SEAFOODplus RTD-pillar 1 Seafood and Human Nutrition

On the way to better, healthier seafood products

Seafood is healthy. This trite phrase is probably familiar to just about everyone today. Far less people know, however, exactly what advantages seafood consumption has to offer, or how it benefits people's health. Some consumers have already heard something about omega 3 fatty acids and protection against heart attacks. But that is by no means all. Nutritionists presume that seafood has much more to offer people's health. In the context of the Seafood and Nutrition research pillar of the SEAFOODplus project they have now begun to shed light upon some of the most important health benefits of a seafood-rich diet.

Eurofish Magazine will carry a series of articles that will profile each of the Pillars and the sub-projects under each Pillar that together comprise the Integrated Project SEAFOODplus. The articles will also be available from www.seafoodplus.org the SEAFOODplus website. To receive intimation of new information on the SEAFOODplus website, sign up to the SEAFOODplus Newsletter at www.eurofish.dk.

Scientists and physicians believe that the number of heart attacks and strokes is so low in Japan because the Japanese eat a particularly large amount of fish. In contrast, in Europe, where seafood is served much less frequently, cardiovascular diseases are the major cause of premature infirmity and untimely death. In fact, cardiovascular disorders account for about 40% of deaths and are thus ahead of cancer which is responsible for a quarter of all deaths. The majority of researchers agrees that this sad balance could be a lot better if Europeans ate more seafood more often. There are significant signs that regular consumption of seafood can contribute towards reducing gastrointestinal diseases such as colon cancer and inflammatory bowel disease. Other illnesses, too, in which inflammatory processes are involved, are diagnosed much less frequently among people who eat fish more often: type II diabetes or osteoporosis, for example. Hardly anyone doubts today that there is a connection between the frequency of seafood consumption and some chronic diseases. But can this be proved scientifically? And if they exist, what substances in fish are responsible for the positive effects? Would it be possible to isolate them and transfer them to other foods so that these would have similar benefits?

From left to right: Back: Prof. Alfredo Martinez (Spain), Dr. Ruben Coronel (NL), Dr. Mairead Kiely (Ireland), Dr. Robert Havenaar (NL), Dr. Ellen Kampman (NL), Dr. Bryndis Eva Birgisdottir (Iceland), Dr. Nina Haberman (Germany), Dr. Linda Harvey (UK), Dr. Andrew Hart (UK), Dr. Joanne Christer (UK) and Dr. Dolores Parra (Spain). Front: Dr. Liz Lund (UK, project leader FISHGASTRO), Prof. Inga Thorsdottir (Iceland, project leader YOUNG), Prof. Gertjan Schaafsma (NL, pillar coordinator) and Dr. Ingeborg Brouwer (NL, project leader METAHEART). Not shown on the photo Dr. Ian Johnson (UK).

Co-operation of fish researchers and physicians

These are just some of the questions which international research teams have decided to answer in the coming years in the course of three projects which are part of the research complex "Seafood and Human Nutrition" (Pillar 1 of SEAFOODplus). The projects are being co-ordinated by Professor Gertjan Schaafsma from the TNO Nutrition and Food Research Institute in the Netherlands. Among other things the researchers are looking for conclusive proof that seafood really does have the health benefits mentioned above. In this connection they will shed light on elementary functional mechanisms and physiological processes that proteins and fatty acids found in seafood products bring about in the human body. To achieve this, the participating scientists will have to co-operate closely with physicians, for such results are only possible with the help of parallel clinical tests on people.

What substances make seafood so healthy?

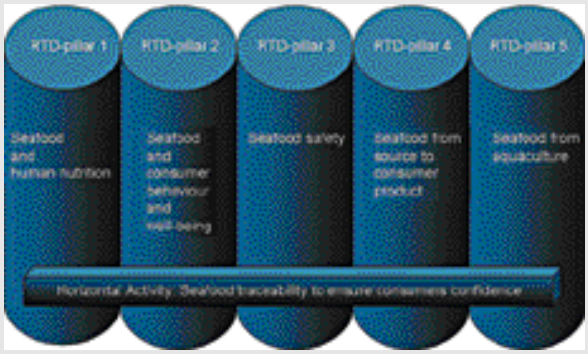
Numerous studies have confirmed that long-chain, polyunsaturated omega 3 fatty acids play a particularly important role in the prevention of cardiovascular diseases. The diets of most Europeans, however, contain fatty acids that are low in omega 3 but high in omega 6. The ratio of omega 6 to omega 3 fatty acids in the diet of an average European is 12:1. A ratio of 6:1 would be much better. This can easily be achieved through eating more seafood. Fish proteins, too, have numerous very positive effects. They are easily digested and rich in essential amino acids that are indispensable for a healthy diet. Scientists even believe that some amino acid chains from fish protein have bioactive effects and can influence a person's intesti- ►

nal flora. For this reason one of the projects hopes to answer the question as to whether certain protein components can change the composition and metabolic activity of the intestinal flora. Might this reveal one of the reasons why a seafood-rich diet can prevent the development of bowel cancer?

Search for new application fields

It has been known for a long time that seafood products contain numerous vital vitamins and minerals. Sea fish, for example, is not only very rich in iodine and phosphorus but on average also contains four times more vitamin B12 and eight times more vitamin D than meat. But there are many more useful substances contained in seafood. During recent years the number of marine based by-products has rocketed. Fish skin and fish guts, brains or bones are often the source of such by-products. Whereas such resources used to be more or less completely overlooked and went into fishmeal or were thrown away, today it is possible to extract from them valuable protein building blocks and omega 3 fatty acids, minerals, enzymes, DNA-salts and nucleotides. Special collagens that can be obtained from fish waste may also be useful. There are a lot of signs that they could relieve rheumatoid arthritis pain. And new substances are being discovered almost every day which can be extracted from what was once considered waste.

It is known of a number of by-products that they have health-giving effects, of others it is presumed. A lot of research needs to be done particularly since some of the substances clearly have considerably more to offer than is known so far. By-products will be more fully investigated in a project under Pillar 4, PROPEPHEALTH,



SEAFOODplus is subdivided into five strategic clusters which will constitute the pillars upon which the overall project rests. The clusters are termed RTD pillars, short for Research and Technology Development Pillars. Each of the individual projects deals with an exactly defined content and topic and can be allocated to at least one of these pillars. A sixth area, which covers traceability issues is, in contrast to the vertical pillars, designed horizontally because it concerns all the RTD pillars.

which is expected to lead to a new class of functional seafoods based on by-product derivatives. Today it is considered proven that omega 3 fatty acids prevent cardiovascular diseases and have positive effects on the development of the brain and retina in small children. What is still lacking, however, are scientifically verified recommendations to add these substances to children's food. This would be of great advantage to the health of growing children. Perhaps adults could also benefit much more strongly from omega 3 fats than we at present believe. Some researchers presume that these fats can lower blood pressure and prevent inflammatory processes. The SEAFOODplus project may soon be able to supply scientific proof of this.

Content and objectives of the three projects in Pillar 1

These examples already show how important the three projects are that will be worked on in Pillar 1, one of six topic complexes of SEAFOODplus. The biggest integrated research programme that the EU has ever promoted in the seafood sector, the work is more strongly directed towards the practical applicability of the results than other comparable projects have been. At the centre of the research is not only the attainment of results but – and above all – the application of the knowledge gained in practical environments, its use for new and better seafood products.

Project 1.1 in Pillar 1 will examine the influence of seafood consumption, particularly of fish proteins, on gastro-intestinal health. The project name has thus been shortened to simply "FISHGASTRO". The project will focus on whether seafood consumption has a preventive effect on colon cancer and inflammatory bowel disease. In contrast to earlier research projects the seafood products will not be examined as whole products for their health effects but the fats and proteins that they contain will be analysed separately. Five research facilities in Great Britain, Germany and The Netherlands are participating in FISHGASTRO which will be managed and co-ordinated by Dr Elizabeth Lund from the Institute of Food Research (UK).

Project 1.2 is to help shed light on the health effects of omega 3 fatty acids. It will focus on young people and young families and is thus simply called "YOUNG". The researchers hope to find out how omega 3 fats affect the intestine, the development and function of the brain, the heart, bone structure and fat tissue. The findings will contribute towards preventing some metabolic diseases and functional disorders of these organs. For example, there are indications that regular seafood consumption reduces the risk of post-partum depression, a disorder suffered by 5 to 20% of all women after childbirth. Five institutes and hospitals from Iceland, Portugal, Spain, Ireland and Denmark are taking part in the YOUNG Project of which Professor Inga Thorsdottir from the Department of Clinical Nutrition, Landspitali-University Hospital in Iceland is in charge.

Project 1.3 in short "METAHEART" is about the metabolism of omega 3 fatty acids and their influence on heart disease. The researchers will, among other things, analyse the role played by bioactive components in seafood on the health of the heart muscle. At a later stage of the SEAFOODplus programme these studies will be linked up more closely with other pillars: with Pillar 4, in particular, which will be looking at functional foods. Two Dutch research facilities and Amsterdam Medical Centre are involved in METAHEART. Dr Ingeborg Brouwer from Wageningen Centre of Food Science is responsible for co-ordination.

SEAFOODplus is geared towards consumer interests and their desire for healthier, better products. The three projects that make up Pillar 1 show how the researchers implement this ambitious goal in their daily work.

More information can be found at www.seafoodplus.org.