



The fifth and final SEAFOODplus conference in Copenhagen

Continuation of collaboration under a new research platform

Four and a half years after its start in January 2004 SEAFOODplus, the biggest research project that the EU has ever funded in the seafood sector, is now on the home stretch. From 8 to 10 June scientists and project participants from the industry met in Copenhagen to report on the work they have done and to present the most important results. The wealth of results they presented is sure proof that the project was a success.

SEAFOODplus was really a second-to-none research project right from the start. More than 200 scientists from about 70 research institutes from 16 European states took part, plus partners from overseas and small and middle-sized companies from the seafood industry. In 20 of the research programme's sub-projects scientists from totally different areas worked together on an interdisciplinary basis, often in co-operation with industrial companies. Rarely before had scientific issues been so carefully planned or approached in such a complex and co-ordinated way. And never before had the EU awarded so much funding to an integrated project within the seafood sector.

The SEAFOODplus project had a financial volume of 26 million euros, of which about 15 million was contributed by the EU. This integrated project was a "flagship" in the European research landscape of recent years, confirmed Ciaran Mangan from the EU Commission in Copenhagen.

If the key parameters of the research programme are impressive the ambitious goals of the individual projects more than matched them. Nearly all of the current problem areas in the seafood sector were touched in some way by SEAFOODplus. The overall project was divided into five strategic clusters, called RTD Pillars (short for Research and Technol-

ogy Development Pillars). Each of the individual projects dealt with a precisely-defined content and topic and could be allocated to at least one of these pillars. A sixth area which covered traceability issues was, in contrast to the vertical pillars, designed horizontally because it concerned all the RTD-pillars. All in all, SEAFOODplus comprised 20 individual research projects, ranging from human nutrition to consumer behaviour, food safety, and traceability along the food chain. Parallel to the research pillars the project ran a further six pillars dedicated to information flow to businesses and consumers, training, dissemination and demonstration activities. The scientific questions concerned topics within the indus-

try that urgently needed addressing. Perhaps that is why so many small and middle-sized companies participated in SEAFOODplus. It was a co-operation that offered benefits to both parties. Industrial companies received answers to their questions and some of them have even already transferred the results to practical production environments. And the scientists were given opportunities that they otherwise rarely had.

Another new feature was that the scope and complexity of the giant project demanded the setting up of a permanent secretariat to pull the strings of all the separate parts and monitor and co-ordinate work progress, organise joint activities, and represent the project to the outside world. Project Co-ordinator Professor Torger Børresen and Secretariat Manager Jette Donovan Jensen adapted to this task well, identifying fully and personally with it.

Project Co-ordinator Torger Børresen. Scientists had put aside all that divided them and focused fully on the joint research objectives.

Most of the 20 projects have already been completed, and the rest will be finished by the end of June. After that, the researchers have just a few weeks to evaluate the last results and write their final reports. So this was just the right time for drawing a provisional balance and giving an account of the past four and a half years' work. Apart from that, however, Copenhagen also offered an opportunity to express thanks and recognition for the work that has been done during the past few years.

The project's significance extends into the future

SEAFOODplus was a good example, said Ciaran Mangan from the EU Commission, of how the concentration of means and potential, and exceeding a certain 'critical mass' led to a desired innovation boost. The research project had shown and explained how some health problems of EU citizens could be

reduced and people's well-being be improved by seafood consumption. The value of these results would not be noticed in full until the next few years, however, when the results had been put into practice and their market relevance became visible. SEAFOODplus had brought more than 200 individual results in the form of tools, trials, surveys, protocols, databases, and intellectual property along the whole food chain, of which it is hoped there will be a high usage effect in the future. The fact that these results bear international comparison and extend our knowledge of seafood considerably has been confirmed by the External Advisory Board of SEAFOODplus. This board consists of 6 carefully selected members, 3 from the USA, and 3 from Australia, the United Kingdom and Norway. These board members are scientists who, though not part of the project, are highly knowledgeable within the specific RTD area they are assigned to provide advice on, and at the same time have a broad scientific experience enabling them to advise on the entire SEAFOODplus research programme.

Right from the beginning the work carried out in the context of the re-

search project was followed closely in the international arena and the results noted with great interest. The homepage of SEAFOODplus alone registered more than 35.000 visits weekly. The integrated research project took place at a time during which warnings of overfishing of individual fish stocks are increasing and being perceived by more and more people. Whilst on the one hand the SEAFOODplus scientists presented reliable proof of the high health value of fish and recommended an increase in consumption there seems on the other hand to be less and less fish available. The researchers naturally addressed this conflict, too. Sustainability and a productive, ethically responsible aquaculture which is accepted by consumers were some of the key topics in the research programme.

Most of the projects are complete, nearly all the studies evaluated, and a lot of important results are now available. The advanced stage of the project promised a particularly worthwhile and interesting conference - and this expectation was not disappointed. Already the external framework of the event made clear that the participants could expect

something unusual this year. The conference was held at Wallmans, a historical circus building that is more than 120 years old and is located in the centre of Copenhagen. Here, where otherwise artistes, dancers, singers and other variety stars captivate visitors with their impressive acts, scientists took the stage for two whole days to concentrate on more serious topics, informing conference participants of the various tests they had carried out and their results.

Results impressive due to complexity of topics

In the eight sessions at this year's conference it was mostly the heads of the individual projects who represented their research teams and presented for the final time the intentions and objectives of their work in combination with the main results. Rarely before had it been so convincingly clear to what extent SEAFOODplus had been planned right down to the last detail, how strictly these plans had been implemented, and how important the results are. Such complex topics can only be successfully managed when all the cogs mesh in synchronisation and everyone



Torger Børresen. The results of SEAFOODplus have been so successful that it is not possible to stop the activities now. Thus, the consortium partners have planned for a continuation by launching a new membership based research platform.



Ciaran Mangan. SEAFOODplus is considered a flagship project of the sixth framework programme because it is the largest research project ever sponsored by the EU in the seafood sector - not only with regard to the total budget, but also with regard to the content and complexity of the research programme.



Doug McLeod. The technological and scientific contributions made by the SEAFOODplus project in the area of shellfish safety represent significant advances in this field. If applied appropriately they could make substantial improvements to the safety of European shellfish.

works in an atmosphere of trust. This was acknowledged by Project Co-ordinator Torger Børresen in his welcoming speech in which he praised the interdisciplinary co-operation. Scientists from very different areas had put aside all that divided them and focused fully on the joint research objectives. This had led to the development of contacts that extended far beyond normal co-operation and offered favourable conditions for further joint projects.

The three lectures in the first session were devoted to the topic of Seafood and Nutrition. In three broadly based clinical studies the participating researchers had investigated what effect seafood consumption has on consumers' health status. In a big experiment with 240 voluntary participants they were able to reveal that at least two fish portions per week reduce the risk of colorectal cancer. Regular fish consumption also contributes towards fighting overweight and adiposity. Young people, in particular, are recommended to eat fish as often as possible. The benefits of fish oil in fighting cardiac arrhythmia could not be confirmed quite so clearly. This is one of the major causes of sudden cardiac death in the western world. Over 546 people with an implantable cardioverter defibrillator took part in the test and although there were a number of signs of improvements they could not be confirmed statistically. Despite this, the researchers still recommend those concerned to eat fish at least twice per week.

The four lectures in the second topic block on Seafood and Consumers were just as interesting. The objective of this Pillar was to investigate eating habits, attitudes and preferences towards fish and seafood as well as trace trends over time across Europe. In Europe-wide surveys and tasting actions it

was investigated, for example, how consumers judge wild and farmed fish, and what expectations they have in relation to seafood. As was to be expected, opinions differed widely from region to region. The researchers were able to divide consumers into three groups, in which differences were revealed with regard to usage of and interest in information on fish labels, fish consumption behaviour, socio-demographic and attitudinal profile, and what was to be gained through targeted information. The biggest group was the Enthusiasts (41.4%), followed by the Confidents



After their presentations the speakers entered into a lively discussion with the audience.

(34.6%) before the Sceptics (24%). After evaluation of their studies the researchers concluded that the information given on fish and seafood products was often imperfect, incomplete, inaccessible, asymmetrically distributed and non-standardised, or costly to collect. Consumers were very interested and were eager to know more but were often fobbed off with marginal, insignificant information. Here lies a chance for the industry to improve product perception.

Better protection of consumers against possible health risks, which can above all arise from bivalve molluscs was the content of the third session. The focus of the five lectures was to find sure proof of viruses and bacteria, better risk as-

essment of histamine in fish, and a risk management strategy for bivalve farming regions. Through the use of ultra-modern methods with which even tiny DNA fragments of dangerous germs can be identified, risks to consumers can be recognised early on and then managed better. This progress was expressly welcomed by Doug McLeod (Association of Scottish Shellfish Growers) who took part in the conference as a guest. He pointed out, however, that the practical relevance of individual findings would still have to be verified more precisely. The increasingly fine,

ever more accurate assays were important but concealed the risk that producers and consumers could be unnecessarily alarmed and made unsure. Not all positive findings constituted a cause for alarm.

The five lectures in the fourth session, Seafood from Source to Consumer Products, made clear how resources could be used and utilised better. The value of fish is not only to be found in the fillet but also in the skin, head, bones, intestines and even in the washing water which often contains valuable substances. One of the objectives in this Pillar was thus to look for and isolate bioactive substances, particularly peptides with health effects, and to show what uses they might have in tailor-made prod-

ucts. The researchers had found, for example, peptides that had an antihypertensive effect in vitro and also several fish protein hydrolysates which had an antioxidative effect.

In the context of this Pillar it was also possible to show that pulsed light can be used to reduce the germ count in seafood products. Process parameters have been optimized on pulse energy, distance and position of the lamps and number of pulses. In case some bacteria still survive, biopreservation as a second strategy consists in limiting their growth during storage. Biopreservation is a new natural technology for inoculating food products with bacteria selected for their antimicrobial properties against undesirable microorganisms without themselves presenting spoiling capacities. A strain of *Carnobacterium divergens* has been isolated from salmon and is active against a wide collection of *L. monocytogenes*. The attempt to enrich seafood products with biologically available selenium and dietary fibers also falls into the category of better usage of resources. Initial restructured products that were enriched with dietary fibers were already available for testing at the conference.

Session 5, Seafood from Aquaculture, was concerned with important problems of fish farming. For example, the scientists had sequenced more than 100 genes of the cod genome. This enables more exact allocation of individual fishes to stocks of this fish species in the Atlantic which makes the farming programme much more effective. Because numerous genes show divergent patterns of variation among populations faster progress with regard to flesh quality but also productivity and well-being of the fishes in aquaculture seems possible. The sci-

entists also investigated how the storage of live fish and pre-slaughter conditions could be optimised. It is known that fish flesh quality is influenced considerably by these two factors.

The topic is Session 6 was Seafood and Traceability. A part of the work has resulted in a new generic traceability model which identifies different aspects of traceability. These aspects are: purpose, data, validation, batch handling and transformation, identification, communication, and documentation and archiving. The user of the model is able to identify the general traceability requirements, as well as sector specific requirements and implementation details.

Session 7, Integration within SEAFOODplus, made clear

just what the researchers had achieved within the individual projects. A good 50 scientists had visited one another in the context of the training programmes in which the R&D activities were co-ordinated. The results had been disseminated widely. In addition to a couple of hundred peer reviewed papers published until now, more than 400 presentations have been given at conferences and an estimated 300 newspaper and magazine articles have been published. On the project website 112 news items have been presented and 25 electronic newsletters have been sent out to more than 600 subscribers. Several video presentations have been recorded from the project, and the European Commission has produced a special video feature about SEAFOODplus.

New research platform to start in January 2009

The eighth and last session was devoted to Co-operation with the Seafood Industry and the Future of SEAFOODplus. In the years 2006 and 2007 four demonstration projects were carried out together with partners from industry. Several companies have participated directly in the project, and many have watched the achievements with great interest and are now ready to pick up the most interesting developments in their own production. For this purpose the demonstration projects are essential, and several representatives from the 'take-up' industries took the stage and explained how they would use the SEAFOODplus results. In the face of the overwhelming suc-

cess of SEAFOODplus the question naturally arises as to what will happen once the project has ended. The co-operation had developed so positively that it was simply not possible to stop now - of that Project Co-ordinator Torger Børresen is convinced. For that reason the Consortium partners intend to continue the co-operation. Admittedly, not in the context of such a large project but they are busy planning a research platform which is already set to start on 1 January 2009. With this decision, the course seems to be set for a continuation of the work beyond national borders for the future, too. In addition to numerous key findings which were gained in the context of the project this is surely one of the particularly notable successes of SEAFOODplus. ■

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