

Discover new technologies for beef production: a focus on *ProSafeBeef* demonstrations and technology transfer

This issue is the second of a series of newsletters which aim to update project partners and stakeholders on progress and key outputs from the *ProSafeBeef* project, together with news and events related to the European beef industry. Through research and innovation, *ProSafeBeef* aims to advance beef safety and quality across Europe. *ProSafeBeef* is a 5-year project which commenced in March 2007 and the project involves 41 leading research and industrial organisations working in 18 different countries.

One of the key objectives of *ProSafeBeef* is to engage with SMEs, expert collaborators from developing countries and new and candidate state countries of the EU, and INCO partners with a vested interest in beef export, to assist in delivery of the *ProSafeBeef* project. One of the main routes to achieving this is to hold demonstrations, and this issue describes highlights of demonstration activities that have taken place so far.

Demonstration activities are organised by Pillar 6, which is dedicated to training, industry networking and dissemination of results. The overall objectives of this Pillar are to set up a structured and sustainable demonstration of new technology developed by other

Pillars and to perform training and dissemination to end users. Throughout the life of the project, demonstration activities will be organised to prove the technological and economic viability of selected new technologies at industrial or pilot scale. A “core team” of eight scientists and technological trainers has been set up to promote the transfer of knowledge and technologies to meat companies and particularly SMEs. This core team will continue to identify new technologies appropriate for demonstration from the project, and will be closely involved with future demonstration activities.

Below: The *ProSafeBeef* team



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Low added value muscle profiling

The first ProSafeBeef demonstration workshop was about *beef muscle profiling*. Muscle deboning of chuck and round muscles was demonstrated by Prof. Dwain Johnson from the University of Florida at Gainesville, USA.



The attendees of the *Low added value muscle profiling demonstration* with Professor Dwain Johnson in Matforsk, Norway

Prof. Dwain Johnson has a wide experience in this field, including novel use of these muscles. Highlights from the programme included sessions on status for beef muscle profiling in the US by Professor Dwain Johnson, beef muscle profiling activities in ProSafeBeef by Dr Jens Petter Wold of Matforsk, the practical demonstration of beef muscle profiling according to techniques at the University of Florida and a discussion about practical aspects of muscle profiling and value addition of beef products. This demonstration took place on the 24th May 2007, and was well attended by 18 participants from Matforsk, ADIV, and other meat companies. A total of 13 meat companies were represented at this very successful workshop.

Discover a new technology for beef meat OSMOFOOD®

ADIV hosted the second demonstration on the 27th of February 2008 in Clermont-Ferrand, France. This was a demonstration on a pilot line, showing the osmotic dehydration of meat and a new technology called OSMOFOOD®.

The demonstration attracted a total of 25 participants from 9 countries (France, Norway, Spain, Tunisia, Belgium, Italy, Canada, Switzerland and USA) and was very successful. The dehydrated meat products produced from this process have a number of applications and can be used in the fast food industry, used as aperitifs and also added to sandwiches.

Some key selling points for OSMOFOOD®

- It is applicable to all meat such as beef, pork, turkey, lamb, etc.
- Osmofood opens a new market for meat consumption

- It's a new and innovative product with superior quality such as texture, flavour and extended shelf life
- It requires low manpower and low production cost

- It requires low processing time
- It reduces microbial flora such as *Salmonella*, *Listeria monocytogenes*, *E.coli* (by using a flash pasteurization technique)
- It can be widely used in the fast food industries, used as aperitifs and also stuffed into sandwiches etc.

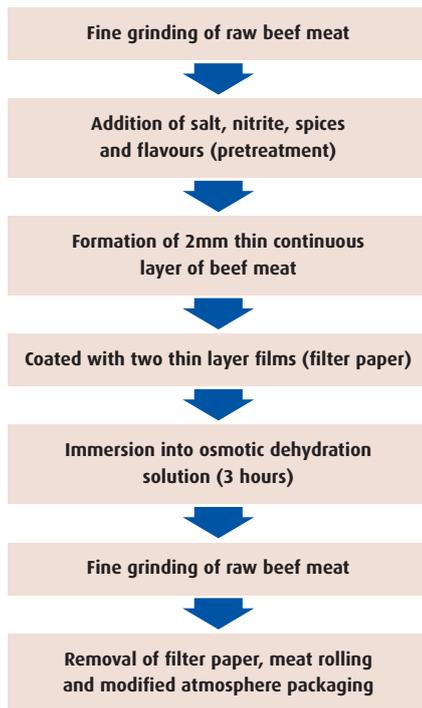


Right: The OSMOFOOD® process

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The processing technology



An example of OSMOFOOD® products

Pi-Vac elastopack system and inline guided microwave spectrometry

Norway was the location for the third *ProSafeBeef* demonstration on *Pi-Vac elastopack system for hot boned muscles and inline guided microwave spectrometry*. The workshop was co-hosted by Matforsk and a meat company called Notura on their industrial plant of Rudshøgda on 17th June 2008. In total 23 people attended the workshop, representing 12 organisations or companies and seven countries.

Inline Guided Microwave Spectrometry (GMS) is based on the orientation and relaxation of polar molecules in an electromagnetic field. The spectroscopic response is an attenuation spectrum for the different microwave frequencies involved. The GMS utilises the lower frequency range of the microwave region, i.e. 200-3200 MHz. The instrument can be mounted on transportation pipes, or directly onto a meat grinder. The main assets of GMS are that practically all the material is measured, and that it has a low sensitivity towards particle size and colour differences. Microwave spectroscopy can be utilised for fat analysis in meat through the

relationship between water (which is the main response for microwaves), protein and fat.

Tenderness of beef muscles can be improved by the use of a wrapping technique, the Pi-Vac Elasto-Pack system, which applies lateral pressure to the muscles during post mortem rigor. The system operates by stretching tubes of highly elastic films to the inside walls of a packaging chamber. The muscle is then inserted into the chamber, and the pressure released. The film contracts to its original dimensions, exerting

strong forces on the muscles and hinders longitudinal muscle contraction. A study of the system applied on beef longissimus dorsi (LD) muscles chilled at air temperatures of 4 or 12°C showed that the process increased the tenderness of the LD at either temperature. This means that the muscles can be chilled rapidly without detrimental effects on tenderness. A more attractive shape of cuts from the muscles is an additional benefit of the process.



Right: Final products using the Pi-Vac Elasto-Pack system

High hydrostatic pressure

The most recent *ProSafeBeef* demonstration involved **High hydrostatic pressure**, which is a type of decontamination technique. The workshop was hosted by IRTA in Girona, Spain, on 9th September 2008. In total 14 people attended the workshop, including a representative from a company in Norway. The demonstration was filmed by TV8, a regional channel from Barcelona, and the film was shown on regional news. A journalist from a regional newspaper called *Diani de Girona* also attended the demonstration.

The demonstration started with a presentation by Narcis Grèbol who discussed industrial application of the meat and meat products derived from this technique. He explained that high hydrostatic pressure inactivates microorganisms by changing the 3D structure of key biological molecules, by creating a pH shift during high pressure processing, and by modification of the permeability of membranes (reversible crystallization of lipids). Its major application is therefore high microbiological safety. The process tends to be inexpensive if high volumes are used.

However, the appearance of the meat product at the end of processing is

dependent on the pressure used (200MPa+ can lead to discolouration). Hence the main application of fresh meat is the food service sector. Cured/pre-processed meats do not suffer from discolouration so can be applied more widely.

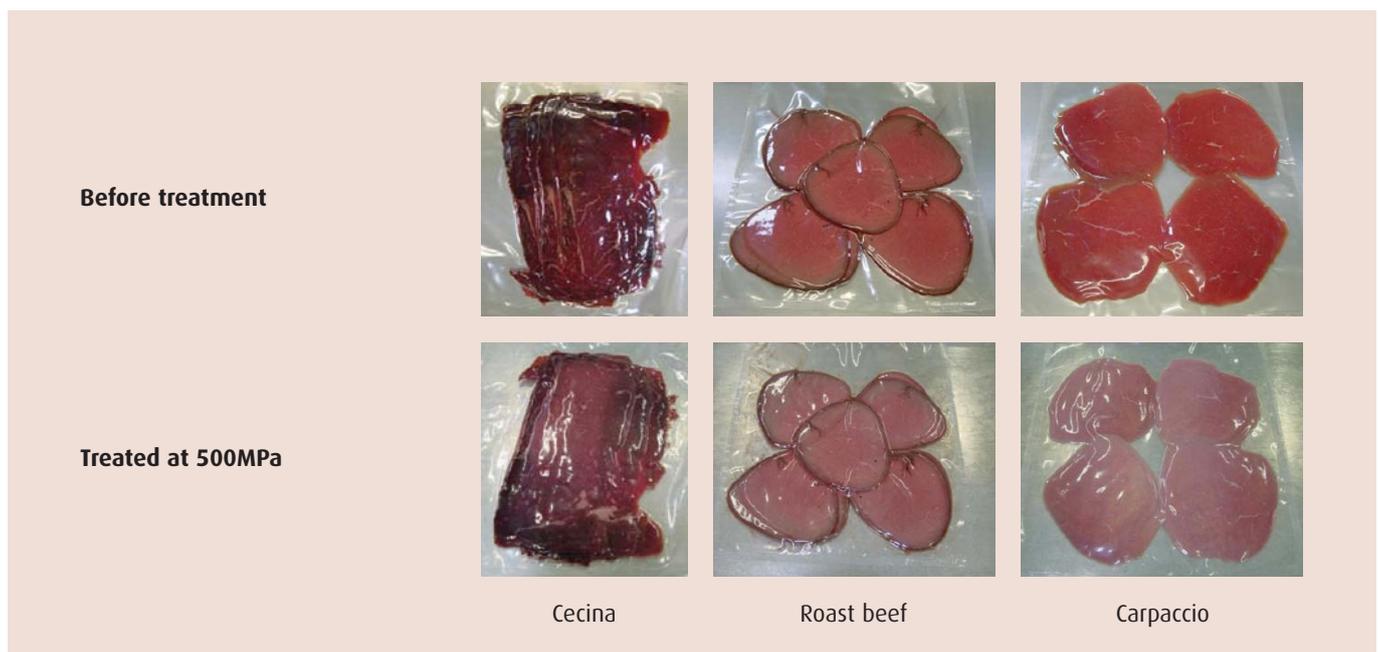
The High Hydrostatic Pressure (HHP) treatment process was demonstrated in full. The packaged food was placed in a large pressure vessel and submitted to water pressures from 100 to 900 MPa. The pressure applied is isostatically transmitted inside the pressure vessel. High pressure treatments were applied to vacuum packaged fresh (15°C) and frozen (-18°C) beef at 5 maximum pressures 200, 300, 400, 500 and

600 MPa with a holding time of 300 s. In addition, commercial products purchased from a local retailer in Spain (roast beef, carpaccio and cured dried beef-Cecina) were treated at 500 MPa. The visual appearance of dried cured products such as Cecina is not modified by HHP treatment. Roast beef showed some discoloration while beef carpaccio showed high discoloration when treated at 500 MPa.

Overall high hydrostatic pressure is a useful technology to increase shelf life of commercially available beef products. The colour of fresh beef is significantly changed during processing so the technology is more appropriate for foodservice (catering, restaurants, hospitals, hotels) where the bright red colour of fresh beef is not important.

For further information about any of these demonstration activities please contact Eric Lemoine or Catherine Souty at ADIV. Email: eric.lemoine@adiv.fr or catherine.souty@adiv.fr

Below: Commercial beef products before and after High Hydrostatic Pressure treatment



Meet the core team

The dissemination of the knowledge and technology developed within *ProSafeBeef* is an incredibly important route to deliver project's success. To help with this process, the leaders of Pillar 6 have identified a "core team" of experts, who will focus on technology transfer to SMEs and meat companies. The core team's aim is to identify consumer oriented and ready to apply new technologies from *ProSafeBeef* and disseminate innovation in beef safety and quality to SMEs, in order to promote a competitive beef industry.

Each member of the core team is an experienced technologist in food research and development and has an excellent knowledge of the meat sector. The core team has spent the second year of the project preparing for technology transfer by learning about the work of *ProSafeBeef* across all Pillars. The core team is now channelling its energy into identifying new opportunities and events for technology transfer. This work forms a critical part of the dissemination activities of Pillar 6. Over the coming months you will no doubt hear more about the core team's work.

Demonstrations:

- Creating and using demonstration kits to promote and disseminate new techniques in different EU countries
- Identifying SME's interest areas and priorities to select demonstrations
- Participating at demonstration sessions

Technology transfer:

- Generating three national networks with models adapted for use in each country
- Generating an EU SME network to identify topics and procedures

Dissemination:

- Reinforcing training activities with local activities performed in new EU member states
- Promoting ProSafeBeef at conferences and forging links with researchers

"I hope the core team can provide the industry with new knowledge from ProSafeBeef that will help them produce safer beef meat and that the industry will see the new knowledge as something useful for them, not only more costs and work."

Berit Foss Hille



Jean-Pierre Frenca

is an Engineer and is the Manager of Scientific, Technological and Product Quality at ADIV where he has worked for

23 years. In 1981 he obtained a diploma in Agro-Food Industry Engineering at ENITIAA: National Engineering School for Industrial Food Processing Techniques. Jean-Pierre's key skills are in the training of red meat instructors including knowledge of rules and regulations, mastering critical aspects [hazard analysis and critical control points (HACCP), danger analysis, etc], sanitary approval and meat technology, technical choices in slaughtering and welfare. He also has gained technical expertise with the National Labels Commission, been involved in studies on the quality of meat, setting-up quality systems in companies, technical economic feasibility studies of modernisation project of slaughtering/cutting/transformation of meat units and technical assistance in companies on hygiene and quality (slaughtering/cutting). Jean-Pierre is also a member of a committee of scientific experts at the AFSSA (French Food Sanitary Agency) and a member of the scientific working group on biohazard risks at EFSA.



Berit Foss Hille is an Engineer and has been the Project manager/ Adviser at Matforsk AS – Nofima Food, for almost two years. She has many years'

experience with hygiene aspects of the meat processing industry. Berit's key skills are in quality assurance and quality assurance systems, microbiological analyses, consultancy and advisory services to the food industry and HACCP.

"I hope the core team can give the SME companies in Europe inspiration for new ideas. We can give demonstrations on 'new' and 'safer' products in the market today. The core team can ultimately increase the expertise of meat companies."

Tom Christen Johannessen



Tom Christen Johannessen

is a Meat Technologist with a Bachelor degree in Food Technology and is the head of the meat pilot plant at Matforsk

AS – Nofima Food, where he has worked for the last 10 years. Tom has 25 years' experience in the Norwegian meat and fish industry and currently works extensively with course development for the Norwegian meat companies. His key skills are development of meat products (recipes, processes and industrialisation), industrial pilot production at Matforsk pilot plant, technical support for the meat and meat product factories, processing evaluations and testing for additives. Tom is also a member of the referee group under the Norwegian national championship in meat products.

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Sylvain LaBayle currently works at ADIV and is responsible for technical studies to the meat sector and specifically in slaughtering and

cutting processes. In 1999 he obtained a TSM Agro-Industrial diploma, specialising in 'Agro-development-transformations' and in 2000 he obtained a postgraduate diploma in Food Sciences. Sylvain's key skills are the design and layout, figuring of abattoirs and cutting plants; technical studies of equipment and processing in abattoir/cutting/elaboration; technical-economic feasibility of meat plants; assisting the design and start up of new meat plants; the technical and economic audit of meat companies; and finally the preparation of administrative documents for EU sanitary approval and regulation of meat companies.



Bjørg Narum is a Food Technologist/Adviser at Matforsk AS – Nofima Food. After a laboratory technology education Bjørg attended several courses by the

Department of Food Science at the University of Life Sciences in Norway. These covered process technology, statistical quality control, multivariate data analysis and meat technology. Her main interest is in process analytical chemistry and improving analytical data through the use of rapid at-line, on-line or in-line instruments. Bjørg believes this is a key tool in efforts to improve asset productivity, lower manufacturing costs and to improve product quality, especially when using near-infrared (NIR), mid-infrared (IR) and Raman technology. Years using NIR technology has given Bjørg the opportunity to work closely with many Norwegian abattoirs and meat companies. Her key skills are to make industrial on-line calibrations for measuring the amount of fat, water and

protein in fresh and frozen ground meat when it comes from the outlet of the blenders. Also, in the mechanisms for developing the rigor mortis processes in beef muscles due to electrical stimulation, stress, low temperature, muscle shortening/tension, and tenderness measured by sensory or instrumental methods like Instron (Warner Bratzler). Besides being a core team member Bjørg is a member of "Center for Biospectroscopy and Datamodelling."



Laurent Picgirard is an Engineer and currently works at ADIV where he is the Head Manager of the processing department. In 1994 he obtained a

General Agronomy Diploma and in 1995 he obtained a diploma in Agro-food engineering specialising in biochemistry and technology of livestock products. Laurent's key skills are development of meat products (formulation, processes, and industrialisation), industrial pilot production at the ADIV manufacturing pilot plant, technical support for meat and meat product factories, process evaluations, testing of additives and packaging, design of processing meat factories and airflow balance/diagnostic tests.

“Having the core team is an excellent opportunity for the ProSafeBeef team to be a success! The core team members have years of experience from research, innovation and knowledge transfer. They know how to build networks and communicate with the SMEs, and are a valuable link between research and industrial innovation.”

Bjørg Narum



Pierre Picouet is a Research Engineer for the Engineering and Process Technology Unit at IRTA.

He has been with the organisation for

5 years. Dr Picouet has a PhD in Solid State Physics which he obtained at the University of Fribourg, Switzerland. His key skills are training of the IRTA staff to use the equipment from emerging technologies such as microwave and radiofrequency and in the setting up of the equipment (microwave tunnel, radiofrequency tunnel, FT-NIR equipment, NMR equipment and computerised tomography system) acquired for the IRTA-CENTA of Monells. He also delivers talks at various conferences on the use of emerging technologies for meat decontamination and lectures at the University of Girona (Spain) on the application of emerging technologies in the food sector.



Carolina Realini is a Food Scientist who joined the research team of IRTA Food Technology, Spain, in January 2005.

She graduated as

an Agricultural Engineer in 1994 (Republic University, Uruguay), completed a Masters degree in 1998 (Massey University, New Zealand) and a PhD and postdoctoral work in Meat Science (The University of Georgia, USA) in 2003. She worked as a Food Scientist in R&D for the USA meat industry in 2004. Dr. Realini has focused her research work on beef carcass and meat quality evaluation since 1996 and has experience in beef processing technology and a good global knowledge of the beef industry. The conference will be of interest to researchers, food producers and retailers, public health specialists, environmental health officers, food safety regulators and policy makers.

Upcoming events: dates for the diary

The Ecology of Pathogenic *E. coli*

An international conference organised by Pathogenic Escherichia coli Network (PEN) on 5-6th March 2009 at the Norwegian School of Veterinary Science in Oslo, Norway.

For further details see the PEN website www.pen-europe.eu.

Participants are invited to submit abstracts dealing with the ecology of pathogenic *E. coli* under one of the following headings:

- Survival in environmental reservoirs such as water, sewage, manure, soil, etc.
- Survival of bacteria versus survival of phages
- Microbial interactions in the animal or human intestine or the 'micro-ecology' of the gut.

For further information regarding submitting an abstract contact the PEN executive manager. Email: clodagh.oneill@teagasc.ie.

Registrations are now being accepted. Those wishing to participate may do so by using the online form at www.pen-europe.eu

Advancing Beef Safety Through Research and Innovation

An international conference organised by ProSafeBeef on 25-26th March 2009 at Ashtown Food Research Conference Centre, Teagasc in Dublin, Ireland.

ProSafeBeef are hosting a conference to present the latest research findings on strategic and targeted controls for microbial pathogens and chemical

residues in beef. International experts will present papers on their latest research findings on beef safety and a poster session will take place. The focus of this conference will be on:

- Detection and tracking of microbial pathogens and chemical residues in the beef chain
- Development and application of quantitative risk assessment models to manage microbial and chemical contaminants in the beef chain
- The development of novel and innovative approaches to control pathogens at key stages along the farm to fork beef chain
- Consumer attitudes and perception of beef safety.

The conference will be of interest to researchers, food producers and retailers, public health specialists, environmental health officers, food safety regulators and policy makers.

Participants are invited to submit abstracts, which relate to the topics outlined above. For more information about abstract submissions please contact Geraldine Duffy.

Email: geraldine.duffy@teagasc.ie

For further details on the conference please contact Robert Mooney. Email: robert.mooney@teagasc.ie

Meat – Muscle, Manufacturing and Meals The 55th International Congress of Meat Science and Technology (ICoMST) meeting on 16-21st August 2009 in Copenhagen, Denmark.

Danish Meat Research Institute (DMRI) and Centre for Advanced Food Studies (LMC) are pleased to announce plans for the 55th ICoMST meeting. The key theme

of the 2009 ICoMST in Copenhagen is 'Meat – Muscle, Manufacturing and Meals' with focus on disseminating the latest research, innovations and visions within the field of meat science and technology. The congress comprises discussions of scientific and practical approaches, and the state-of-the-art technology necessary to ensure a high quality production of meat and meat products.

For more information see <http://www.icomst2009.dk/>

ProSafeBeef, Advancing Beef Safety and Quality through Research and Innovation: European Framework Programme 6: (FOOD-CT-2006-36241)

More information

For more information on ProSafeBeef please visit our website at www.prosafebeef.eu or contact Robert Mooney, Project Manager, at robert.mooney@teagasc.ie.

ProSafeBeef is an Integrated Project supported under the 6th Framework Programme of the European Union.

It involves 41 leading research and industrial organisations working in 18 different countries.

ProSafeBeef is a five year project which commenced on March 1st 2007.



Ashtown Food Research Centre

