganic fertilizers with organic manures. In organic agriculture enhance the effect of organic fertilizers with green manure; biogas production offers large amounts of energy in gas and high quality organic fertilizer. This strategy is effective in lowering the environmental load of manure when the process is correctly planned, constructed and monitored.

Improvements through research activities

Significant amounts of animal waste products and effluent are produced. Instead of destroying these parts, a share of these by-products can be used by the animal feed industries or be utilized in a biogas production plant.
Traditional food products are reported to employ a vast range of packaging materials. Where packaging can not be avoided, low density polyethylene (LDPE) is the least energy intensive material, which contributes significantly to the lower impact of the product packaging production. Also, promising results are reported in connection with biodegradable packaging materials based on cellulose and starch polymers.

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Reduction of the environmental impact for beer brewing

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Expected benefits

- Reduction of environmental burden and optimization of resource use (material and energy consumption reduction).
- Better marketing position – more and more consumers are demanding that environmental issues are taken into account in the production - added value to the product (environmentally balanced production).
- Additional products (e.g. whey cheese), higher aesthetic and quality value of the primary production environment.
- Basis for the development of a decision support tool that allows the selection of different production alternatives from the ecologic and economic point of view. Life Cycle Assessment – like approach.

Needs / challenges:

A selected traditional food product (TFP), beer brewing, is being investigated from the environmental impact point of view.

The evaluating process:
1.of environmental impact potential in *current* productions TFPs,
2.identification of environmental impact potential in *future* productions of TFPs,
3.formulation of a comparative assembly suitable for the distinction of environmental impacts of traditional and novel production steps,
4.formulation of a basis for reduction of possible additional environmental impacts of innovative TFPs production lines.

Improvements through research activities

Possible solutions of the studied process:
- Several environmental issues, such as spent grain and spent yeast management, CO2 and water consumption.
- Spent grains have a strong potential for being recycled and upgraded in the production of high value food additives (commonly used for animal feed, also in composting, fertilizing, mushroom growing and earthworm cultivation etc.).
- Spent yeast has similar potential. Additionally it can be reused in the fermentation or sold to pharmaceutical or cosmetic industry.
- Heat generated in the previous batch can be recovered (from water or from vapor) e.g. for mashing the next batch.

Traditional food products are reported to employ a vast range of packaging materials. Where packaging can not be avoided, low density polyethylene (LDPE) is the least energy intensive material, which contributes significantly to the lower impact of the product packaging production. Secondary packaging is made of paper or cardboard. For beverages, reusable glass packaging bottles are still estimated to be the most environmentally favorable system over aluminum, steel and PET drinking containers.

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Reduction of the environmental impact of cauliflower production

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Expected benefits

- Reduction of environmental burden and optimization of resource use (material and energy consumption reduction).
- Better marketing position – more and more consumers are demanding that environmental issues are taken into account in the production - added value to the product (environmentally balanced production).
- Additional products (e.g. whey cheese), higher aesthetic and quality value of the primary production environment.
- Basis for the development of a decision support tool that allows the selection of different production alternatives from the ecologic and economic point of view. Life Cycle Assessment – like approach.

Needs / challenges:

A selected traditional food product (TFP), the cauliflower, is being investigated from the environmental impact point of view.

The evaluating process:
1.identification of environmental impact potential in *current* productions TFPs,
2.identification of environmental impact potential in *future* productions of TFPs,
3.formulation of a comparative assembly suitable for the distinction of environmental impacts of traditional and novel production steps,
4.formulation of a basis for reduction of possible additional environmental impacts of innovative TFPs production lines.

Generally, the reduction of the environmental impact in the primary production phase can be achieved by altering the feeding regime in a low emission barn and applying proper manure storing and application times and techniques: adjusting the feeding regime (nutrient balanced rations, supplements to reduce energy loss for ruminants …); employing a low emission barn; proper manure storing (frequent removal of the excreta outdoors, covering open manure stores, compaction of farmyard manure, slurry lagoons with low surface to volume ratio) and application (slurry application in narrow bands or by injection, incorporation of farmyard manure within a few hours after application) times and techniques (slurry application in narrow bands or by injection, incorporation of farmyard manure within a few hours after application); reduce energy and nutrient-related emissions by combining inorganic fertilizers with organic manures. In organic agriculture enhance the effect of organic fertilizers with green manure.

Improvements through research activities

Biogas production offers large amounts of energy in gas and high quality organic fertilizer. This strategy is effective in lowering the environmental load of manure when the process is correctly planned, constructed and monitored.
Traditional food products are reported to employ a vast range of packaging materials. The fruit and vegetable sector uses crates to transport the products from field to the market. Each reusage of an individual crate is good practice for environmental impact reduction.

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An analysis of the more relevant aspects for successful innovations in the SMEs - Improving the success rate of innovations

Needs / challenges:

Innovations are vitally important for the competiveness of food industry companies. However the failure rate of innovations in the food industry is quite high. Within the Truefood Project, the University of Applied Sciences carried out a written company survey with the focus on small and medium sized enterprises in Germany, Italy and the United Kingdom for finding out to which extent the companies realize the factors which are beneficial for the success.

=> Small and medium sized enterprises of the Traditional food sector can be informed which factors can impact the success of innovation in a positive way. If these factors are realized, the success rate of innovations can be enhanced!! The success of innovations is quite important for the competitiveness of food industry companies. So the results can be helpful to confirm the positioning of SMEs on the market.

Possible solutions / Improvements through research activities :

An effective marketing analysis which contains for example knowledge of requirements and buying behaviour of consumers impacts the success in a positive way. Among other the planning quality of marketing actions is quite important regarding the success of innovation projects. This applies in particular to a specific education and know-how expertise of the involved personnel.

For the success of a new product planning, of every phase of the process, is a very important criterion. According to their own view planning of the distribution requirements and channels distribution, planning of the target market, planning of the positioning of a new product against competiting products as well as calculating the financial effects of innovation projects is realised by a high part of companies.

Typical for a co-operative management style is the involvement of employees in decision-making processes and a wide autonomy of employees how to realize specific projects. This includes actively looking for new ideas and positive attitude towards innovations in the project management.

According to studies dealing with success factors of the food industry the formation of cross-section-oriented and competent project teams and the stimulation of co-operation overlapping different departments are also considerable success factors.According to literature co-operations with external partners advance the innovation success of new products.

The attributes and characteristics of new food products determine the success of innovations to a high extent. According to many authors an important aspect for the success of innovations is a specifc product advantage which is recognised by the consumers or food retailers.. It is also important that these product advantages are visible for the consumers and communicated by producers.

Generally it is acknowledged that simple me-too products often do not have specific advantages for consumers or food retailers thus it might be difficult to achieve long-term economic success with such products despite they are offered to a lower price.

Products with a high level of novelty (“real novelties”) have been launched only by a limited number of SMEs. New products should be marketed embedded in a certain subjective environment in which the product is in harmony with the needs and behaviour of the target group, the selected distribution channel, the positioning of the product in its competitive environment, the image of the company and the presentation of the product.

The using of synergy effects is important for the economic success of a company. Synergy effects mean accessing of resources which are already available in the company. For realizing synergy effects a new product should be adapted in the consisting product line. The results of this survey show that in most companies in all analyzed countries new products are well embedded in the present range of products in most companies.

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Potential health impacts of innovations for TFPs

Functionality trial

The aim was to investigate the modifications induced on blood lipid profile and antioxidant status of selected healthy volunteers following the ingestion of an experimental cheese of raw cow milk, with low saturated fatty acids content. This cheese was obtained adding linseed oil to the cows feeding. The administration of this kind of cheese, within a recommended dietary regimen, leads up to an increase of plasma vitamin E and vitamin C, which are powerful antioxidants, but above all limits the increase blood concentration of atherogenic fatty acids, such as myristic acid. Changing lipid profile of dairy products maintaining as much as possible their characteristics could be an area of interest in terms of potential functionality of these foods.
Producers: production of food with a good lipid profile (not only low fat)
Consumers: knowledge of the importance of fat quality as well as of fat quantity

Bioavailability trial

The aim was to evaluate the effect of acute consumption of fresh and stored strawberries on red-ox status in humans. Typical strawberries have higher nutritional values than the equivalent commercial ones; moreover, strawberry bioactive compounds were bioavailable with differences between fresh and stored fruit, meaning that both quantity and quality of compounds reaching the systemic circulation and available at the site of action are different; finally, there is an increase of plasma defences against radical forms harmful to human health after consumption of fresh food.
Producers: importance of food quality and short distribution chain
Consumers: importance of fresh food consumption

Metabolic action trial

The aim was to evaluate the impact of consumption of strawberry jam sweetened with wild apple juice (mainly fructose) on glycaemic status in non diabetic obese volunteers and type 2 diabetic obese volunteers; a strawberry jam sweetened with sucrose was used as control. In both types of volunteers consuming the naturally sweetened strawberry jam, the increase of plasma levels of glucose and insulin is lower compared to consumption of conventional jam for both types of volunteers. Improving traditional processes to obtain this kind of products could be a strategy to enhance the quality of life of diabetics helping them with a better compliance to a dietary regimen including highly accepted food. Moreover, it could be established a better cooperation between research and industry in order to develop primary prevention programmes and to promote healthy diet and physical activity as key elements of a healthy lifestyle, with the end point to hinder the dramatic rise in the costs for health and medical care caused by this pathology.

Biochemical action trial

The aim was to examine the effect on humans of concomitant consumption of alcoholic or non alcoholic beer and lettuce (containing bioactive compounds), studying plasma defences against radical forms as indicators of antioxidant status. Briefly, plasma antioxidant status of volunteers is different after the administration of the alcoholic treatments and the non alcoholic one, while single plasma antioxidants do not change after beer administration; moreover, beer phenolic compounds are bioavailable, with differences between alcoholic and non alcoholic beer, as well as lettuce phenolic compounds. The association between beer and lettuce does not imply a higher effect. The technological process influences the bioactive compounds content in beer but considering the complexity of the theme about the effects of alcohol on health and the absence of a plain effect on antioxidants, alcoholic beverages consumption could be not suggested.

Producers: improvement of traditional processes to obtain dealcoholised beverages
Consumers: knowledge of the effects of alcohol on health

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Valorisation of Corsican Pig Breed: the Nustrale *case*

Prepared by INRA LRDE, Corte, INRAN, SPES TDU Federalimentare (The Italian Food and Drink Industry Federation)
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Needs / challenges:

The valorisation of local breeds is a more and more used criterion by the French Institutions to certify products by origin in order to:

1) To underline the connection with the territory
2) To discover an inner resource
3) To enhance the PDO ratio ("*charcuterie corse*")

Possible solutions / Improvements through research activities:

The creation of a PDO ratio was established first of all after a survey in which PDO and breed association where questioned about the fact that the PDO "*Charcuterie de Corse*" has not yet been definitively acknowledged and that the recognition of the "*Nustrale*" breed is very recent.
The technicians belong mainly to extension structures, and for a small number of them to the research organisation (INRA).

Costs were also taken into account as the racial type is easier to get than the pure breeds.

Expected benefits/Impact of the results and possible uses for food producers:

More details on the consumer survey can be read at www.truefood.eu.

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Comparison of the environmental impacts of existing and innovative TFPs productions

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Needs / challenges:

The environmental impacts of the innovation of food production system have been studied within the TRUEFOOD project.

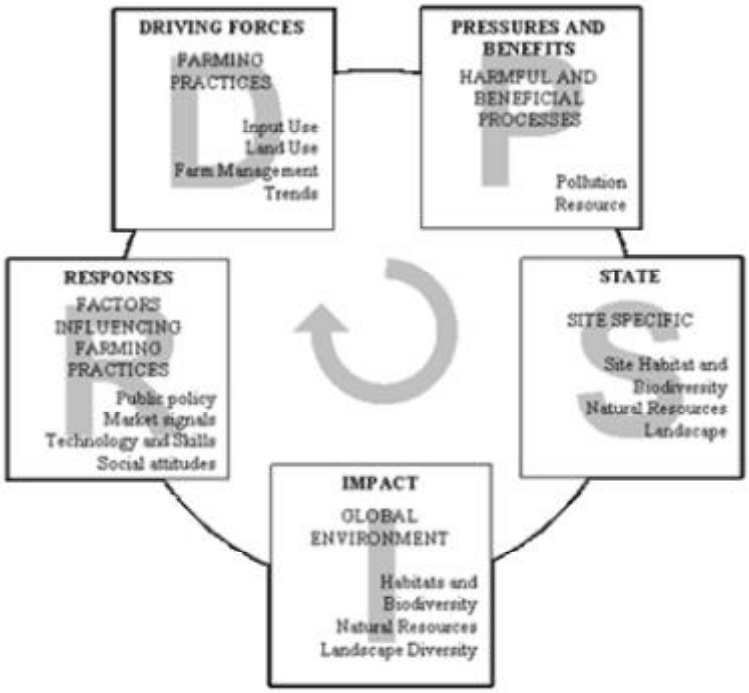
A set of agri-environmental indicators were taking into account the life cycle assessment (LCA) methodology for studying:

- vegetable oil supplementation
- once daily milking
- ripening room ventilation
- addition of potassium lactate
- fertility management
- packaging materials

Possible solutions / Improvements through research activities:

Methodologies were needed in order to evaluate the correct impact.

An adaptation of the Agricultural DPSIR MODEL (see figure below) was proposed.



Expected benefits/Impact of the results and possible uses for food producers:

In our opinion, the principle of the LCA method is relevant and applicable to the TFPs production lines environmental impact evaluation.

More details on the consumer survey can be read at www.truefood.eu, www.federalimentare.it/formazione D.7.2.6.

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Valorisation of Northen Alps cheeses: the Savoyard *case*

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Needs / challenges:

Traditional cheeses can be considered, particularly in France, like identity products, markers of the bond to the territory. The choice of the area is due with the diversity of the observable situations as regards cheese qualification and to the fact that some of them count among most advanced in France. The Northern Alps offer an interesting framework to illustrate the new orientations led by the INAO (then National Institute of the Labels of origin) out of matter of qualification of the food products.

Researchers studied the impact of the Savoyard production.

Possible solutions / Improvements through research activities:

- Territorial impact: the production of Savoyard cheese increased the average milk payment quota more than 50%, the biodiversity of the territory has been preserved,
- Dairy activities impact from a “spatial” point of view, tourism point of view,

Expected benefits/Impact of the results and possible uses for food producers:

The exploitation of traditional productions have significantly positive effect on the whole economical/ environmental and social system.

More details on the consumer survey can be read at www.truefood.eu. And www.federalimentare.it/formazione

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The possibility of reducing quantity of sugar in food: an health strategy for diabetics

Prepared
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Needs / challenges:

The consumption of sugar based products could be a problem for diabetics; TRUEFOOD researchers investigated about some products as case studies such as:

- confectioneries,
- spread chocolate paste,
- jam
- marmalades.

The possibility of improving the quality of the life of people with this pathology providing them tasty product that did not affect their health could be valuable as far as concerning the general management of the disease.

Possible solutions / Improvements through research activities:

According to the previous index TRUEFOOD researchers picked up strawberry jam with low glycemic index as the principle case study.

Expected benefits/Impact of the results and possible uses for food producers:

The consumption of food products with a high Glycemic Index (GI) for diabetics is very problematic and can course serious health damages. Considering the realization of food products with a low GI could make the life of people with food related problems easier.

More details on the consumer survey can be read at www.truefood.eu. And www.federalimentare.it/formazione