



Federal Ministry of
Food, Agriculture
and Consumer Protection

Research Institutes overseen by the Federal Ministry of Food, Agriculture and Consumer Protection





Foreword

Dear Reader,

The work performed by the Federal Ministry of Food, Agriculture and Consumer Protection (BMELV) is closely linked to issues concerning the future. These range from securing food supplies to feed people at home and around the world, the type of foods that will be available tomorrow, managing natural resources, efficient use of renewable energy (especially renewable raw materials) to secure energy supplies, and the effects of climate change on plants and animals. In addressing these problems and deciding what policy approaches to take, the availability of science-based knowledge is vital.

21st century science and research serves to provide this knowledge. And modern research is reliant on modern structures. In 2008 therefore, departmental research at the Federal Ministry of Food, Agriculture and Consumer Protection switched its focus towards sustainability, excellence and optimal resource management. The aim is to realign the department and its resources to meet future needs and provide sustainable structures by means of simplified bureaucracy. This resulted in the former seven federal research centres being consolidated to create four new federal research institutes. The next step was to give the new research institutes greater independence in terms of their organisation, staffing and budgets.

The focus of their research work mirrors the policy areas covered by the ministry: plants and crops, animals, food and nutrition, rural development, forestry and fisheries. Some of our research institutes can draw on more than a century of high-level research work conducted. The new approach taken to research creates optimal conditions for research excellence, both to provide the federal government with highly reliable science-based advice and to pave the way for the emergence of the knowledge society in matters of food, agriculture and consumer protection. Consolidation of specific research areas and linking the various research institutes to form a network promotes modern, flexible structures to support future-focused departmental research at BMELV and thus to secure Germany's future. The German government sees knowledge as a vital resource: by placing particular emphasis on the natural sciences, research at BMELV makes a key contribution to Germany's standing in the research sector. This serves both policymakers and society as a whole.

The Leipzig-based German Biomass Research Centre (DBFZ) was called into being to help find ways of securing a sustainable energy supply. Research on biomass as an energy

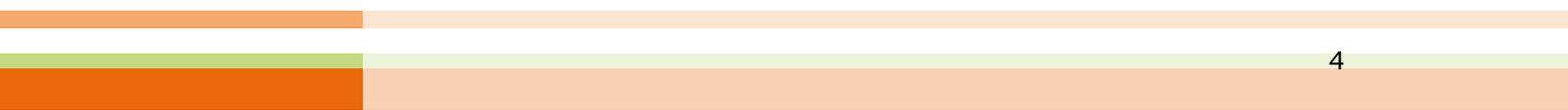
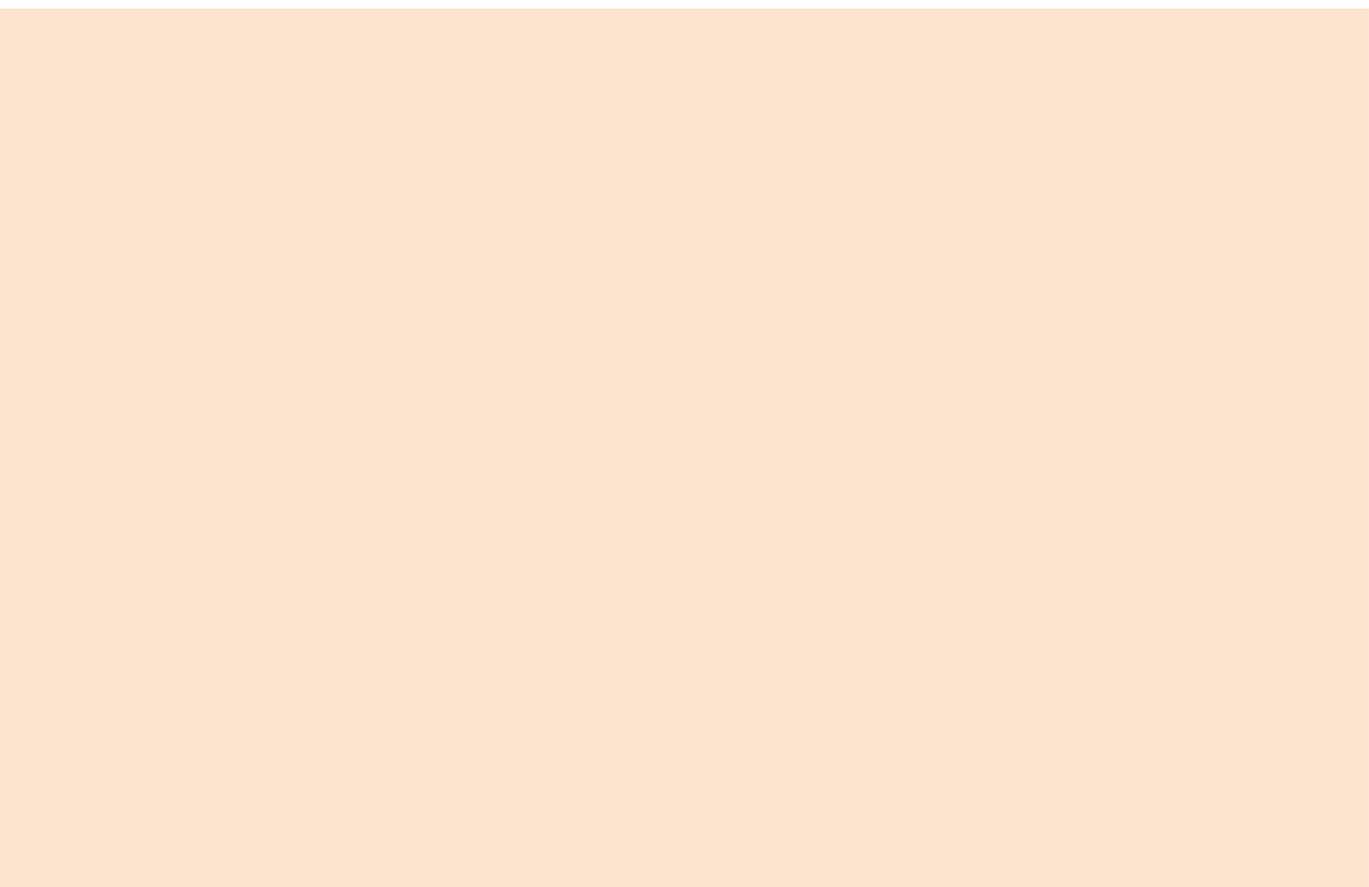
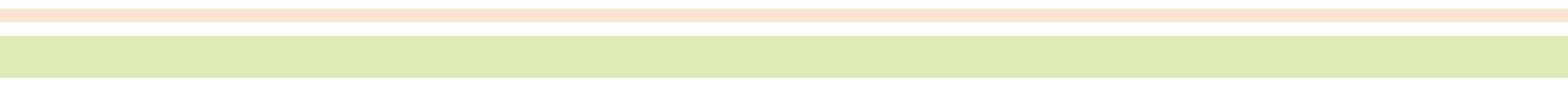


source is designed to foster the potential harboured in biofuel development, use of bioenergy to combat climate change and management of available resources. Research on food and product safety largely centres on protecting consumers' health. Rather than simply responding to events, we aim to be pro-active and conduct research into ways of making things safer: breeding research benefits farmers who must adapt their practices to accommodate new management requirements, while development of humane production methods serves animal protection. These are just two examples of the areas covered by our research department.

This brochure illustrates the structures behind departmental research at BMELV and highlights the research tasks assigned to the various institutes. Read on and learn more about a wide range of research activities and their importance in everyday life.

A handwritten signature in green ink that reads "Ilse Aigner". The signature is fluid and cursive.

Ilse Aigner
Federal Minister of Food,
Agriculture and Consumer Protection



Contents

Introduction	6
Julius Kühn Institute, Federal Research Centre for Cultivated Plants (JKI), Quedlinburg	8
Friedrich Loeffler Institute, Federal Research Institute for Animal Health (FLI), Isle of Riems	10
Max Rubner Institute, Federal Research Institute for Nutrition and Food (MRI), Karlsruhe	12
Johann Heinrich von Thünen Institute, Federal Research Institute for Rural Areas, Forestry and Fisheries (vTI), Braunschweig	14
Federal Institute for Risk Assessment (BfR), Berlin	16
German Biomass Research Centre (DBFZ), Leipzig	18
Leibniz Institute for Agricultural Engineering Potsdam-Bornin (ATB), Potsdam	20
Leibniz Centre for Agricultural Landscape Research (ZALF), Müncheberg	22
Research Institute for the Biology of Farm Animals (FBN), Dummerstorf	24
Leibniz Institute of Vegetable and Ornamental Crops (IGZ), Grossbeeren / Erfurt	26
Leibniz Institute of Agricultural Development in Eastern and Central Europe (IAMO), Halle (Saale)	27
German Research Centre for Food Chemistry (DFA), Garching	28
Organisational chart of the federal research institutes overseen by the Federal Ministry of Food, Agriculture and Consumer Protection	29
The people behind the names	30
Addresses	32

Introduction

In performing its ministerial duties, which include the enactment of legislation, the Federal Ministry of Food, Agriculture and Consumer Protection (BMELV) relies on research findings. The necessary scientific groundwork and expert advice is largely provided by the four federal research institutes (Bundesforschungsinstituten, or BFIs) within BMELV's remit. They produce scientific opinions on matters concerning food, farming, forestry, fisheries and consumer protection, and serve society as a whole by broadening the knowledge base in these subjects. These federal research institutes operate independently and make the results of their work available to the general public. They are an integral part of Germany's scientific community.

The BFIs were reorganised in 2008 in line with the ministry's strategy towards future-focused departmental research. The aim was to align the institutes to the decisionmaking needs of the ministry, both in terms of their research focus and their structures. In response to recommendations made by the German Scientific Council, research excellence is to be enhanced and secured for the longer term. The BFIs have thus been given greater independence as regards their budgets, organisation and staffing. Consolidating specific research areas and forming locational clusters achieves synergies to allow implementation of consolidation decisions made by the German Bundestag to be linked with improvements in research quality.

Alongside their research and advisory duties, each of the federal research institutes performs tasks assigned by law – for example under legislation on plant protection, biotechnology, protection against infection, animal disease, chemicals, radiation and agricultural statistics. This work is finely meshed with their various research activities to ensure that the advice the government receives reflects available knowledge. The federal research institutes are public-law institutions without separate legal personality and federal agencies within the remit of the Federal Ministry of Food, Agriculture and Consumer Protection (BMELV). The Julius Kühn Institute (JKI) is responsible for cultivated plants (crops), the Friedrich Loeffler Institute for animal health and the Max Rubner Institute for nutrition and food. The fourth in the group, the Johann Heinrich von Thünen Institute, covers rural development, forestry and fisheries.

In addition to the four federal research institutes, the Federal Institute for Risk Assessment (BfR) conducts research into matters connected with its activities. The BfR is a legally independent public-law institution and focuses on consumer health and protection. It cooperates closely with the four BFIs.

BMELV also funds the German Biomass Research Centre (DBFZ), whose research work is primarily aimed at increasing the share of bioenergy in Germany's energy supply. Along with DBFZ, the six institutes belonging to the Leibniz Science Association (Wissenschaftsgemeinschaft Gottfried Wilhelm Leibniz, or WGL) help supply BMELV with the science-based knowledge it needs for decisionmaking. The Leibniz Association operates as a legally independent, financially autonomous body and is jointly funded by BMELV and the 16 German Länder (states). BMELV has representatives on the governing bodies of WGL member institutes and liaises closely with them at working level.

Where they are either unable to or cannot adequately tackle research questions to provide results for use in policy consultation, BMELV may commission research work from external sources. There are also funding programmes for research, development and demonstration projects in the biomass, organic farming and innovation sectors.

Conducting active research work of nationally and internationally recognised quality is vital to the credibility both of departmental research and international cooperation activities. Trust-based cooperation with BMELV and its research department is of utmost importance and is equally as essential as cooperation between the institutes themselves.

The research focus of the BFIs must correspond to the remit and policy areas covered by the ministry. A research management system ensures that BMELV's need for science-based decisionmaking assistance is met in a timely, reliable and efficient manner through use of the research work performed by its research institutes and by external sources. The ministry's research needs are set out in the BMELV Research Plan which lists the main goals and objectives and also the key responsibilities of departmental research. The BFIs and BfR use the plan to work out detailed research programmes.



Breeding research with rye

These contain the various research activities required (projects and ongoing tasks). The programmes are coordinated between the research institutes and then approved by the ministry.

Interdisciplinary research activities conducted within the BMELV remit are coordinated by the Senate of the Federal Research Institutes (BFI Senate). The BFI Senate acts as an interface within departmental research at BMELV and also between the departmental research institutes and BMELV. The ministry involves the Senate in its research planning and coordination.

Senate business is managed by the Senate's presiding body, which also represents BFI research interests in dealings with

other research institutes and BMELV. To coordinate and address cross-institute topics, the Senate establishes interdisciplinary working groups who are assigned specific research tasks, usually with a limited project lifecycle. The Senate working groups thus form a link in the research network.

Departmental research institutes also compete for third-party financed research projects. Because BfR and the BFIs advise the federal ministry and perform statutory responsibilities, they are barred from accepting third-party contracts that could endanger their independence and neutrality. The research and advisory services performed by the BFIs and BfR are regularly evaluated in line with a specially designed process which is geared to assessing departmental research.

Julius Kühn Institute, Federal Research Centre for Cultivated Plants (JKI), Quedlinburg



The Julius Kühn Institute (JKI) stands for consolidated expertise in all matters relating to plants and crops. Its work focuses on crop health and productivity.

Research Focus

JKI conducts research into plant genetics, crop-growing, plant nutrition, soil science, plant protection and plant health. This allows linkage between key crop-growing issues -in the field, in the greenhouse or in storage supplies – and development of integrated strategies for crop growing, crop production and crop maintenance. One of the main aims in this regard is the achievement of good quality food and feed.

Evaluating and Preserving Plant Genetic Resources

The genetic diversity of our cultivated plants is vital to the lives and survival of all people on earth. The availability of plant genetic resources for food and farming and of information on their special traits is of fundamental importance in securing long-term performance and yield stability in crops. The JKI collects and publishes a wide range of data on the potential for using plant genetic resources and researches ways of safeguarding them. It develops, operates and coordinates a large number of databases and maintains comprehensive collections like the German Fruit Genebank (www.deutsche-genbank-obst.de).

Breeding Research

Breeding research supplies the scientific groundwork to allow adaptation of crops to altered production conditions and consumer demands. Breeding helps plants become more resistant to disease, animal pests and the effects of climate change, and it can also assist in improving taste. The availability of resistant crop varieties is a key component of environmentally sound, integrated crop management.



Root rot in wheat

Sustainable Crop Production

When it comes to reconciling sustainable crop production with the needs of a globalised world, the growing demand for energy and food and dwindling availability of resources call for a careful balancing act. This means constant readjustment of crop-growing strategies and research to support such activities. Part of the work performed at JKI involves the development of innovative cultivation and fertilisation measures and procedures.

Diagnosis and Biology of Harmful Organisms

Biological research into plant disease, pests and weeds, and diagnosis of damage caused to crops make up a large part of the work performed at JKI. This often involves predicting future events such as the harm to be expected from any new pathogens that research reveals and the potential effects of climate change. JKI then goes on to develop strategies for environmentally sound, integrated crop production. The aim is to foster use of methods that have the least possible impact on the environment.

Quarantine Pests and Alien Species

Globalisation and the internationalisation of supply chains increase the risk of alien species being introduced into Germany – species which could cause great damage to crops and the natural environment. JKI performs the associated risk analyses and recommends measures and standards to deal with the problem.

Integrated Plant Protection

Germany's National Action Plan on Sustainable Use of Plant Protection Products calls for use of chemical pesticides to be reduced to the necessary minimum. JKI is instrumental in achieving this goal, for example by conducting longitudinal studies aimed at identifying what constitutes the necessary minimum. It also develops biological and other non-chemical plant protection methods for use with crops in instances where adequately effective substances and procedures are lacking. To allow situation-specific plant protection, forecasting models and decision-making tools are devised and optimised.

Safety in Biotechnology

JKI's research activities in the biotechnology sector concentrate on safety issues involving the release of genetically modified organisms and the planting of genetically modified crops.



Plant protection equipment is tested on a vibration test rig

Legal Mandate

As part of the approval and licensing process for plant protection products and the evaluation of active substances in accordance with EU requirements, JKI tests for efficacy and also studies substance impact and pathogen resistance. New plant protection equipment is tested prior to being placed on the market and methods are agreed for monitoring equipment already in use. JKI also assists in licensing and approval for the release and sale of genetically modified organisms.

Cooperation Activities

JKI cooperates with a wide range of domestic and foreign universities and research institutes, industry associations and societies. Many researchers at JKI teach at universities and colleges and sit on committees at national, EU and international level. Worthy of note are JKI's contacts with the Federal Office of Consumer Protection and Food Safety (BVL), the Federal Institute for Risk Assessment (BfR), the Federal Environment Agency (UBA), the Robert Koch Institute (RKI), the Federal Office of Plant Varieties (BSA) and the plant protection offices in the individual German Länder (states). Numerous foreign researchers take up research stipends at JKI.

Structure

JKI is able to draw on more than a century of plant protection and breeding research. The institute is the successor to three renowned BMELV research centres: The Federal Biological Research Centre for Agriculture and Forestry (BBA), the Federal Centre for Breeding Research on Cultivated Plants (BAZ) and two of the institutes belonging to the Federal Agricultural Research Centre (FAL).

JKI has an 820-strong staff which includes 210 researchers. The institute's headquarters are located in Quedlinburg. JKI also has the following research institutes within its remit:

In Braunschweig:

- Institute for Crop and Soil Science
- Institute for Plant Protection in Field Crops and Grassland
- Institute for National and International Plant Health
- Institute for Techniques in Plant Protection
- Institute for Plant Protection in Horticulture and Forests (some sections still located in Münster)
- Institute for Epidemiology and Pathogen Diagnostics (some sections still located in Quedlinburg and Münster)

In Quedlinburg:

- Institute for Breeding Research on Agricultural Crops (currently located in Gross Lüsewitz)
- Institute for Breeding Research on Horticultural Crops and Fruit Breeding (some sections in Dresden-Pillnitz)
- Institute for Resistance Research and Stress Tolerance (partly still located in Gross Lüsewitz)
- Institute for Biosafety of Genetically Modified Plants (partly still located in Braunschweig)

In Siebeldingen:

- Institut für Rebenzüchtung

In Kleinmachnow:

- Institute for Ecological Chemistry, Plant Analysis and Stored Product Protection (currently located in Berlin and Quedlinburg)
- Institute for Strategies and Technology Assessment in Plant Protection

In Dossenheim:

- Institute for Biological Control (currently located in Darmstadt)
- Institute for Plant Protection in Fruit Crops and Viticulture (some sections in Siebeldingen, currently located in Bernkastel-Kues)

■ JKI

Julius Kühn Institute, Federal Research Centre for Cultivated Plants

Erwin-Baur-Straße 27 | 06484 Quedlinburg |

Germany | Telephone: +49 (0)3946 47-0

Telefax: +49 (0)3946 47-255

E-mail: poststelle@jki.bund.de | www.jki.bund.de

Friedrich Loeffler Institute, Federal Research Institute for Animal Health (FLI), Isle of Riems



The health and welfare of livestock and protecting humans against infectious diseases that can be transmitted by animals (zoonoses) form the core of the research work performed at the Friedrich Loeffler Institute (FLI). The institute conducts research into disciplines such as physiology, ethology, epidemiology, immunology, virology, bacteriology and parasitology while drawing upon other related sciences.

Research Focus

The aim of FLI research is to prevent the spread of infectious disease by providing faster diagnosis, developing preventive measures and supplying the groundwork to develop modern strategies to control animal disease and zoonoses to improve farm animal husbandry in compliance with animal welfare, preserving genetic diversity of farm animals and effective use of animal feed to produce high-quality animal-based foods.

Animal Feed

Animal nutrition research takes in nutrition physiology, feed science and animal feeding. It looks at effective transformation of feed substances into high-quality food of animal origin or into other animal products while taking account of environmental and economic issues and animal health.



Research in the FLI focuses on animal health

Animal Protection and Livestock Husbandry

FLI carries out research projects to assess and improve animal farm husbandry and the transportation, anaesthetisation and slaughtering of farm animals. The different work areas are complementary and interdisciplinary.

Animal Genetic Resources

Animal genetic diversity is a natural component of agricultural production. It is a 'raw material' or 'resource' used in animal breeding. Research on preservation, assessment and use of animal genetic resources is gaining in importance.

Molecular Characterisation of Animal Pathogenic and Zoonotic Infections

Pathogens are studied using molecular and cellular biological techniques. The results are used to develop vaccines and diagnostic procedures.

Etiology, Pathogenesis and Control of Infectious Disease

Virological, bacteriological, molecular biological and immunological tests are used to study pathogen-host relationships, including in respect of the host's immune system. The tests assist development of immunoprophylactic measures and strategies to control infectious disease.

Immune Mechanisms and Farm Animal Infections

Using molecular biological tests on a range of viruses, preventive and monitoring strategies are improved or newly developed, and risk assessments performed on the release of genetically modified organisms. This includes research on the biochemical principles of virus reproduction, immune response following viral infection and the development of vaccines.

Epidemiology of and Risk Assessment on Infectious Disease in Animals

Epidemiological studies of farm animal disease, risk assessment and the development of early warning systems for alien infectious diseases form the basis of effective animal disease prevention using modern epidemiological methods.

Legal Mandate

FLI maintains upwards of 50 national reference laboratories for notifiable and reportable animal diseases. Accredited according to ISO/IEC 17025, they investigate suspected cases, advise the competent veterinary authorities and conduct ring trials and other quality assurance measures for animal disease diagnostics in Germany. If an outbreak occurs, the institute runs epidemiological tests. It also performs risk assessments on infectious diseases in farm animals. At international level, FLI runs International Office of Epizootics (OIE) reference laboratories for avian influenza, enzootic bovine leukaemia, Newcastle disease, bovine herpes virus 1, brucellosis, chlamydiosis, glanders and rabies. It also serves as the OIE's Collaborating Centre for Zoonoses in Europe and operates a WHO Collaborating Centre for Rabies. The various reference laboratories also conduct research other than that assigned by law.

In addition to the above, FLI acts as the national approval and licensing authority for veterinary diagnostics and certain animal disease vaccines such as those used to control foot and mouth disease and classical swine fever.

FLI advises the German government by issuing regular scientific opinions on the entire spectrum of animal health – from nutrition, to animal husbandry and genetics, to food-producing animals and animal disease.

Cooperation Activities

FLI works closely with the National Crisis Centre for Animal Disease, the Länder Task Force and the competent Länder-level authorities. Its researchers sit on national and international committees and belong to a range of research networks, both German and multinational. They conduct projects and engage in missions for international organisations like the International Office of Epizootics (OIE), the European Food Safety Authority (EFSA), the World Health Organisation (WHO) and the UN Food and Agriculture Organisation (FAO). Many FLI scientists hold visiting professorships and lectureships in universities at home and abroad, and they cooperate with research institutes around the world. Together with the Paul Ehrlich Institute, FLI serves as the licensing and approval authority for serums, vaccines, antigens and detection methods used in veterinary medicine. In its work on zoonoses, FLI engages in interdisciplinary cooperation with human medicine research bodies like the Robert Koch Institute.



Extraction of fluid from eggs at an FLI laboratory

Structure

Founded on the Isle of Riems in 1910, the Friedrich Loeffler Institute was the world's first virological research institute. Its responsibilities and research focus grew as the institute expanded. FLI currently employs a large staff of 650, of which 160 are scientists. The institutes which make up FLI include:

At the headquarters on the Baltic island of Riems:

- Institute of Molecular Biology
- Institute of Infectology
- Institute of Diagnostic Virology
- Institute of Novel and Emerging Diseases
- Institute of Immunology (still located in Tübingen)
- Institute of Epidemiology (still located in Wusterhausen)

In Braunschweig:

- Institute of Animal Nutrition

In Jena:

- Institute for Bacterial Infections and Zoonoses
- Institute for Molecular Pathogenesis

In Mariensee:

- Institute of Farm Animal Genetics
- Institute for Animal Welfare and Livestock Husbandry (still located in Celle)

■ **FLI**
Friedrich Loeffler Institute, Federal Research Institute for Animal Health

Südufer 10 | 17493 Greifswald-Insel Riems | Germany
Telephone: +49 (0)38351 7-0
Telefax: +49 (0)38351 7-151
E-mail: poststelle@fli.bund.de | www.fli.bund.de

Max Rubner Institute, Federal Research Institute of Nutrition and Food, (MRI), Karlsruhe



Do functional foods have the desired effect? Are levels of persistent pollutants in fish and meat increasing or declining? How can food quality be enhanced and secured for the longer term? These and many other issues are the focus of food and nutrition research conducted at the Max Rubner Institute (MRI).



Microbiology is an important research field at MRI

Research Focus

A healthy diet, protecting consumer health in relation to food and improved food quality form the core of the research activities carried out at the Max Rubner Institute (MRI). Its work involves the identification and nutritional and physiological assessment of food ingredients which could impact on human health, research on environmentally sound and sustainable management and processing, quality assurance for plant and animal-based foods, and studies on nutritional behaviour.

Cross-Product Research Focus

■ Food and Health

Questions regarding the health value of certain foods and of food components play an increasingly important role at the Max Rubner Institute. Its traditional research work includes studies on the nutritional and physiological effects of foods and substances contained in foods. This involves looking at the entire nutritional chain, from molecular to cellular level up to the individual as a whole. The findings are used to produce recommendations on how to eat healthily.

■ Quality Assurance and Hygiene

Ensuring food safety is of vital importance in protecting consumer health. Risks must be investigated and assessed by qualified scientists. One of the key tasks in hygiene research is to develop procedures to allow detection of microbial contamination. Describing, weighting and measuring quality traits are integral components of quality research, as is work carried out on the possible utilisation of beneficial microorganisms and on preventing the effects of harmful microorganisms.

■ Food Handling and Processing

The work performed at the Max Rubner Institute includes all kinds of food products to study the fundamental aspects of food handling and processing, both conventional and innovative. The production of safe food and quality products are the prime areas of focus.

■ Desired and undesired substances

Food safety and food quality are the goals in research on desired and undesired substances in food. This involves studies of the natural substances contained in food and on additives and contaminants. To assess food, in-depth analytical and sensory methods are developed for use in nutrition research, food analyses and food monitoring. In testing for undesired substances, for example, research is carried out to track their transfer from animal feed to meat and animal organs.

■ Nutritional Behaviour

Issues concerning nutritional behaviour are attracting more and more attention. The Max Rubner Institute looks, among other things, at factors that cause or foster overweight and obesity, nutritional deficiencies and nutrition-related diseases. Projects on nutritional behaviour in Germany, such as the National Nutrition Survey II (a nationwide study on eating habits in Germany) and the National Nutrition Monitoring Nationale Ernährungsmonitoring (a nationwide monitoring programme to assess nutritional behaviour) underline the key role played by MRI in Germany.

Production Chain-Focused Research

Ensuring, maintaining and, where possible and necessary, improving food safety and quality is also the aim of production chain-focused research at MRI. Equal importance is attached to making food production sustainable. Monitoring activities stretch the entire length of the food chain, from



MRI headquarters in Karlsruhe

production or harvest through to the consumer. Research largely concentrates on the following product groups:

- Milk and dairy products, fish
- Meat, meat products and eggs
- Cereals, potatoes, oilseed and legumes
- Fruit and vegetables.

Cooperation Activities

Researchers at MRI are highly active in national and international research programmes. They are also represented at national and international committees and authorities such as the European Food Safety Authority (EFSA). Many MRI scientists teach at universities and technical colleges.

Structure

The Max Rubner Institute comprises eight separate institutes, four of which investigate safety and quality according to product groups. The other four address interdisciplinary issues concerning nutrition and food. MRI currently has a workforce of 480, including 120 scientists. It also has a fluctuating number of third-party-funded positions. Along with its headquarters in Karlsruhe, the institute has sections in Kiel, Detmold and Kulmbach. The eight MRI institutes are as follows:

In Karlsruhe:

- Institute of Physiology and Biochemistry of Nutrition
- Institute for Nutritional Behaviour
- Institute for Food and Bioprocess Engineering
- Institute for Safety and Quality of Fruit and Vegetables

In Kiel:

- Institute for Microbiology and Biotechnology (partly still located in Kulmbach)
- Institute for Safety and Quality of Milk and Fish (some sections still located in Hamburg)

In Detmold:

- Institute for Safety and Quality of Cereals (some sections still located in Münster)

In Kulmbach:

- Institute for Safety and Quality of Meat

■ MRI

Max Rubner Institute, Federal Research Institute for Nutrition and Food

Haid-und-Neu-Str. 9 | 76131 Karlsruhe | Germany

Telephone: +49 (0)721 6625-0

Telefax: +49 (0)721 6625-111

E-mail: poststelle@mri.bund.de | www.mri.bund.de

Johann Heinrich von Thünen Institute, Federal Research Institute for Rural Areas, Forestry and Fisheries, (vTI), Braunschweig



Interdisciplinary expertise for policy consultation and sustainable development in tomorrow's society are the focal points of research conducted at the Johann Heinrich von Thünen Institute (vTI). The institute uses application-oriented and practice-related research to develop concepts for sustainable and competitive resource management in agriculture, the forestry and timber sector, and fisheries.

Research Focus

The research work performed at vTI covers a broad spectrum. Research expertise on the economic, environmental and technological needs of the agriculture, fishery and forestry and timber sectors allows use of complex methodologies and a cross-institutional approach.

Climate Change

Agricultural production systems are both a cause and a victim of climate change. vTI researches the impact on crops and fish stocks, develops minimisation strategies for climate-damaging emissions from farming and broadens the knowledge base on, e. g., the greenhouse gas sources arising from and the carbon sink functions played by land management systems.

Biodiversity

Biological diversity is declining rapidly. vTI looks at the threat to biodiversity at genetic, organism and ecosystem level and devises strategies to preserve it.

Renewable Resources/Raw Materials

Agricultural products and timber are vital resources in the chemicals and wood-processing industries. vTI acquires knowledge on mobilisation of raw materials from agriculture and forestry and develops innovative ways of using renewable raw materials. (See the section on the German Biomass Research Centre for details of using renewable raw materials for energy).

Sustainable Resource Management

vTI uses modern sensor and information technology to assist in the design of environmentally sound and animal-welfare friendly production processes. It develops models for nature-compatible game management along with methods for sustainable fisheries.

Competitive Production

vTI's economics-focused institutes analyse trends in the agriculture, forestry, timber, food and fisheries sectors to identify potential policy action. For food and renewable raw materials especially, economic analysis of entire process and value creation chains is gaining in importance on account of increasing liberalisation and tighter competition in international markets.

Rural Development

vTI studies on the economic situation and living conditions in rural areas supply the scientific groundwork for rural development policy measures. vTI also devises strategies to enable rural regions to adapt to the altered conditions brought about by demographic change.



vTI studies the situation in rural areas

Organic Farming

vTI analyses trends in organic farming and provides decision-making tools for use in areas such as designing legal frameworks. Economic studies performed at vTI look at trends like the demand for organic foods. Research conducted at the institute helps the development of organic farming.

Monitoring

Through long-term, consistent monitoring using systematic data collection, observation and controls, vTI gains valuable data series which are then used to prepare government reports – for example to fulfil Kyoto Protocol requirements and to report on the state of the environment. With regard to forestry, vTI coordinates the Federal Forestry Inventory, forest soil studies, and forest status reports, and is also active in forest monitoring at EU level. To make recommendations for the EU Common Fisheries Policy (CFP), ocean fish stocks are monitored for their productivity and health status. vTI also engages in monitoring activities conducted in line with marine protection agreements to identify the levels to which marine fish are exposed to pollution.

Legal Mandate

The Johann Heinrich von Thünen Institute performs tasks arising from Germany's Act on Preventive Radiation Protection (Strahlenschutzvorsorgegesetz) and its Federal Waterways Act.

Cooperation Activities

vTI cooperates with universities and other research institutes at national and international level. Many researchers at vTI also hold professorships or lecture at universities. At vTI's Hamburg premises, work is conducted under a government contract which requires close cooperation with the University of Hamburg in research on and teaching of forestry and timber management. vTI's fisheries research institutes are linked to similar institutes in the North Atlantic and Baltic regions. vTI is represented in numerous international working groups and assists in the development of international-level initiatives and programmes.

Structure

The institute was founded at the beginning of 2008 and can draw upon a 60-year history in research. It comprises the former Federal Research Centres for Fisheries and for Forestry and Forest Products, and large parts of the Federal Agricultural Research Centre. It currently has a staff of 600, including 190 scientists, and also a fluctuating number of third-party-funded positions. Equipped with resources such as fisheries research vessels, an aquaculture centre, an organic farm with a herd of cattle and various technical testing laboratories, vTI is a highly sought-after research partner.



In vitro cultivation of young forest plants

vTI institutes in Braunschweig:

- Institute of Rural Studies
- Institute of Farm Economics
- Institute of Market Analysis and Agricultural Trade Policy
- Institute of Agricultural Technology and Biosystems Engineering
- Institute of Agricultural Climate Research
- Institute of Biodiversity

In Trenthorst:

- Institute of Organic Farming

In Eberswalde:

- Institute of Forest Ecology and Forest Inventory

In Großhansdorf:

- Institute of Forest Genetics
- (some departments still located in Waldsiedersdorf)

In Hamburg:

- Institute of Wood Technology and Wood Biology
- Institute of Forest Based Sector Economics
- Institute of World Forestry

In Bremerhaven:

- Institute of Sea Fisheries (currently located in Hamburg)
- Institute of Fishery Ecology (currently located in Hamburg)

In Rostock:

- Institute of Baltic Sea Fisheries

■ vTI

**Johann Heinrich von Thünen Institute
Federal Research Institute for Rural Areas, Forestry
and Fisheries**

Bundesallee 50 | 38116 Braunschweig | Germany

Telephone: +49 (0)531 596-0

Telefax: +49 (0)531 596-1099

E-mail: info@vti.bund.de | www.vti.bund.de

Federal Institute for Risk Assessment (BfR), Berlin



How can we make food, chemicals, cosmetics, toys and many other products used in everyday life as safe as possible? As an independent scientific body, the Federal Institute for Risk Assessment (BfR) provides answers by analysing the associated risks to consumer health and recommending both risk minimisation and safety measures.

Area of Responsibility and Activity

The work done at BfR takes in everything and anything that can influence food safety and consumer health. BfR has been entrusted by law with the job of conducting scientific assessments on health risks to the consumer and of communicating its findings using a pro-active, broad-based approach.

Assessing Health Risks

Residues and contaminants in food and animal feed can pose risks, as can the additives and substances contained in food. Risks from microbial sources can occur not only in food and feed, but also in cosmetics and other commodities. Processing of genetically modified organisms in food production can also be a source of risk. BfR assesses these health risks and publishes its findings in assessment reports and scientific opinion papers.

Substance Assessment

One of BfR's key tasks involves the assessment of a wide range of substances: chemicals, pesticides, biocides, components in cosmetics and products such as clothing textiles, food contact materials (materials and articles intended for contact with food), toys and other consumer products.

Alternatives to Animal Testing

BfR houses the Centre for Documentation and Evaluation of Alternatives to Animal Experiments (Zentrale Erfassungs- und Bewertungsstelle für Ersatz- und Ergänzungsmethoden zum Tierversuch, or ZEBET). This has the legal mandate of identifying, developing and assessing methods to either replace or complement animal experiments when testing substances and products.

Research

BfR conducts limited research in fields closely linked with those covered by its legal mandate. One aim of such research is to fill knowledge gaps in safety-related matters concerning food, chemicals, commodities and biocides. Another is to ensure the institute has the expertise needed to maintain its status as an autonomous centre of risk assessment excel-



BfR building in Marienfelde

lence. By conducting independent research, BfR boosts its standing in risk assessment at national and international level. Experimental and non-experimental research gives BfR researchers outstanding knowledge and skills, thus allowing them to independently assess the findings of third-party research and incorporate them into their own work.

BfR research focuses on:

- Research work conducted in its capacity as a reference laboratory with the aim of developing more modern and more sensitive detection methods
- Research to obtain data during risk analysis for subsequent use in exposure assessments
- Research on risk detection, early warning systems and risk minimisation
- Research to document, evaluate, develop and validate alternative methods to and complementary methods for animal testing
- Research on risk communication and risk perception

Cooperation Activities

In times of global exchange and flow of goods, the assessment of health-related risk must take an international approach. BfR thus works closely with national bodies like the federal research institutes overseen by the Federal Ministry of Food, Agriculture and Consumer Protection (BMELV) and increasingly with international bodies and organisations, and institutes in other countries whose work involves consumer health and food safety. BfR is actively involved in numerous EU research projects. A main area of its mandate takes in cooperation with EU bodies and with the European Food Safety Agency (EFSA). BfR is Germany's EFSA focal point and cooperates with sister authorities in other EU and non-EU states.

For many years, BfR has liaised closely with the World Health Organisation (WHO), the UN Food and Agriculture Organisation (FAO), the International Office of Epizootics (OIE), the International Programme for Chemical Safety (IPCS), the scientific bodies of the OECD and the International Organisation of Vine and Wine (OIV). BfR researchers represent German expertise on Codex Alimentarius Commission committees and thus work on improving food safety around the world.

BfR Committees

BfR has established a scientific network of experts. Committees have been set up to advise the institute in its risk assessments on food, animal feed, chemicals, commodities and other consumer products. The BfR committees consolidate German expertise and make it available to international bodies. They provide an expert network which can also be consulted at times other than when dealing with a crisis.



BfR's mandate also includes development of alternatives to replace animal testing

Structure

Founded on 1 November 2002, the Federal Institute for Risk Assessment is a public body within the remit of the Federal Ministry of Food, Agriculture and Consumer Protection. BfR currently employs a staff of 550, of which 200 are scientists. A total of 470 people work in research all told.

The BfR has nine departments:

- Administration
- Risk Communication
- Interdisciplinary research
- Biological safety
- Food safety
- Chemical safety
- Consumer product safety
- Food chain safety
- Experimental toxicology, ZEBET

■ BfR

Federal Institute for Risk Assessment

Thielallee 88-92 | 14195 Berlin | Germany

Telephone: +49 (0)30 8412-0

Telefax: +49 (0)30 8412-4741

E-mail: poststelle@bfr.bund.de | www.bfr.bund.de

German Biomass Research Centre, (DBFZ), Leipzig



DBFZ in Leipzig

The German government aims to step up use of bio-energy and make it a key pillar in the country's future energy supply. This approach will serve climate change mitigation, save fossil resources, secure energy supplies, boost value creation in rural regions and in the forestry and timber sector, and help protect the environment.

Research Focus

The German Biomass Research Centre (DBFZ) has the task of using applied research to promote effective integration of biomass as a valuable resource for sustainable energy supply while taking account of technological, environmental, economic, social and energy industry needs along the entire supply chain. DBFZ is also responsible for providing science-based decisionmaking tools for policymakers.

Use of biomass for energy can only become a permanent solution if it is made sustainable, that is if it is economically viable, environmentally beneficial and socially acceptable. DBFZ must thus push forward in developing the technology needed. Potential conflict between the various aims con-

nected with the promotion of bioenergy must be analysed and future-focused structural approaches devised at the earliest opportunity. Account must, however, be taken of the fact that expanding the use of biomass is taking on momentum in many European and non-European countries – something which will greatly influence national trends and developmental opportunities.

DBFZ primarily works on the following issues:

- Use of biomass and bioenergy in industrial, local, regional, national and international energy systems; this involves monitoring the scope and quality of existing usage pathways, theoretical analysis and expert reports such as cost-benefit analyses, environmental studies, potential forecasts, energy market analyses, scenario analyses, technical analyses, evaluation of policy and administrative measures, and policy consultation.
- Analysis and advancement of first and second generation liquid and gaseous biofuels and their use in the transport sector; this involves bioenergy production, distribution and use, and takes in both theoretical and systematic

studies and expert reports together with practical work in laboratories and tertiary technical colleges, particularly in respect of bioethanol (including from cellulose) and low-emission use of biofuels in motor engines.

- Heat supply from solid biofuels (i.e. woody and non-woody solid biomass, including straw, cereals, whole crops) in facilities with less than 1 MW output, giving consideration to the logistics chain; this also includes analysis of solid biofuels (including fuel standardisation and testing). The aim, among other things, is to establish a centre for small-scale heat plants in which systems already on the market are tested and improved and where plants are developed and optimised in cooperation with industry, for example to reduce emissions of particulate matter.
- Enhancement and optimisation of anaerobic biogas production for electricity generation and for feeding biomethane into the gas supply grid; this includes work in the biogas laboratory, among other things the optimisation of processes for the breakdown of the biomass into methane. In addition, work concentrates on systems technology to incorporate such facilities into existing structures.
- Conceptual and practical issues relating to small and large-scale gas generation from biogenic solid biofuels to produce electricity, the aim being to advance technological processes with regard to improving operation and efficiency while taking account of the needs of the entire supply chain.

Cooperation Activities

DBFZ is part of a broad research network. Apart from close cooperation with the Helmholtz Centre for Environmental Research (UFZ), DBFZ seeks broad-based cooperation with scientific bodies in eastern Germany (e.g. TU Bergakademie Freiberg, Thuringia Landesanstalt für Landwirtschaft, the University of Halle-Wittenberg, and the University of Rostock) and with other research institutes funded by Federal Ministry of Food, Agriculture and Consumer Protection (BMELV). There are also plans to cooperate with industry.

Structure

Based in Leipzig, DBFZ was founded on 28 February 2008 as a non-profit company with limited liability (gemeinnützige GmbH). It currently has a staff of 110, of which around 70 % are scientists. The institute is funded by the Federal Ministry of Food, Agriculture and Consumer Protection (BMELV) and receives additional project-related funding from the Federal Ministry of Transport, Buildings and Urban Affairs (BMVBS), the Federal Ministry for the Environment, Nature Conser-



Trial fermenter used in tests on biogas yields from various substrates

vation and Nuclear Safety (BMU), and the Federal Ministry of Education and Research (BMBF). Funds provided by the Free State of Saxony are used for investment in building. Third-party funds are also received from industry and the EU.

DBFZ comprises the following departments:

- Bioenergy systems
- Biofuels
- Biomass combustion
- Biogas technology
- Thermal-chemical processing technology
- International affairs

■ DBFZ German Biomass Research Centre

Torgauer Str. 116 | 04347 Leipzig | Germany
Telephone: +49 (0)341 2434-112
Telefax: +49 (0)341 2434-133
www.dbfz.de | info@dbfz.de

The Leibniz Institute for Agricultural Engineering (ATB) works on process-engineering models for cost-effective, sustainable land management and develops innovative technologies for agriculture, horticulture and industry. The research performed looks at effective use of limited resources and at adapting agricultural processes to the effects of climate change and its mitigation.

Research activities concentrate on the development of environmentally sound, competitive agricultural production processes, quality and safety of food and animal feed, and on renewable raw materials and energy in rural areas. These include low-emission livestock husbandry, sensor-aided quality management of fruit and vegetables, and optimised processes in biogas production. The use of sensor, information and communication technology in complex management and documentation of process flows is vital, both in respect of site-specific production and with regard to product safety and food traceability. The use of biotechnological principles, for example to produce fuels and materials from biomass, also plays a key role.

The research conducted takes account of the often very different needs of consumer, animal and environment protection. Parallel technology evaluation supports this process. The institute thus responds to current research questions and covers the practical advisory and back-up needs of policymakers, industry and farmers.

Research Focus

Resource Management and Climate Change

The main research focus is on assessing the technological, economic, social and environmental impacts of various agricultural management practices and processes adopted to cope with climate change. Nutrient and energy balances serve in highlighting sources of environmental pollution and in evaluating the intensity and sustainability of the management practices adopted.

Sensor-Aided Information-Gathering and Information Management

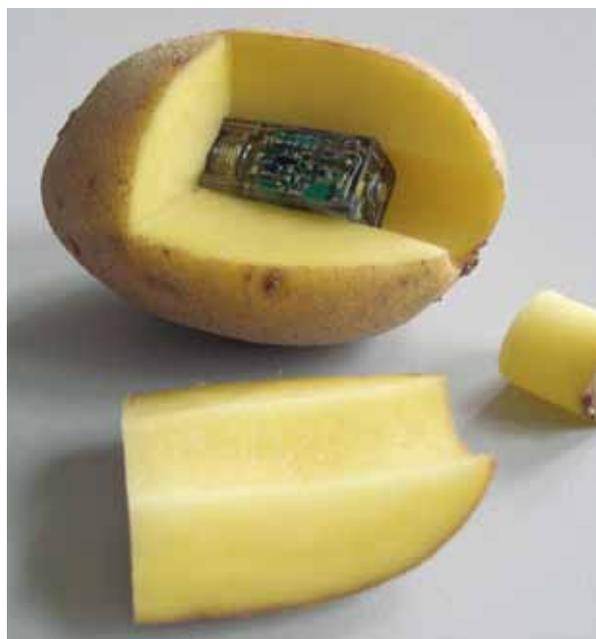
Sensor-aided processes allow for greater precision in agricultural production. This is instrumental in reducing environmental pressures and also opens up opportunities to make humane livestock husbandry more efficient.

Environmentally Sound, Humane Livestock Management

The quality of animal products is increasingly connected with humane, environmentally sound management of livestock. The prime focus is on work to reduce emissions and pollution from livestock, environmentally sound use of industrial fertilisers, protecting animal health and developing milking technologies that are easier for farmers to use and less of a burden to animals.

Quality Assurance for Perishables

Fruit and vegetables are subject to high quality standards, as are milk and meat. The aim is to prevent loss of quality by means of better controls and management of process technologies, for example by using innovative sensor technology. This takes in the entire value creation chain, from producer to retailer. Further work looks at making the most work-intensive and laborious harvest and preparation work in horticulture more ergonomic.



Potato with sensor implant



Pilot facility for the production of lactic acid from vegetable biomass. Lactic acid serves as a basic chemical in processing of biologically degradable plastics.

Quality Assurance in Animal Feed Production

Energy-efficient, less-intensive processes for drying, wet grinding and storage of agricultural products are to be used to avoid the formation of mould and thus of toxins in food and animal feed.

Use of Renewable Raw Materials

The aim is to develop processes to allow use of renewable raw materials and the substances they contain. These processes must be competitive and hold their own against conventional fossil-based ones. Processing of natural fibre and bioconversion of starch-containing agricultural materials for substance extraction are two key areas of focus at ATB which have already been implemented at pilot facilities. Along with basic research, the study of entire processing lines – from raw material to end product – allows practice-based process optimisation and the provision of sample products for industry and research.

Production and Use of Bioenergy Carriers

Bioenergy production gives farmers a new source of income. It involves the environmentally sound, energy-efficient cultivation of energy crops, preparation and conversion of bioenergy crops into a usable form (such as biogas) and the use of biogenic fuels, for example to generate electricity from biogas in fuel cells.

Cooperation Activities

At both national and international level, ATB is represented in numerous networks and joint projects. This work is based on intensive cooperation with universities and non-university institutions in Germany and abroad. ATB also works closely with the research institutes overseen by the Federal Ministry of Food, Agriculture and Consumer Protection (BMELV). For example, in matters of food safety it cooperates with JKI (ProSenso.Net2) and MRI (FreshScan), and in bioenergy research with DBFZ.

Against the backdrop of applied research conducted at ATB, close cooperation with industry and businesses plays a special role. The institute works with upwards of 150 businesses and farms at national and international level.

Structure

The Institute was founded in 1992 as a registered association and is a member of the Leibniz Science Association. It receives equal amounts of funding from the competent federal ministries and the State of Brandenburg. Third-party funding makes up 25 percent of ATB's budget. ATB has a total of 112.5 positions (full and part-time), with 35.5 held by scientists. Third-party funding is used to finance a further 50 employees. The institute's six departments provide the expertise and resources needed for interdisciplinary, cross-departmental research work:

- Bioengineering
- Technology assessment and substance cycles
- Post harvest technology
- Engineering for crop production
- Engineering for livestock management
- Horticultural engineering

■ **ATB**
Leibniz Institute for Agricultural Engineering
Potsdam-Bornin

Max-Eyth-Allee 100 | 14469 Potsdam | Germany

Telephone: +49 (0)331 5699-0

Telefax: +49 (0)331 5699-849

E-mail: atb@atb-potsdam.de | www.atb-potsdam.de

Leibniz Centre for Agricultural Landscape Research (ZALF), Müncheberg



The Leibniz Centre for Agricultural Landscape Research (ZALF) is committed to developing environmentally sound and economically viable land use systems, both in Europe and beyond. The aim is to develop multifunctional, location-specific land use models and provide opportunities for sustainable development in rural regions.

This is done against the backdrop of climate change, new requirements under EU agricultural policy, the introduction of modern farming technologies, increasing change in the intensity of countryside use, demographic change, greater public expectations regarding environmental and consumer protection, and the effects this all has on rural areas. ZALF takes an integrated approach to landscape research, its work being based on excellent, solution-oriented disciplinary research. A wide range of natural and societal processes are investigated on various scales, the differing systems being integrated by means of computer-aided models. ZALF studies are largely conducted in the soils of the geo-logically recent moraine landscapes in north-eastern Brandenburg and in the fens of the Rhin-Havelluchs lowlands. The methods and approaches developed there can be transferred to many other situations and regions in north-eastern Europe.



ZALF headquarters in Müncheberg

Research Focus

ZALF has pooled its research activities in a cross-institute research network called Sustainable (Agricultural) Landscape Development and Use (Nachhaltige Entwicklung und Nutzung von (Agrar)Landschaften) and in other large multisectoral projects funded by third parties (pre agro, GLOWA-Elbe, MEA-Scope, SENSOR, NEWAL-NET, PLUREL, CRAFT). Work

focuses primarily on developing targeted land use approaches which create new opportunities for rural regions and taking account of global change, could result in sustainable landscape development in Northern Central Europe. The following research programme themes represent the key areas of focus in ZALF activities:

- Diversity in landscape functions
- Landscape productivity
- Protecting landscape resources
- Managing landscape use

Agricultural landscape research at ZALF involves assessing and evaluating altered conditions in natural production in the face of global change. It also takes in reevaluation of prevailing conditions in light of new requirements and identification of sustainable use models. ZALF expertise in the modelling of agricultural ecosystems, especially for north-eastern central Europe, is an important base on which to develop practicable, region-specific recommendations and to conduct research into current trends.

Priority is given to monitoring current social debate in order to identify opportunities for sustainable landscape use while promoting rural development. This involves issues such as the role of agricultural landscapes in climate change, the consequences of an increase in economically unviable areas of farmland, region-specific pressures on land, the risks arising from one-sided use of land, greater use of renewable raw materials and energy crops, and reconciling alternative crop production with conventional crop-growing practices, nature conservation, tourism, water management requirements, and so on.

Another important component of ZALF's research approach is the integration of external experts. This allows more intensive use of the growing number of research networks (e.g. the European Landscape Tomorrow network and the Leibniz network AGRI RESEARCH plus) and of local research platforms like the joint Berlin-Brandenburg rural areas research platform (Forschungsplattform Berlin-Brandenburg Entwicklung Ländlicher Räume) and the climate and climate change research platform (Forschungsplattform für Klima und klimafolgenrelevante Forschung).

Cooperation Activities

As a non-university research institute, ZALF cooperates – partly through joint appointments – with universities and technical universities in Berlin and Brandenburg. Cooperation with the federal research institutes overseen by the Federal Ministry of Food, Agriculture and Consumer Protection (BMELV) focuses in particular on biodiversity, socio-economic issues, rural development and the impact of climate change on agriculture. ZALF also cooperates with many European universities, numerous non-university institutions and specialist associations. It also acts as lead institute in European networks and manages large-scale EU projects.



Measuring photosynthesis

Noteworthy activities include the EU SENSOR (Sustainability Impact Assessment: Tools for Environmental, Social and Economic Effects of Multifunctional Land Use in European Regions) project, PLUREL (Peri-Urban Land Use Relationships: Strategies and Sustainability Assessment Tools for Urban-Rural Linkages) and LUPIS (Land Use Policies and Sustainable Development in Developing Countries), all of which involve numerous partner establishments in many countries around Europe.

Structure

Situated in a traditional research location, ZALF was founded in 1992 as a registered association and is a member of the Leibniz Science Association. One half of its basic funding comes from the Ministry of Rural Development, Environment and Consumer Protection of the State of Brandenburg (MLUV) and the other half from the Federal Ministry of Food, Agriculture and Consumer Protection (BMELV). ZALF also attracts substantial competitive funds from third parties, accounting for around € 5.9 million in 2007. It has a 241-strong workforce, of which 81 are scientists. Third-party funding is used to finance positions for 90 employees.

ZALF comprises six institutes and a number of central organisations and working groups which work in line with its interdisciplinary approach:

- Institute of Landscape Systems Analysis
- Institute of Land Use Systems
- Institute of Socio-Economics
- Institute of Landscape Hydrology
- Institute of Soil Landscape Research
- Institute of Landscape Matter Dynamics

ZALF facilities are completed by a research station charged with landscape monitoring and field experiments. Located in Dedelow, the station has outposts in Paulinenaue and Müncheberg.

■ **ZALF**
Leibniz Centre for Agricultural Landscape Research

Eberswalder Strasse 84 | 15374 Müncheberg
Germany
Telephone: +49 (0)33432 82-0
Telefax: +49 (0)33432 82-223
E-mail: zalf@zalf.de | www.zalf.eu

Research Institute for the Biology of Farm Animals (FBN), Dummerstorf



FBN conference centre in Dummerstorf

Based in Dummerstorf near Rostock, the Institute for the Biology of Farm Animals (FBN) operates as a public-law foundation. It is a member of the Leibniz Science Association and conducts basic and applied research into the biology of farm animals. FBN studies the functional biodiversity of livestock as a basis for domestication and as a key component of sustainable agriculture and food supply. The strategic importance of its research mandate arises primarily from the irreversible process of domestication and the need for people to play an active role in shaping it in order to cope with altered conditions.

Farm animals harbour great potential when it comes to meeting the growing global demand for quality foods of animal origin. It is thus vital that the biodiversity of farm animals be studied under changing husbandry and production conditions. This enables this biological resource to be managed, produced and used in a sustainable manner. The differing adaptation strategies farm animals have developed in order to cope with similar conditions in the course of their evolution are investigated in an effort to understand the genetic and physiological aspects of functional biodiversity and to implement the findings in sustainable breeding and husbandry strategies.

Research Focus

Research on the functional biodiversity of farm animals is made possible by studying their vital processes using an holistic approach which is based on the traits they show in specific environments. Interdisciplinary, coordinated research is the key.

The introduction of programme budgets produced a co-herent, cross-sectoral research programme which advances FBN's systematic research approach and concentrates on the following research themes:

Use and Management of the Biological Diversity of Farm Animals

Biodiversity is a 'raw material' used in breeding and a vital resource in animals' ability to adapt to altered environmental conditions. Knowledge of biodiversity is a key prerequisite for resource-sparing, environmentally sound production of quality animal-derived foods.

Knowledge and Structuring of Livestock-Environment-Human Interaction

Farm animals have to adapt to ever-changing livestock husbandry and production practices. Knowledge of the

under-lying ethological and physiological mechanisms in coping with stress and their interplay with performance-related regulations is one of the main preconditions for humane, performance-based livestock management.

High Fertility and Resistance to Disease

As vitality traits, high fertility and resistance to disease play a key role in animal production. Selection of disease-resistant, robust animals is critical, both to food production and to the success of domestication and breeding efforts.

Cooperation Activities

Cooperation with science and industry at national and international level is a key component of the research work performed at FBN. The institute is currently involved in 87 cooperation projects with partners at 188 institutes in 32 countries. FBN lays great store in training young scientists. Some 26 FBN researchers are involved in teaching and hold visiting professorships and lectureships at six different universities.

Structure

FBN is located in Dummerstorf near Rostock. Of its 228 staff positions, 66.5 are held by scientists. A fluctuating number of additional positions are financed from third-party funding. The interdisciplinary research approach taken at FBN is based on geographically and thematically focused cooperation between its six research disciplines:

- Genetics and Biometrics
- Molecular Biology
- Reproduction Biology
- Behavioural Physiology
- Muscular Biology and Growth
- Nutritional Physiology



A young foal, Lorinna ET, was born at FBN using cryoconservation and embryo transfer



Pigs use an automated sound-trigger feeding system developed at FBN

There is also a dedicated research group which studies functional genome analysis. Other FBN resources comprise facilities for animal experiments, a scientific library, centralised computer technology and an administration section. FBN receives half of its basic funding from the Ministry of Food, Agriculture, Forestry and Fisheries of the State of Mecklenburg-Western Pomerania and the other half from the Federal Ministry of Food, Agriculture and Consumer Protection (BMELV).

■ **FBN**
Research Institute for the Biology of Farm Animals

Wilhelm-Stahl-Allee 2 | 18196 Dummerstorf
Germany

Telephone: +49 (0)38208 68-5

Telefax: +49 (0)38208 68-602

E-mail: fbn@fbn-dummerstorf.de

www.fbn-dummerstorf.de

Leibniz Institute of Vegetable and Ornamental Crops (IGZ) Grossbeeren/Erfurt



Horticultural products must be of high quality, be grown in environmentally sound conditions and be affordable. The Leibniz Institute of Vegetable and Ornamental Crops (IGZ), with premises in Grossbeeren (near Berlin) and Erfurt, performs the groundwork for environmentally sound and economically viable horticulture. It looks at growth, development and quality in crops grown under optimal and sub-optimal conditions, and assesses the impact of changing environmental conditions on horticultural production.

The aim is to apply new knowledge on genetics and environment-related issues in modern horticultural approaches. Research cooperation conducted at regional, national and international level is especially important to IGZ's future and ensures its research potential is used effectively.



Greenhouses at IGZ

Research Focus

The research work performed is divided into programme areas. Each field comprises key research aspects which are tackled in an interdisciplinary approach:

- Horticultural practice and modern production
- Use of biological regulation systems in horticulture
 - Adventitious root formation and young plants
 - Embryogenesis and seed development
 - Biological fundamentals of pathogen management

- Horticulture, the environment and consumers
 - Environmental stress imposed on the physiology of yield and quality
 - Quality in the food supply chains
 - Reduction of vegetable allergies
 - Nutrient fluxes in horticulture
- Global changes and horticulture
 - Plant growth and micro climate
 - Sustainability and stability of management systems
 - Reducing poverty and enhancing quality of life through vegetable and ornamental plant production

Cooperation Activities

IGZ works closely with universities, other research institutes and practitioners in Germany, Europe and beyond. Several of its staff hold lectureships at universities.

Structure

Founded as a registered association in 1992, IGZ has an 87-strong staff of which 29 are scientists. It receives funding in the amount of €6 million per year, half from the federal government and the other half from the Free State of Thuringia and the State of Brandenburg. Third-party funding is also made available for specific research projects.

IGZ is a member of the Leibniz Science Association and is one of the biggest publicly funded horticultural research institutes in Germany. It has premises in Grossbeeren near Berlin and in Erfurt. Findings from research on modelling, plant reproduction, plant quality, plant health and plant nutrition are consolidated. This allows interdisciplinary research in many aspects of horticulture and food production. As a service to the public, IGZ provides information and documentation on horticultural issues. This includes a library (stock acquisition, cataloguing, catalogue publication, distance lending, searches in national and international databases, editing and public relations work).

■ **IGZ**
Leibniz Institute of Vegetable and Ornamental Crops
Theodor-Echtermeyer-Weg 1 | 14979 Grossbeeren
Germany
Telephone: +49 (0)33701 78-131
Telefax: +49 (0)33701 78-551
E-mail: igzev@igzev.de | www.igzev.de

Leibniz Institute of Agricultural Development in Central and Eastern Europe (IAMO), Halle (Saale)



Since its foundation in 1994, the Leibniz Institute of Agricultural Development in Central and Eastern Europe (IAMO) has monitored trends in the agri-food industries and in rural development. Its research environment covers Central, Eastern and South-East Europe, including Turkey and the emerging economies of Central and Eastern Asia. As a member of the Leibniz Association, IAMO makes a key contribution towards understanding and managing the profound structural, institutional and political processes of change under way in the agri-food industries in these regions.

Research Focus

Research work performed at IAMO focuses on change in agricultural policy, trends in agricultural markets and structural change at enterprise level and in rural areas. Key research topics take in the economic and social impacts of EU accession by Central and Eastern European states, restructuring of the agricultural and food sectors in the former CIS states, and rural development in China.

The institute conducts the following activities to comply with its mandate of performing application-oriented basic research for the benefit of society:

- Analysis of the economic and social implications of the above processes
- Providing guidance to the parties involved in the transformation process
- Training and promotion of a new generation of academics from partner countries
- Exchange of scientific findings through publications, international cooperation and conferences

IAMO's training activities place special emphasis on promoting up-and-coming academics from partner countries. The institute also serves as a forum for the exchange of scientific findings and solution models and thus fosters European and global networking of research in the agri-food sector and dialogue between science and practice.



The IAMO building in Halle

Cooperation Activities

In terms of research and knowledge transfer, IAMO benefits greatly from close cooperation with partner institutions in Central and Eastern Europe and China and especially from its work with young scientists in these countries.

Structure

Research conducted at IAMO covers three departments:

- External Environment for Agriculture and Policy Analysis
- Agricultural Markets, Marketing and World Agricultural Trade,
- Structural Development of Farms in Rural Areas

IAMO has 40 staff positions, including 24 posts for scientists. It also has a varying number of posts funded by third parties.

■ **IAMO**
Institute of Agricultural Development in Central and Eastern Europe

Theodor-Lieser-Str. 2 | 06120 Halle (Saale) | Germany
Telephone: +49 (0)345 2928-0
Telefax: +49 (0)345 2928-199
E-mail: iamo@iamo.de | www.iamo.de

German Research Centre for Food Chemistry (DFA), Garching



DFA is housed in the chemistry building at Munich University of Technology

As the availability of functional foods becomes more widespread, the role of food in human health is steadily gaining in importance. But in order to gain consumer acceptance, it is not enough for food to be healthy, it must taste good as well. Research conducted at the German Research Centre for Food Chemistry (DFA) thus focuses on the use of objective criteria to assess and identify the textural, sensory and health values attached to food. Other key areas of focus involve the influence of grain and cereal constituents on the quality of pastry, dough and baked goods, and intolerance of people suffering from coeliac disease. DFA also publishes comprehensive tables on foodstuff composition which are specially tailored to dietetics and nutrition education.

DFA was founded in 1918 as a public foundation by the then Royal Bavarian state ministries and joined the Leibniz Science Association in 1975.

Research Focus

Research work at DFA aims at improving the quality of food. The following issues are tackled by individual working groups:

Sensory Value of Food

- Formation and degradation, isolation and structure of food ingredients, and determination of the sensory relevance of flavour-triggering compounds in foodstuffs.
- Quantitative analysis of flavour-active compounds.
- Objectification of sensorily perceptible quality changes as a function of the raw material and the stages in technical processing.
- Physiological bases of taste perception during consumption.
- Identification of ligands for olfactory receptors.

Biopolymer Interactions

- Clarification of significant relationships between the chemical structure and the technological, physical and toxicological properties of plant biopolymers with the aim of improving food quality and preventive health care.
- Further development of physico-chemical measuring methods to optimise the texture-forming properties of macromolecules.
- Action mechanisms of additives such as emulsifiers and enzymes used to improve the properties of food and optimise technical processes.

Physiological Efficacy of Food Ingredients

- Examination of structure-function relationships using biochemical and molecular biological methods.
- Establishment of effect-related screening methods.
- Studies on the metabolism of food ingredients.
- Studies on the influence of technological parameters on physiological efficacy.

Compilation of Food Composition and Nutrition Tables

DFA also compiles literature data on food ingredients relevant in nutritional physiology, evaluates this data in scientific terms and publishes it in a regularly updated set of tables (printed and on-line version). This list of nutritional values drawn up by DFA researchers Souci, Fachmann and Kraut has become established as an international work of authority.

Structure

DFA currently has 30 established posts, including 11 for scientists. Half of its basic funding is provided by the Federal Ministry of Food, Agriculture and Consumer Protection (BMELV) and the other by the Free State of Bavaria. The DFA director also holds the professorial chair for food chemistry at the Technische Universität München.

■ DFA

German Research Centre for Food Chemistry

Lichtenbergstraße 4 | 85748 Garching | Germany

Telephone: +49 (0)89 289-14170

Telefax: +49 (0)89 289-14183

E-mail: lebensmittelchemie@lrz.tum.de

www.dfal.de

Organisational chart showing the federal research institutes overseen by the Federal Ministry of Food, Agriculture and Consumer Protection (BMELV)

			
Institute	Institute	Institute	Institute
of Crop and Soil Science	of Animal Nutrition	of Physiology and Biochemistry of Nutrition	of Rural Studies
for Breeding Research on Agricultural Crops	for Animal Welfare and Livestock Husbandry	for Nutritional Behaviour	of Farm Economics
for Breeding Research on Horticultural and Fruit Crops	of Farm Animal Genetics	for Food and Bioprocess Engineering	of Market Analysis and Agricultural Trade Policy
for Grapevine Breeding Geilweilerhof	for Bacterial Infections and Zoonoses	for Microbiology and Biotechnology	of Agricultural Technology and Biosystems Engineering
for Resistance Research and Stress Tolerance	for Molecular Pathogenesis	for Safety and Quality in Milk and Fish	of Biodiversity
for Biosafety of Genetically Modified Plants	of Molecular Biology	for Safety and Quality of Fruit and Vegetables	of Agricultural Climate Research
for Epidemiology and Pathogen Diagnostics	of Diagnostic Virology	for Safety and Quality of Meat	of Organic Farming
for National and International Plant Health	of Infectology	for Safety and Quality of Cereals	of Wood Technology and Wood Biology
for Plant Protection in Field Crops and Grassland	of Novel and Emerging Diseases		of Forest Based Sector Economics
for Plant Protection in Horticulture and Forests	of Immunology		of World Forestry
for Plant Protection in Fruit Crops and Viticulture	of Epidemiology		of Forest Ecology and Forest Inventory
for Biological Control			of Forest Genetics
for Strategies and Technology Assessment in Plant Protection			of Sea Fisheries
for Application Techniques in Plant Protection			of Fishery Ecology
for Ecological Chemistry, Plant Analysis and Stored Product Protection			of Baltic Sea Fisheries

The people behind the names

Julius Kühn Institute, Federal Research Centre for Cultivated Plants

Julius Kühn

Born 23.10.1825 in Pulsnitz (Oberlausitz), deceased 14.4.1910 in Halle/Saale, Agricultural scientist and farmer

Following a farming apprenticeship and work as a farm administrator, Kühn went on to study in Bonn (Poppelsdorf). He qualified to teach at professorial level in 1856 at the Landwirtschaftliche Akademie in Proskau and from 1857 to 1862 served as Wirtschaftsdirektor for a number of large farms in the Glogau region. In 1862, Kühn was made an ordinary professor of agriculture at the University of Halle, founded the Institut für Landwirtschaft in 1863 and in the course of the next 40 years developed it into one of Germany's most important agricultural science teaching and research centres. He was made an Emeritus Professor in 1909. Kühn was one of the first scientists to study phytopathology (*Die Krankheiten der Kulturgewächse, ihre Ursachen und ihre Verhütung*, 1859) and discovered a substance to combat sugar beet pest (1889 Station zur „Nematodenvertilgung“). Begun in 1878, his Eternal Rye (Ewiger Roggenbau) trials were the first ever attempt to grow monocultures and are still in operation today.

Friedrich Loeffler Institute, Federal Research Institute for Animal Health

Friedrich August Johannes Loeffler

Born 24.6.1852 in Frankfurt (Oder); deceased 9.4.1915 in Berlin Medical doctor, hygienist and bacteriologist

Loeffler studied medicine in Würzburg and Berlin from 1870 to 1874. He subsequently worked with Robert Koch at the Imperial Health Office, where he discovered the pathogens for a range of infectious diseases such as glanders, diphtheria (he discovered the diphtheria bacillus in 1884 while working with Edwin Klebs) and erysipelas. In 1888 he was made professor of hygiene and medical history at the University of Greifswald. Together with Paul Frosch (1860 – 1928) he described the virus that causes foot and mouth disease as a particulate agent, which is smaller than a bacterium. In doing so he became the co-founder of the discipline of virology. The foot and mouth virus was the first animal virus to be described. Loeffler developed the first serum to fight foot and mouth disease but was unable to use it on grounds of cost. He founded the first virological research institute on the island of Riems in 1910, but left in 1913 to accept an appointment as director of the Robert Koch institute.

Max Rubner Institute, Federal Research Institute for Nutrition and Food

Max Rubner

Born 2.6.1854 in Munich; deceased 27.4.1932 in Berlin
Physiologist

Rubner studied medicine in Leipzig and Munich, wrote his doctoral thesis in 1878 (*Über die Ausnützung einiger Nahrungsmittel im Darmkanal des Menschen*) and became a professor of physiology in 1883. He was made professor of hygiene at the University of Marburg in 1887. He succeeded Robert Koch as professor and director of the Berlin Institute of Hygiene in 1891, where from 1909 to 1922 he taught physiology and founded the Kaiser Wilhelm Institut für Arbeitsphysiologie. He is the founding father of modern-day nutritional science. Apart from numerous bacteriological and hygiene studies, he published fundamental works on issues of thermogenesis and metabolism (including *Gesetzlichkeiten des Ernährungsverbrauchs bei der Ernährung* (1902), *Lehrbuch der Hygiene* (1907), *Volksernährungsfragen* (1908), *Wandelungen in der Volksernährung* (1912), *Elementare Zusammensetzung, Verbrennungswärme und Verbrauch der organischen Nährstoffe* (1928) and was instrumental in formulating the laws of isody-namics, specific dynamic effect and surfaces.

Johann Heinrich von Thünen Institute, Federal Research Institute for Rural Areas, Forestry and Fisheries

Johann Heinrich von Thünen

Born 24.6.1783 in Gut Canarienhäuser (now Kreis Friesland);
deceased 22.9.1850 in Tellow near Teterow, Mecklenburg
Agricultural scientist, economist, social reformer

Thünen began an agricultural apprenticeship in 1799 and then switched to study at the Landwirtschaftliche Lehranstalt Flottbeck. From 1803 on, he studied economics in Göttingen. He acquired the Tellow farming estate in Mecklenburg-Schwerin in 1810, where the rational organisation of his estate and the study of economics became his life's work. In 1826 he published the first part of his treatise, *The Isolated State (Der isolierte Staat in Beziehung auf Landwirtschaft und National-Ökonomie: Untersuchungen über den Einfluß, den die Getreidepreise, der Reichtum des Bodens und die Abgaben auf den Ackerbau ausüben)*. His pioneering works include the development of land and forestry production, location and spatial structuring theories (the Thünen rings), providing impetus for economic geography and regional science, and sparking the teaching of agricultural business and economics in Germany. He also drew up a systematic explanation of the wages, interest and land rents and their distribution in a national economy (marginal productivity theory). His set of basic principles for optimal forestry management pre-empted the generally accepted capital theory approaches.

In 1830 he was made an honorary doctor of the University of Rostock in recognition of his services to science. His life's work combined theoretical knowledge of mathematics with practical experience gained on his model farm estate.

Addresses

Julius Kühn Institute
Federal Research Centre for Cultivated Plants
Erwin-Baur-Straße 27
06484 Quedlinburg
Germany
Telephone: +49 (0)3946 47-0
Telefax: +49 (0)3946 47-255
E-mail: poststelle@jki.bund.de
www.jki.bund.de

Friedrich Loeffler Institute
Federal Research Institute for Animal Health
Südufer 10
17493 Greifswald-Insel Riems
Germany
Telephone: +49 (0)38351 7-0
Telefax: +49 (0)38351 7-151
E-mail: poststelle@fli.bund.de
www.fli.bund.de

Max Rubner Institute
Federal Research Institute for
Nutrition and Food
Haid-und-Neu-Str. 9
76131 Karlsruhe
Germany
Telephone: +49 (0)721 6625-0
Telefax: +49 (0)721 6625-111
E-mail: poststelle@mri.bund.de
www.mri.bund.de

Johann Heinrich von Thünen Institute
Federal Research Institute for Rural Areas,
Forestry and Fisheries
Bundesallee 50
38116 Braunschweig
Germany
Telephone: +49 (0)531 596-0
Telefax: +49 (0)531 596-1099
E-mail: info@vti.bund.de
www.vti.bund.de

Federal Institute for Risk Assessment
Thielallee 88-92
14195 Berlin
Germany
Telephone: +49 (0)30 8412-0
Fax: +49 (0)30 8412-4741
E-mail: poststelle@bfr.bund.de
www.bfr.bund.de

German Biomass Research Centre
Torgauer Str. 116
04347 Leipzig
Germany
Telephone: +49 (0)341 2434-112
Telefax: +49 (0)341 2434-133
E-mail: info@dbfz.de
www.dbfz.de

**Leibniz Institute for Agricultural Engineering
Potsdam-Bornim**

Max-Eyth-Allee 100
14469 Potsdam
Germany
Telephone: +49 (0)331 5699-0
Telefax: +49 (0)331 5699-849
E-mail: atb@atb-potsdam.de
www.atb-potsdam.de

**Leibniz Centre for Agricultural
Landscape Research**

Eberswalder Strasse 84
15374 Müncheberg
Germany
Telephone: +49 (0)33432 82-0
Telefax: +49 (0)33432 82-223
E-mail: zalf@zalf.de
www.zalf.de

**Research Institute for the Biology
of Farm Animals**

Wilhelm-Stahl-Allee 2
18196 Dummerstorf
Germany
Telephone: +49 (0)38208 68-5
Telefax: +49 (0)38208 68-602
E-mail: fbn@fbn-dummerstorf.de
www.fbn-dummerstorf.de

**Leibniz Institute of Vegetable and
Ornamental Crops**

Theodor-Echtermeyer-Weg 1
14979 Grossbeeren
Germany
Telephone: +49 (0)33701 78-131
Telefax: +49 (0)33701 78-551
E-mail: igzev@igzev.de
www.igzev.de

**Leibniz Institute of Agricultural Development
in Central and Eastern Europe**

Theodor-Lieser-Str. 2
06120 Halle (Saale)
Germany
Telephone: +49 (0)345 2928-0
Telefax: +49 (0)345 2928-199
E-mail: iamo@iamo.de
www.iamo.de

German Research Centre for Food Chemistry

Lichtenbergstraße 4
85748 Garching
Germany
Telephone: +49 (0)89 289-14170
Telefax: +49 (0)89 289-14183
E-mail: lebensmittelchemie@lrz.tum.de
www.dfal.de





Publisher

Bundesministerium für Ernährung,
Landwirtschaft und Verbraucherschutz (BMELV)

11055 Berlin, Germany

Point of Contact

Referat 123 – Forschung und Innovation
Rochusstraße 1
53123 Bonn, Germany

Text

BMELV

Status

December 2008

Design

design_idee_erfurt

Printed by

BMELV

Photos

JKI, FLI, MRI, vTI, vTI/Dr. Michael Welling, BfR, DBFZ, ATB, ZALF, FBN, IGZ, IAMO, DFA,
BMELV, aid infodienst e. V.

This and other BMELV publications are available free of charge from:

Internet: www.bmelv.de → Service → Publikationen

E-Mail: publikationen@bundesregierung.de

Fax: +49 (0)1805-77 80 94

Tel.: +49 (0)1805-77 80 90

In writing: Publikationsversand der Bundesregierung

Postfach 48 10 09

18132 Rostock

Germany

Additional information is available on the BMELV website at:

www.bmelv.de

This publication is issued free of charge as part of the public relations work of the Federal Government of Germany. It may not be used for election campaign purposes, either by political parties or by individual candidates or their campaign assistants. This applies to European, Federal, Länder and municipal elections. Misuse of this publication includes its distribution at election campaign events and on party information stands, and also the insertion, printing or affixing of party political information or advertisements in, on or to it. This publication may not be passed to third parties for election campaign purposes. Nor may it, irrespective of when, where, how and in what quantities it was received, be used at times other than during election campaigns where the impression could arise that the Federal German Government favours a specific political group.