

## Current Activities in Food Innovation

■ Innovation in the food sector is driven by a broad range of new technologies as well as by latest results of basic research. Examples comprise the elucidation of the molecular interactions between nutrition and health, the characterisation of novel functional ingredients and smart processes for gentle manufacturing or the application of electronic devices for improved food chain management.

Bavaria has a long tradition in agriculture and food. With almost 500,000 employees and about Euro 37 billion sales the agricultural and food business is one of the most important sectors of Bavaria's economy. With food manufacturers, leading universities, R&D centers and technology providers it represents also a high-tech location with focus on food innovations. The Bavarian Food Cluster – one of 19 Clusters initiated by the Bavarian State Government to strengthen networking for innovation – integrates stakeholders in Bavaria along the value chain: agriculture, food manufacturers, scientific institutes, service providers, retailers and consumers. Bayern Innovativ with its Network Life Science pursues a broader interdisciplinary approach. It brings together leading national and international companies and research institutes from agricultural and food industries as well as from pharma, chemistry and engineering to instigate interdisciplinary cooperation exchanging and applying latest results in biotech and bioscience.



Dr Helmut Maucher, Spokesman of the Bavarian Food Cluster (left), and Prof Josef Nassauer, Chief Executive of Bayern Innovativ, at the 'Forum Life Science 2007'

Prof Josef Nassauer, Chief Executive of Bayern Innovativ and honorary professor for food engineering at the TU München, states: 'Innovation in the food industry requires the intensive cooperation of partners along the entire value chain. In particular, the promising field of food with added health value needs close interaction with experts from areas such as nutritional science and medicine.'

The current Newsletter Life Science highlights various aspects of 'Food and Nutrition' in Bavaria, e.g. research institutes working on molecular understanding of nutrition and health, R&D and production sites of multinational food companies, projects of the Bavarian Food Cluster, latest results in process technology or new aspects in food chain management for extended quality assurance.

### International Congress 'Forum Life Science 2009' 18 and 19 March 2009, TU München, Garching



Recent discoveries in nutrition science and latest developments in food industry will be one focus at the 6th International Congress 'Forum Life Science' taking place on 18 and 19 March 2009 at the Technische Universität München in Garching. More than 60 leading experts from 11 countries will present scientific results, novel technologies, product innovations and future strategies in 'Pharma Development', 'Industrial Biotechnology' and 'Food and Nutrition'. Furthermore, 100 companies and institutes will showcase in the accompanying exhibition.

The 'Food and Nutrition' session will highlight latest research results on the molecular links between nutrition and health, trends in functional food, as well as technologies and processes for innovative food products.

The 'Forum Life Science 2009' is conceived and organised by Bayern Innovativ, supports the Cluster Initiative Bavaria and is funded by the Bavarian Ministry for Economic Affairs, Infrastructure, Transport and Technology.

Further information:  
[www.bayern-innovativ.de/fls2009](http://www.bayern-innovativ.de/fls2009)

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## Research for Nutrition and Health

Research Center for Nutrition and Food Science (Z I E L), Technische Universität München

### Nutrition and Food Sciences: From Molecules to Human Health



ZIEL – Scientific expertise at the interface of food, nutrition and health sciences

The interrelationship of food, nutrition and health is the prime line of all research activities at the Technische Universität München Z I E L – Research Center for Nutrition and Food Science. Interdisciplinary research teams at Z I E L cover a variety of aspects of the food chain from analytics of food constituents

and contaminants, process engineering (see also article on page 6) and food microbiology to human physiology and clinical nutrition. Some of the research carried out at Z I E L will be presented during the 'Forum Life 2009'.

#### From genes to metabolic functions and from metabolism to gene function

■ Nutrients and non-nutrient components of food affect molecular and cellular targets from gene transcription to altered complex metabolic functions. The **Biochemistry Unit** headed by **Prof Hannelore Daniel** assesses these interactions of dietary constituents with the genome in model organisms (bacteria, yeast, *C. elegans*, mice) and in humans by both gene-guided and nutrient-guided approaches. A strong emphasis is put on gastrointestinal functions as the gastrointestinal tract is the first site where food and food constituents interact with the mammalian organism. Nutrient absorption and sensory functions of the gut that alter hormone secretion, glucose metabolism and diabetic state are studied at all levels of complexity of the biological systems in basic and applied research approaches. One example is a recently approved project, funded by the German Federal Ministry of Education and Research (BMBF), which will investigate the effects of food constituents on glucose uptake mechanisms in intestinal cells with the aim to identify effective inhibitors for reducing sugar absorption, improve glucose metabolism and prevent the development of obesity and diabetes. The project receives Euro 1.1 million and is carried out in close collaboration with industrial and academic partners.

#### Bavarian Food Cluster

### New Research and Innovation Platform 'BayFood' Planned

■ The Food Cluster is an important part of the Bavarian Cluster initiative. One major objective of the Cluster is to increase networking between research facilities in Bavaria and to enhance knowledge transfer into application-oriented projects. The foundation of the research and innovation network 'BayFood' is planned as an important additional element of the Food Cluster. The intention is to establish a new platform bringing closer together the food processing industry and science, coordinate research contents, and enable the financing of

#### Studying causes of food-related disorders

■ The complex gut-associated microbial ecosystem (gut microbiota), and nutrition-related factors are the most important environmental triggers for the development and modification of lifestyle-related diseases including chronic inflammatory disorders in the gut as well as metabolic pathologies. The gut acts as a highly selective barrier and communication organ between the luminal bacterial environment and the host responsible for the regulation of metabolic and immune functions. The relation between nutrition and inflammation with regards to the functional role of the gut is investigated at the **Biofunctionality Unit**. In the group of **Prof Dirk Haller**, microorganisms (probiotics and the complex intestinal microbiota) and secondary plant compounds are examined with regards to their ability to regulate cellular stress mechanisms and inflammatory processes.

#### Investigating nutrition in clinical research

■ Comparable to pharmacological drug candidates being tested for safety and efficacy in clinical trials, the effects of nutrition on healthy and diseased patients can be studied in clinical research. For this purpose the **Nutritional Medicine Unit** has a clinical study unit, comprising testing space, an experimental kitchen and accommodation for nutritional studies involving humans. The research focus of **Prof Hans Hauner** is the prevention and treatment of obesity, type 2 diabetes and metabolic syndrome. Obesity and diabetes are of high medical importance and it is known that there exists a close relation between both. The number of obese and diabetic people is steadily increasing. With this in mind, nutritional approaches play an increasing role for the prevention of type 2 diabetes.

Other departments of the research center are working on bioanalytics, molecular nutritional medicine, microbiology, physiology and technology. Furthermore, the **Z I E L-TUM Akademie** offers training with focus on product development and health claims.

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innovative projects by combining various financing sources. One focus will be the 'Health Food' area. The combination and clustering of resources and competencies is projected to enable the predominantly medium-sized Bavarian foodstuffs business to reinforce its position in national and international competition.

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Helmholtz Zentrum München

## Epidemiologic Studies on Diet-related Diseases

■ The Institute of Epidemiology at the Helmholtz Zentrum München – the German Research Center for Environmental Health – investigates the role of environmental factors and genetic predisposition in human health. In this context, the molecular analysis of complex diseases such as type 2 diabetes and the elucidation of the correlation between lifestyle, diet and genetic predisposition is one important focus.

The Institute of Epidemiology is participating in three international consortia with the objective to identify gene variants associated with diet-related diseases: GIANT (Genetic Investigation of Anthropometric Parameters) aims at discovering adipositas-related genes, DIAGRAM (Diabetes Genetics Replication and Meta analysis) investigates the genetic causes of type 2 diabetes, and MAGIC (Meta-Analyses of Glucose and Insulin-related traits Consortium) targets gene variants determining the blood glucose level. Several gene variants with a correlation to disease development have already been identified by each of those consortia.

So far, there is no evidence for a difference in the impact of life style and nutritional scheme on people with different genetic

predisposition concerning the incidence of disease. Thus, to gain a deeper understanding, a so-called Virtual Institute was founded in 2007 involving the Institute of Epidemiology of the Helmholtz Zentrum München and the university hospitals of the Ludwig-Maximilians-University Munich and the Technische Universität München. Virtual Institutes are created by the Helmholtz Association to unite the competencies and resources of universities and Helmholtz Centers. At the Virtual Institute 'Molecular Basis of Glucose Regulation and Type 2 Diabetes', new gene variants for early types of type 2 diabetes and deficient glucose regulation are identified and their impact on glucose metabolism is determined. For the most promising gene variants, clinical studies are conducted with a main focus on insulin secretion, insulin sensitivity and the influence of nutrition in persons with different genetic endowments.

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**'Blood Donor Biobank' of the Bavarian Red Cross**

## Research on Biomarkers for Early Diagnosis of Type 2 Diabetes

■ The 'Blood Donor Biobank' of the Bavarian Red Cross is a unique resource of over 4 million standardised collected and frozen blood samples of its blood donors, suitable for innovative approaches to research on parameters accompanying the onset and progress of diseases: it provides demographic and medicinal data and blood samples from a big number of healthy persons, collected over a long period. This prospective collection allows the analysis of several blood samples of a person collected and stored before diagnosis of disease, and as a consequence, the detection of early biomarkers allowing for a screening for higher levels of disease risk already before the disease becomes manifest. It is the first biobank worldwide based on samples and data of blood donors.

A current research project funded by the Bayerische Forschungsstiftung aims at the development of novel, cost-effective, sensitive and specific screening methods to identify individuals at risk of developing diabetes at an early stage. Blood donors with a medium or high risk of developing diabetes are identified using the FINDRISK questionnaire considering several diabetes risk factors such as a high body mass index, lack of exercise or family cases of type 2 diabetes.

Subsequently, the blood sugar level (HbA1c value) is determined and an oral glucose tolerance test is performed to iden-

tify persons already suffering from pre-diabetes who will be further examined. With this multi-step approach, a sufficient number of cases can be gathered for biomarker research.

The pre-screening carried out by the blood bank will be completed this summer, followed by a two-year phase of analysis of potential markers applying methods in the field of metabolomics, proteomics, peptidomics, and lipidomics. The identification and evaluation of potential biomarkers will be realised by academic and industrial project partners, namely the Institute of Epidemiology of the LMU Munich, the Diabetes Center of the Medical Clinic

Innenstadt LMU Munich, the Institute for Biophysics and Physical Biochemistry of the University of Regensburg, metabolomics Health GmbH, Berlin, Toplab GmbH, Martinsried and LipoFIT Analytic GmbH, Regensburg.

Dr Silke Martin, Head of the Bavarian Red Cross Biobank, will also present the project at the 'Forum Life Science 2009'.



*The sample collection of the 'Blood Donor Biobank' increases by 2000 samples every working day*

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**R&D in the Food Industry**

Nestlé

**Science and Technology for Nutrition and Health**

Good Food, Good Life



*Dr Stefan Palzer, Head of Food Science & Technology, Nestlé Research Center, Lausanne, Switzerland*

*Dr Stefan Palzer joined Nestlé in 2000 as Project Manager in the Product Technology Center for culinary products. Since 2007 he is Head of the Food Science & Technology department at the Nestlé Research Center in Lausanne, Switzerland. Dr Stefan Palzer studied Food Technology and received his PhD and habilitation in Process Engineering at the Technical University of Munich.*

**Dr Palzer, how does Nestlé Research address the steadily increasing demand for more nutritional and healthy food products?**

At Nestlé Science & Research, we investigate the link between diet, metabolism and health. In parallel, we analyse physiological and psychological factors that influence human perception and the development of food preferences. Based on these scientific findings we develop concepts and technologies for healthy and tasty food products. In this context we address nutrition and health for all Nestlé product categories by continuously improving the nutritional profile of existing products and by launching new product innovations that deliver specific health benefits to consumers.

**What role does food science and technology play in the development of healthy and nutritious products?**

It is a misconception that simply adding a single active substance to a given food matrix comprises a healthy food product. Healthy foods may contain significant amounts of fibres, milk proteins, vegetables and fruit components, or are fortified with vitamins and minerals. Probiotic bacteria or bioactives can be added to food matrices to provide specific health benefits. Furthermore, consumers expect that healthy foods contain no negatively perceived additives and often have a reduced-calorie content. And, let's not forget that food is consumed primarily for pleasure. Thus, healthy food products hardly allow any compromises on taste and aroma.

Consequently, food technologists must develop food structures and process technologies to facilitate the incorporation of bioactives into a food matrix, but also to compensate for the reduction of fat, calories or the elimination of food additives. The microstructures of calorie-reduced products must be modified to maintain optimal sensory attributes. If the fibre, whole grain, milk protein or vegetable content of a food is increased, negative textural changes can only be avoided through the appropriate structuration of the food or the ingredients.

Finally, the stability and bioavailability of micronutrients, bioactives and probiotic bacteria strongly depend on the properties of the surrounding food structure.

**Can you please give us some insight on how Nestlé Science & Research collaborates with other research institutions?**

Currently, we have over 200 external collaborations and partnerships with leading universities and research institutes worldwide, in accordance with Nestlé's research objectives. These collaborations include joint research projects, sponsorship of PhD students and ongoing scientific partnerships.

The Life Science Center Weihenstephan, of the Technical University of Munich, especially represents an important partnership for Nestlé Science & Research, due to their work in nutrigenomics, nutrition, food chemistry and food technology. The unique combination of these different disciplines at the same site brings a huge potential for collaboration. Today, Nestlé is actively building relationships in these areas and we intend to strengthen collaboration in the coming years. Additionally, we are interacting with the Fraunhofer Institute for Process Engineering and Packaging, located in Freising.

**What are the future consumer trends related to healthy food?**

Consumers are demanding food products that bring health benefits such as protection, improved performance, and growth and development, among others. Since many consumers are affected by obesity, the demand for fat- and calorie-reduced products is also increasing. One major future trend is the nutritional personalisation of food. Looking ahead, advances in medical and analytical technologies will enable the evolution of functional foods that are targeted to specific subsets of people with various nutrition needs, i.e. children, adolescents, athletes, older adults and people with illnesses. And, these technologies could also enable the adaptation of the diet to an individual's specific metabolism. Personalisation of foods will bring individuality to our life and improve the health of consumers.

**Dr Palzer, thank you very much for the interview.**

**Nestlé in Bavaria**

In Bavaria, Nestlé has manufacturing locations in Biessenhofen, Weiding, and Munich. These respective facilities produce a variety of products including infant formulas, cereals, baby food, ready-to-drink beverages and performance nutrition products. Nestlé continuously invests in its Bavarian sites. In fact, Nestlé is currently investing more than Euro 100 million to extend and upgrade its manufacturing facilities for hypoallergenic infant formula in Biessenhofen.

## Kraft Foods

## European Research, Development & Quality Center for Confectionery and Food products in Munich

■ Kraft Foods is one of the world's leading food and beverage companies with 103,000 employees worldwide and annual net revenues of USD 37.2 billion (in 2007). Munich, with about 300 employees, is the European center of Kraft Foods for research, development and quality assurance for chocolate-based confectionery and food products. Beyond that, Munich is even the global center of expertise for chocolate development and processing, whereas the global center for food research is in Glenview, USA (near Chicago).

Besides confectionery, Munich focuses on product and process development and associated new technologies in cheese & dairy, grocery, convenient meals, refreshment beverages, salted snacks and biscuits. Quality assurance, food safety and packaging development are further topics.

A chemistry department of R&D Munich offers its services to

better understand and further develop raw materials, products and processes. The nutrition group provides strategic leadership and expertise in nutritional science for product development, corporate and regulatory affairs as well as for marketing. Sensory testing and consumer research services are provided by the consumer & sensory group.

Examples of the research and development activities of the center in Munich are the application of membrane technology in cheese manufacturing, improvement of taste or texture of cheese or chocolate, but also new packaging concepts delivering an aroma burst after opening.

Further information:  
[www.kraft-munich.com](http://www.kraft-munich.com)

### Cognis Global Competence Center for Nutrition & Health in Illertissen

## Creative Recipes for Healthy Nutrition

■ How can a delicious yoghurt reduce body fat? How can a spread enhance heart health and orange juice improve skin hydration and elasticity? Cognis, being a worldwide supplier of innovative specialty chemicals and nutritional ingredients with a particular focus on the areas of wellness and sustainability, provides answers to these questions. The company employs about 6,000 people and operates production sites and service centers in 30 countries.

The international Nutrition & Health Competence Center in Illertissen with 380 employees is the company's global manufacturing site for emulsifiers, stabilizers, plant sterol esters, and conjugated linoleic acid (CLA). This strategic business unit of Cognis is one of the world's leading suppliers of natural-source ingredients for the food, dietary supplement and pharma industries – it is the market leader in CLA, plant sterols, and natural carotenoids, and one of the market leaders in natural vitamin E. As well as being an important production site, Illertissen is also home to extensive research and development facilities. Cognis' R&D activities are highly customer-focused, and most of the company's formulations are tailor-made in response to specific consumer demands. The effectiveness of Cognis' products, formulations and marketing approaches is scientifically

proven. For example, the application technology department has its own bakery where effects of emulsifiers in various baked goods can be tested.

Cognis has invested around Euro 35 million in the functional foods business in Illertissen



Test bakery at Cognis Illertissen



The Cognis site in Illertissen

over the last few years. In late 2007, Cognis expanded its sterol ester production capacities by opening a new deodorization facility for the production of premium-grade plant sterol esters. Vice President Nutrition & Health Gerhard Lobmaier emphasizes: 'Food manufacturers will now be able to incorporate these ingredients without any further processing. Cognis' refined plant sterol esters are completely odorless and neutral in taste which is a key requirement for functional food ingredients.' Andreas Heidbreder, Site Manager Cognis Illertissen, adds: 'This investment is further proof of the company's ongoing commitment to the Illertissen site serving the global wellness and sustainability trends with innovative products.'

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## Healthy Dairy Products and Technologies

Danone – Research as the Basis of Product Development

### Manufacturing of Healthy Dairy Products in Bavaria

■ Science and research in the services of health is the basis of product development at Danone. The company's first yoghurt was developed in 1919 by founding father Isaac Carasso to help children who suffered from severe stomach illnesses due to poor hygiene. The yoghurt was sold in a pharmacy in Barcelona.

Nowadays, Danone invests around Euro 190 million each year in research and development. Danone has more than 1,100 employees around the world working in science. The Daniel Carasso Research Center in Paris, with an interdisciplinary team of around 750 staff, is the heart of the dairy and water product division. Dairy products play a very important role for Danone: 3,500 probiotic bacteria strains are stored at the research center in Paris and subjected to ongoing investigations. After several years, this kind of process can end in a new product with functional added value. Each functional added value is verified in numerous scientific studies. Additionally to the research center in Paris, Danone has a research center in Wageningen, where the focal points are baby nutrition and medical nutrition.

'We see ourselves as a 'research-based food company'' explains Marion Fürst, Director of Communications, Science and Nutrition at Danone Deutschland. The company's vision is to 'Bring health through food to as many people as possible'.

Danone Germany GmbH, with 800 employees, has its regis-



The Danone production site in Ochsenfurt

tered office in Haar near Munich. The company has three production centers in Germany, two of which are situated in Bavaria: in Ochsenfurt, near Würzburg and in Rosenheim, south of Munich. Bavaria is also the home of the 'Institut Danone Ernährung für Gesundheit e. V.' (Danone institute for nutrition for health), a not-for-profit organisation which is engaged in promoting research and understanding nutrition. It also provides a platform for scientific exchange on current issues in the areas of health and nutrition and acts independently of any product.

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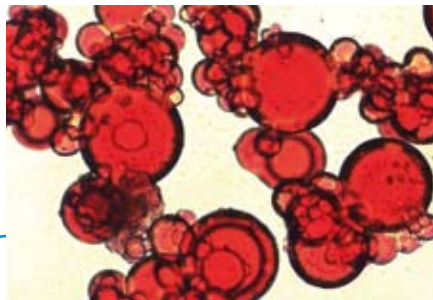
Food Process Engineering and Dairy Technology at the TU München

### Process Technology for Sensitive Ingredients

■ Functional food ingredients, such as probiotics or bioactive substances, are sensitive to environmental influences during manufacturing and storage of the food product. Furthermore, loss of bioactivity can occur during digestion in the stomach and intestine. At the Institute for Food Process Engineering and Dairy Technology, Technische Universität München, processes are developed and optimised to preserve viability and activity of probiotic microorganisms and sensitive substances.

Probiotics – microorganisms with a positive effect on gut function – are often stored and applied as dried cultures. However, they are sensitive to thermal and drying stress. Basic questions regarding fermentation, freeze drying, vacuum drying and lyophilisation are approached at the institute. A thorough understanding of the processes and thus an optimisation of drying parameters and development of novel drying technologies could facilitate the production of stable cultures of probiotic microorganisms.

Micro-encapsulation offers another approach to reduce loss of vitality. In a process employed at the institute, the capsules are produced from protein as soluble matrix material and are trans-



Micro-capsules of blueberry extract

ferred to an insoluble state through enzymatic or thermic reactions. Besides the application for probiotics, such capsules can be used to protect bioactive substances of low molecular weight such as extracts from berries containing anthocyanes. The advantage of this process using proteins as material for the capsule is the buffering capacity helping acid-sensitive substances or microorganisms to survive the extreme pH milieu in the stomach. Thus, they provide long-lasting

protection, but remain digestible – in contrast to certain polysaccharides – and release the active agent at the target site in the intestine. This method will also be presented in detail by Prof Dr Ulrich Kulozik, Head of the Institute, at the 'Forum Life Science 2009'.

Furthermore, research at the institute focuses on topics such as the preparation of physiologically active peptides through enzymatic hydrolysis of proteins as well as the enrichment and isolation of physiologically active substances through filtration.

Further information:

Prof Dr Ulrich Kulozik

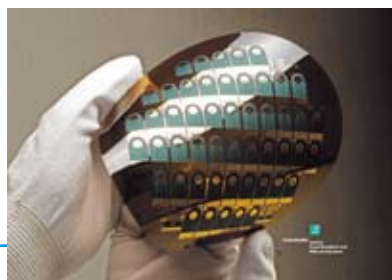
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## Food Chain Management

### The Fraunhofer 'Food Chain Management' Alliance

## Ensuring Food Traceability and Quality

■ Safety and high quality of food are important issues for both, consumers and food industry. In this context, Food Chain Management (FCM) offers a promising approach. FCM focuses on the chain of food manufacturing as an integral process – extending from the primary production via processing and trade until it reaches the consumer. The aim is to analyse and optimise these processes in order to finally supply consumers with qualitatively sound food as efficiently and reliably as possible.



*Electrochemical electrodes for biosensors in food technology (Fraunhofer IZM)*

FCM has an enormous economic significance. The EU food industry comprises about 309,700 enterprises including nearly 4.3 million jobs and a sales volume of approximately Euro 870 billion, thereof Euro 138 billion in Germany alone (2007). Nevertheless, 55 % of all German producers still have problems to ensure traceability.

The Fraunhofer 'Food Chain Management' Alliance, founded in 2008, aims at introducing latest scientific know-how in new products and solutions of this field by means of mutual projects. For this purpose, the platform 'Food Chain Management' of the Fraunhofer Gesellschaft shall merge the expertise of partners from 10 Fraunhofer Institutes from all over Germany. Four of them are situated in Bavaria. The Fraunhofer Institute for Integrated Circuits IIS in Erlangen develops 3D scanners for fast measurement of plants in the field. The Fraunhofer Center for

Applied Research on Technologies for the Logistics Service Industries (ATL) in Nuremberg follows the question of the supervision of supply chains by means of sensor networks and RFID. At the Fraunhofer Institute for Process Engineering and Packaging IVV in Freising, not only a delicious fitness sausage is developed, but also the suitable food packaging with active and indicator functions. The Fraunhofer Institute for Reliability and Microintegration IZM in Munich develops biosensors and microfluidic systems for robust and simple analysis systems for mobile applications.

The close linking of these disciplines allows for generating new expertise and research approaches. Within this process, new approaches in food safety, microelectronics and logistics, which can easily be integrated in the entire food chain and have an added value at low costs, are of crucial significance.

This synergetic approach for improving food safety is unique until now. In addition, the Fraunhofer 'Food Chain Management' Alliance acts as a competent contact partner and problem solver for both industrial partners and SMEs.

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*Fitness sausage, developed at the Fraunhofer IVV*

### 'Informationsplattform Fleischwirtschaft' of the Bavarian Food Cluster

## Optimising Data Flow in the Meat Production Chain

■ Almost 1 million tons of pork, beef and poultry are produced every year in Bavaria, and annual sales in the meat business add up to Euro 3.4 billion. To advance the network of market partners along the value chain in the meat sector, a central information platform was initiated by the Bavarian Food Cluster in 2006. The 'Fleischprüfung Bayern e. V.' is responsible for the implementation of the project.

The web-based information system is intended to improve quality management and traceability of goods as well as to optimise production processes. To implement this flagship project of the Cluster, software modules will be connected and complemented with further components. Additionally, data acquisition, e.g. regarding date of birth, origin, participation in quality programmes, hygienic status and results of veterinarian examination, at the diverse interfaces of the value chain will be standardised. This enables the different stakeholders such as farming,

cattle trade, slaughtering and retail to feed information accruing at the interfaces during the production and marketing of cattle into a central database. The information is subsequently made available again to the specific target groups.

This consolidation of the data also enables the involved industries to swiftly, economically and securely implement future legal requirements. The first module of the internet-based system was launched in 2008, and further modules are following. The aim is to establish a network reaching from the stable to the counter.

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## Calendar of Events

|                  |  |
|------------------|--|
| 18. – 19.03.2009 | ' <b>Forum Life Science 2009</b> ', International Congress and Exhibition, Munich-Garching<br>www.bayern-innovativ.de/fls2009  |
| 02.04.2009       | ' <b>Biofunctionality of Food Ingredients</b> ', Workshop and final report of the High Tech Offensive project, Freising-Weihenstephan, www.akademie.ziel.tum.de  |
| 06.05.2009       | ' <b>IKOM Life Science</b> ', Recruiting Forum, Freising-Weihenstephan<br>www.ikom.tum.de/students/lifescience   |
| 14.05.2009       | ' <b>Innovation for Competitiveness</b> ', Nutritional Science Symposium of the Bavarian Food Cluster and the University of Applied Sciences Weihenstephan, Freising-Weihenstephan, www.cluster-bayern-ernaehrung.de |
| 17. – 18.06.2009 | ' <b>NutrEvent</b> ', European event for research and innovation in nutrition & health, Lille, France, www.nutrevent.com   |
| 22. – 24.06.2009 | ' <b>11th Symposium Food Microbiology</b> ' (VAAM and DGHM), organised by ZIEL-TUM-Akademie, Wildbad Kreuth, www.akademie.ziel.tum.de  |
| 09.07.2009       | ' <b>Sustainability</b> ', 2nd Cluster Forum Food, Munich<br>www.cluster-bayern-ernaehrung.de  |
| 14. – 19.09.2009 | ' <b>drinktec 2009</b> ', Joint Pavillon Bayern Innovativ, Munich<br>www.bayern-innovativ.de/drinktec2009  |
| 01.10.2009       | ' <b>Functional Plant-derived Ingredients</b> ', Cooperation Forum, Wolnzach<br>www.bayern-innovativ.de/ingredients2009  |
| 17. – 19.12.2009 | ' <b>InnovAsia 2009: Food in the Future</b> ', International Conference and Exhibition on Food Innovation, Bangkok, Thailand, www.fif2009.com  |

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### Imprint



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