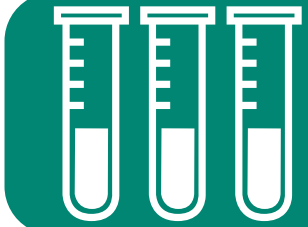
PROF. WACLAW DABROWSKI
INSTITUTE OF AGRICULTURAL AND FOOD BIOTECHNOLOGY
STATE RESEARCH INSTITUTE

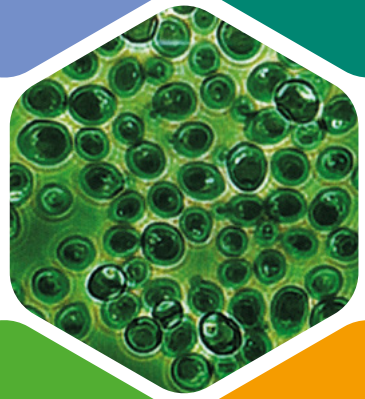
Scientific Institute of category A

R&D projects, international cooperation



Functional and organic food

Research and development activity



Technical support in the agricultural products processing

Technical support in organic farming

– Doctoral students

– Students

Implementation of innovations and new technologies

Development of new products and recipes

Foreword

Prof. Artur Hugo Świergiel, Ph.D.
Director
of the Institute of Agricultural
and Food Biotechnology
– State Research Institute in Warsaw

The Institute of Agricultural and Food Biotechnology was founded in 1949 in Warsaw, first under the name of the Main Institute of Agricultural and Food Industry, and is now the largest scientific and research unit in Poland which operates within the area of food production. The research activities and projects of the Institute of Agricultural and Food Biotechnology are carried out within all fields of food production and food economy in Poland.

The core task of the Institute is to conduct basic and applied research in the field of agri-food biotechnology and safe food production and storage, as well as to support agri-food industry and carry out activities aimed at improving the quality of people's lives.

The Institute is a place where we enlarge our experience and know-how as well as initiate the state-of-the art research while cooperating with the economic and business environment.

We introduce new technologies developed at our Institute into the world of industry. Novel solutions upscale and facilitate the work of companies and offer them opportunities to enter new markets. We raise awareness among manufacturers that continuous investment in R&D is a key factor in increased market participation, cost management benefits, advancements in marketing abilities and trend-matching.

Quick Facts

12 departments

~80 research staff

~25 support staff

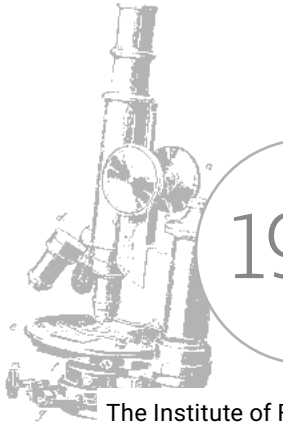
70+ research projects

600 accredited research methods

50+ scientific papers annually

~10 invention patents annually

History



1911

The Institute of Fermentation Industry and Agricultural Bacteriology was founded in Warsaw by Professor Waclaw Dabrowski

1988

The Institute of Agricultural and Food Biotechnology established under a new official name

2009

The Institute of Meat and Fat Industry and the Institute of Sugar Industry merged into the Institute of Agricultural and Food Biotechnology

2021

The Institute of Agricultural and Food Biotechnology gained the status of the state research institute

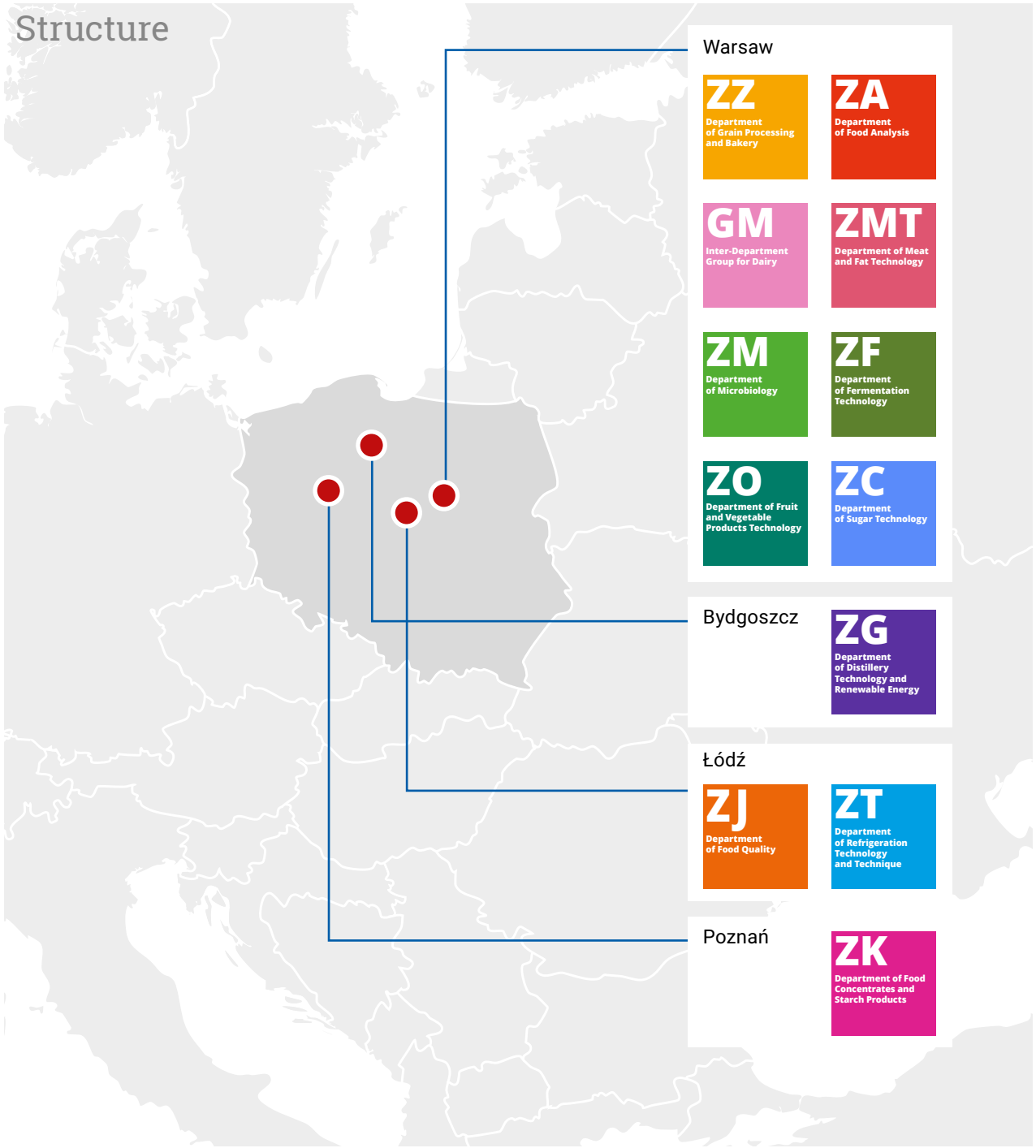
Who we are: *The Institute of Agricultural and Food Biotechnology is the leading agricultural and food research academic unit in Poland and the national body responsible for research, training and consulting to the Polish government as well as different regulatory bodies and the agri-food industry stakeholders.*

What we do: *The main scope of the Institute's activity is conducting basic and applied research in the field of agri-food biotechnology, safe food production and storage as well as food and feed safety and quality. We support the agri-food industry, including food distributors and conduct research aimed at improving the quality of people's lives.*

The Institute of Agricultural and Food Biotechnology collaborates with partners from various sectors of the agri-food industry. We also respond to the needs of many related sectors, which include environmental protection, renewable energy and refrigeration. The mission of the Institute is to create modern, energy-saving technologies for industries which operate in the fields of fermentation, fruit and vegetable, food concentrates, cereal and milling, baking and confectionery, sugar, meat and fat. We also aim at developing technical solutions and projects to improve food quality, which includes the development of analytical methods.

Our mission: *Develop novel, proecological technologies in all fields of food production and introduce them into the world of industry. Raise awareness among indigenous producers that investment in R&D sector is a key factor in the country's economic growth.*

Structure



The Institute of Agricultural and Food Biotechnology consists of 12 research Departments.

There are 9 Departments located in Warsaw and 4 which are based in other cities - Łódź, Poznań and Bydgoszcz.

Departments in Warsaw:

- Department of Grain Processing and Bakery
- Department of Food Analysis
- Inter-department Group for Dairy
- Department of Meat and Fat Technology
- Department of Microbiology
- Department of Fermentation Technology
- Department of Fruit and Vegetable Products Technology
- Department of Sugar Technology

Department in Bydgoszcz:

- Department of Distillery Technology and Renewable Energy

Departments in Łódź:

- Department of Food Quality
- Department of Refrigeration Technology and Technique

Department in Poznań:

- Department of Food Concentrates and Starch Products

Facilities (Labs)

Our departments are equipped with modern analytical and semi-technical devices and employ more than 600 accredited research methods

We are engaged in supporting all branches of the agri-food industry in Poland

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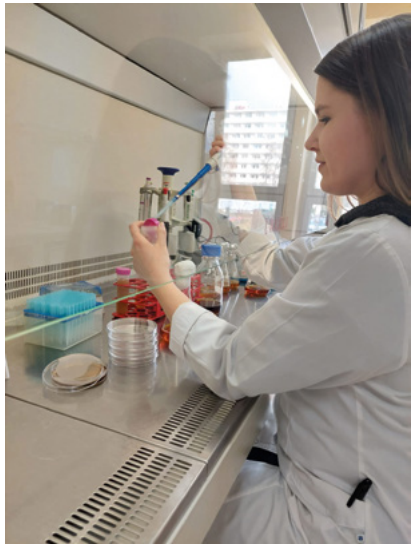
Department of Fermentation Technology

Modern preparation for making ensiled feed for livestock

Line of bioreactors for obtaining starter cultures



Preparation of inoculum of microorganisms for cultivation

Storage of microorganisms

Starter cultures for use in traditional silage-making processes and fermentation of vegetables.

Department of Fermentation Technology conducts innovative research for healthier and sustainable development of food processing and agriculture. The main goal of the R&D activity is focused on the use of traditional food and feed preservation technologies based on the use of microbial preparations, containing starter cultures of lactic acid bacteria (LAB):

a) in processing - to initiate the fermentation of vegetables and fruits, baker's sourdough and edible mushrooms, and to develop new categories of fermented products.
b) in agriculture - for ensilage of feed and biomass for biogas plants.

The Department is also involved in projects related to the processing of plant waste materials for use as feed additives and components. The scope of the Department's activity includes research on native microflora involved in food and agricultural production processes, works related to the isolation of new strains of microorganisms from natural environments and the characteristics of their specific features which are useful in the technology and biological preservation of food and feed.

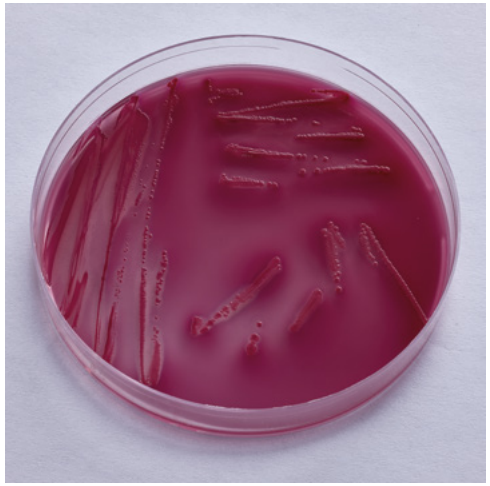
Department of Fermentation Technology has many years of experience in developing innovative biopreparations that have received national and international patent protection. Preparations are manufactured using the designed pilot line owned by the Department.

Research activities:

- Safety of food production and processing including the development of innovative methods.
- Transition to pesticide-free agriculture through dedicated research on biocontrol agents.
- Innovations in the production of high-quality food with high nutritional density and bioavailability.
- Minimizing the extent of food processing with full preservation of nutrients and beneficial bioactive substances.
- Development of food products for special groups of consumers, fermented analogues of meat products and food produced in the organic system.
- Processing agricultural products related to the exploitation of microorganisms for fodder and biogas production.

Department of Food Quality

A new batch of products has just arrived for quality testing



The Department of Food Quality has 62 accredited microbiological, physicochemical and organoleptic methods.

The Department's research activity is focused on basic research, applied research and implementation involving advanced technologies related to the food industry and agriculture.

The Department consists of two laboratories:
- Laboratory of Microbiology
- Laboratory of Physicochemical and Sensory Analyzes

The mission of the Department is to conduct commercial, scientific and educational research as well as implementation activities at the highest level. The Department contributes to the economic and intellectual development of the Polish society, with particular emphasis on rural areas, the food economy and the natural environment.

The Department of Food Quality investigates a wide range of food products: beverages, ready-to-eat products, meat and meat products, fruit and vegetable products, chilled and frozen meals, confectionery products, dairy products and water intended for human consumption.

Research activities:
- Research in safety and quality of raw materials and food products, focused mainly on environmental contaminants as results of the production and distribution processes.
- Research on the occurrence of biogenic amines with the use of cutting-edge instrumental methods.

Department of Food Analysis

Pickled radish study underway

The Department of Food Analysis specializes in food research which requires top-tier scientific equipment and high qualifications of research and technical personnel.

The Department conducts research on many chemical and biological contaminants and selected basic nutrients of food products, as well as additional substances, which are increasingly introduced into food produced in Poland. The conducted research allows to track the most important achievements in the area of food analysis in the world. The results of analytical research are used in the agri-food industry for the development and evaluation of new technologies and the production of high-quality food products, and also serve to promote both, the export of Polish food products and their introduction to the domestic market.

The Department also participates in the determination of reference values in plant materials for proficiency testing organized by the Institute of Nuclear Chemistry and Technology.

Research activities:

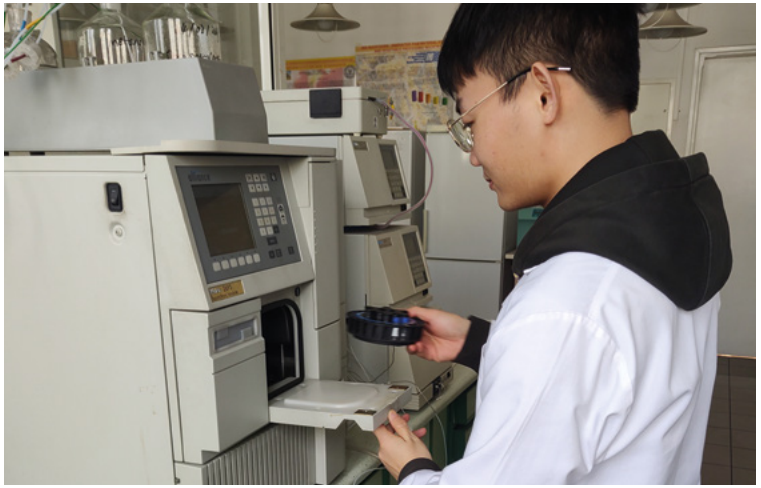
- Development of analytical methods in assessing food quality and safety.
- Development, adaptation and application of modern analytical methods and techniques for the study of chemical and biological contaminants, nutrients and adulterations.
- Identification and quantitative determination of natural ingredients and environmental pollutants in raw materials and food preparations. Food contamination monitoring.
- Development of health quality standards for raw materials and food products.
- Testing of the authenticity (adulteration) of food and feed: detection of permitted and prohibited additives.
- Introducing natural food products with health-promoting properties.
- Risk assessment of chemical contamination in agricultural and food products.
- Study of metabolic pathways and environmental transformations of chemical food pollutants.
- Research on the mechanisms and kinetics of the formation of undesirable substances during food processing.
- Testing of controlled substances, including psychoactive substances.
- Protein composition and structure analysis.
- Food microbiome metabolomics.
- Analysis of selected toxicological aspects related to the presence of contaminants in food.
- Instrumental analysis of selected flavoring substances present in food.

Services and training activities:

- Analyzes and expert opinions on the quality of raw materials and food products for business.
- Amending the subject standards of the fruit and vegetable industry and methodological standards for the determination of contaminants in food (PN, PN-EN, PN-ISO).
- Training in modern analytical techniques used in the analysis of contaminants in food.

Department of Fruit and Vegetable Product Technology

The Beer and Malt Laboratory examines the best lattice beers



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Development of a new food pasteurization technique based on the use of high pressure CO_2

The Department of Fruit and Vegetable Product Technology has been working closely with the fruit and vegetable industry as well as with other branches of the food industry for over 70 years.

The Department consists of the following research units:

- Physicochemical and Sensory Quality Research Laboratory
- Technology Laboratory
- Beer and Malt Laboratory

Research activities:

- Development of technologies for fruit and vegetable products with health-promoting properties and special nutritional purposes (functional food), with the use of the biotechnological processes.
- Use of innovative and the up-scalling of current technologies for the processing and preservation of fruit and vegetable products.
- Development of technologies for fruit and vegetable products with the use of regional and/or organic raw materials with high health potential.
- Development of technology for the production of fermented beverages based on malted cereal grain.
- Establishing criteria for the assessment of physicochemical and sensory quality.
- Developing and adapting new analytical methods for testing of raw materials, semi-finished products and the fruit and vegetable products for malting and brewing industries.
- Investigations on applying new and improving existing techniques for extracting bioactive compounds.
- Bioavailability of biologically active ingredients.
- Application of fruit and vegetable biomass.
- Assessment of suitability for the production of new species and varieties of malting barley and hops.
- Improvement of malt and hop products manufacturing technology.
- Improvement of mashing, fermentation, maturation and filtration processes of beer in terms of improving quality of beer, better use of raw materials, energy savings and environmental protection.
- Development of technology and techniques for the management of biowaste of the malting and brewing industry.
- Research on natural aromas and food colours.
- Utilization of fruit and vegetable pomace.
- Quality testing of: barley, malt, hops, corn grits, wort, beer, spent grain, spent yeast and beer based on: physico-chemical, chromatographic and organoleptic tests according to Analytica EBC and MEBAK.
- Nutritional and energy value of beer and food products.
- Functional food ingredients: dietary fibre, beta-glucan.

Department of Grain Processing and Bakery

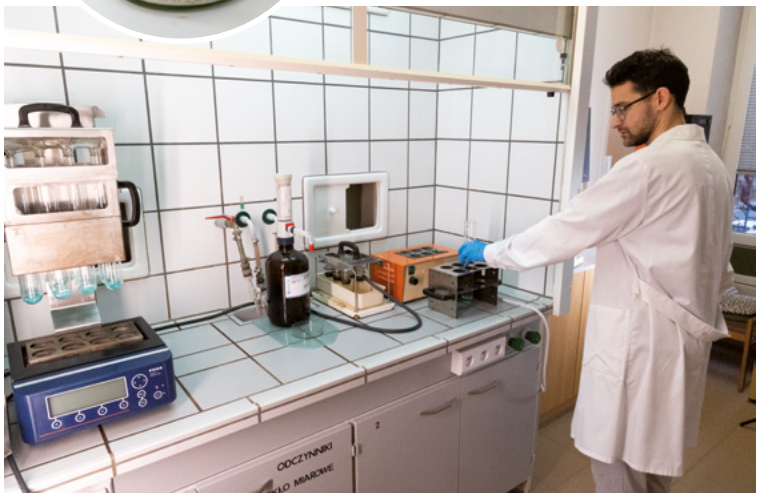
Department of Grain Processing and Bakery is approved by GAFTA (The Grain and Feed Trade Association)

The process of evaluating baked breads from different types of flour obtained in a laboratory baking test

Research activities:

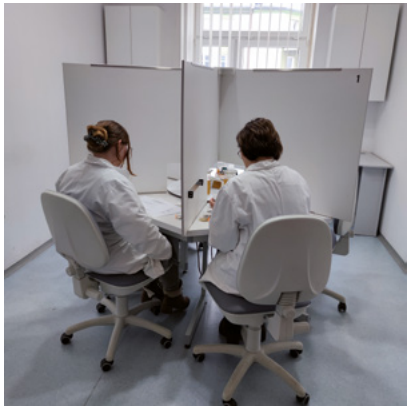
- Assessment of technological value of cereal grains processing for products intended for consumption.
- Improving techniques and processing technology, storage and maintenance of cereal grains.
- Improving techniques and processing of bakery and pastry products.
- Development of new or improvement of existing methods in assessing the quality and marketing standards for cereal grains and products as well as bakery and pastry products.
- Assessment of suitability of new instrumentation in determining the quality of cereal grains and products as well as bakery and pastry products for the needs of the business sector.
- Development and verification of the calibration of electrical moisture meters for cereal grain (1st and 2nd class accuracy) and attestation of NIR devices in industrial laboratories.
- Proficiency testing for quality assessment of wheat and wheat flour.
- Training in research methods and standardization of the quality of cereal grains, cereal and bakery products.
- Development of standard documents for companies.

Ash content analyses (accreditation AB 452)

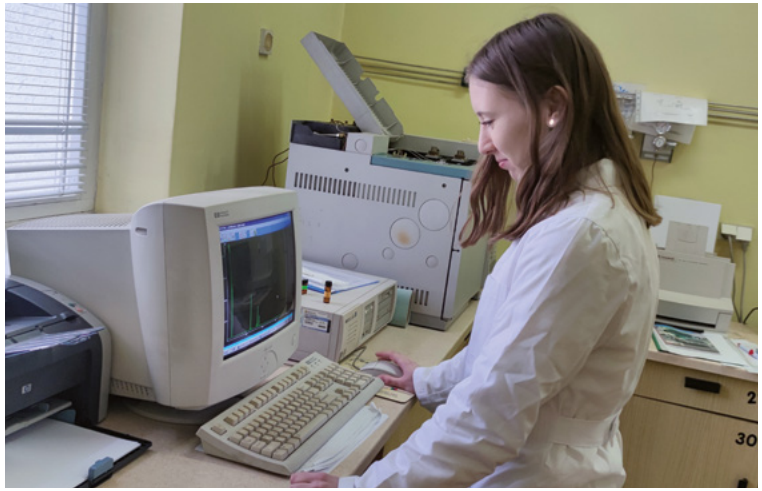


In the lab – protein content analyses (accreditation AB 452)

Department of Food Concentrates and Starch Products



Lab creates plant-based alternatives to popular products



Food quality test in the lab

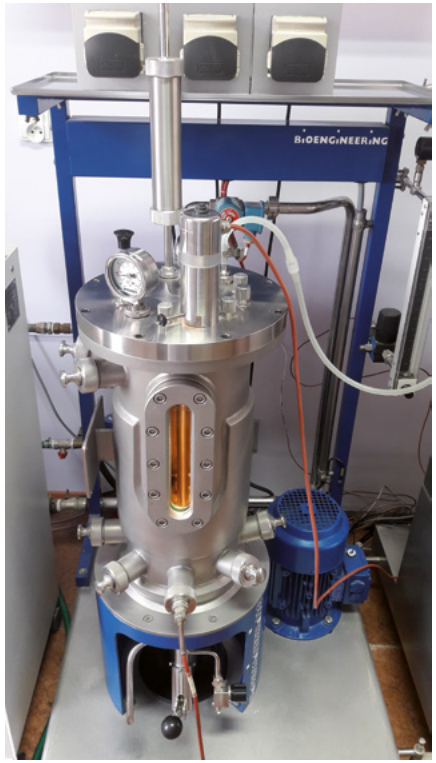
Research activities:

- Design and development of starch processing technologies and its derivatives.
- Development of technologies for the production of innovative products (including vegan) from legume seeds.
- Development of food technologies with a high content of bioactive ingredients.
- Design of functional food for the prevention and therapy of civilization diseases.
- Food management of by-products from food processing.
- Research on biodegradable/edible packaging for food.
- Implementation of research for the development of “novel foods”.

Research offer:

- Comprehensive and interdisciplinary research, development and implementation works for the food concentrates and starch industry.
- Implementation of innovative solutions within the framework of projects co-financed by the European Union.
- Physicochemical, sensory and microbiological testing of the quality of food products.
- Research works on modified starches and starch hydrolysates.
- Testing of the quality of generic products of retail chains.
- Storage tests of food products.
- Steam decontamination of plant raw materials.
- Consulting services for industry.

Department of Distillery Technology and Renewable Energy



The Department of Distillery Technology and Renewable Energy conducts research, development projects and laboratory analyses in the field of renewable energy sources, with particular emphasis on biofuel production and bio-waste management. Research is carried out within the management of agri-food waste for obtaining energy carriers (bioethanol, biogas, biobuthanol). Research works also cover the use of post-production waste to obtain soil biopreparations. The Department offers research in the field of protein analysis and other physico-chemical determinations in industrial raw materials and compound feeds as well as analyzes of the content of cellulose, hemicellulose and lignin in fibrous raw materials intended for fodder or fertilizers. In addition, the Department analyzes nitrates, nitrites, COD, heavy metals and other pollutants in soils and fertilizers and determines chemical impurities in ethanol and alcohol products.

Research activities:

- Optimization and intensification of the technological process of ethanol production.
- Research on the technology applied in the processing of new distillery raw materials into ethanol using fermentation method.
- Development of technologies for the reduction of the content of volatile compounds polluting ethanol.
- Development of the methods applied in agri-food waste management to obtain low-emission energy carriers.
- Research on technology for the second-generation biofuels production from lignocellulosic biomass.
- Research on biochemical methods of lignocellulosic structure decomposition including thermochemical and enzymatic treatment.
- Research on utilization of distillery stillage for fertilization, fodder and biogas purposes.
- Development of a protein-mineral preparation for farm animals as an alternative protein-energy animal feed.
- Research on the production of biofertilizers based on the methane fermentation waste as an alternative to synthetic fertilizers.

Department of Meat and Fat Technology

Carcass classification of pork in industrial conditions

Fat products developed in collaboration with the Department of Meat and Fat Technology

Technology for the production of organic long-ripened meat products using environmental lactic acid bacteria

The Department of Meat and Fat Technology carries out research towards the development of meat and fat science and production technology as well as solving current problems of the meat and fat industry in Poland.

Department of Meat and Fat Technology consists of:

- Meat Technology Laboratory
- Fat Technology Laboratory
- Raw Materials Research and Slaughter Technology Laboratory
- Protein Substitutes of Animal Origin Technology Laboratory
- Food and Environment Research Laboratory

Research activities:

- Development of methods for classifying slaughter animals and qualitative assessment of meat, products and food additives.
- New production methods of meat products, with particular emphasis on improving their nutritional quality and safety, meat processing without nitrites and nitrates and organic products.
- Isolation of environmental lactic acid bacteria strains and assessment of their probiotic, antioxidant, antibacterial and technological properties for the use as starter cultures in the meat processing.
- Research on the influence of bacteria on muscle and fat tissue.
- Study of the mechanisms of microbial transformation of meat heme pigments and the influence of bacteria on the colour formation of meat products without the addition of nitrites and nitrates.
- Research on the antioxidant properties of biologically active peptides of meat and meat products.
- Research in the field of fats, in particular on rapeseed oil, sunflower oil, soybean oil, corn oil, palm oil, olive oil, cocoa fat (CB), milk fat, animal fat, margarines and others.
- Quality and authenticity analysis of cocoa butter and cocoa butter equivalents CBE.
- Research analyses in: pressed oil, oil extraction, refining, modification (blending, hydrogenation, interesterification), quality and authenticity assessment.
- Analysis of fat deterioration processes in frying fats and during the storage of products.
- Research on the oleogels utilization as solid fat alternative in food products and emulsions.

Department of Microbiology

Lyophilization process

Department of Microbiology consists of:

- Laboratory of Biotechnology and Molecular Engineering
- Laboratory of Analysis of Microbiological Quality
- Microbiology Culture Collection – Collection of Industrial Microorganisms

Laboratory of Biotechnology and Molecular Engineering conducts R&D related to biotechnology, systems biology, genomics and genetic engineering. The laboratory uses innovative "omics" technologies as well as the latest genomic engineering methods. Activities in the field of innovative research are focused on the development strategies of the food market aimed at producing healthy food, oriented at the prevention of human civilization diseases.

Laboratory of Analysis of Microbiological Quality offers cooperation in:

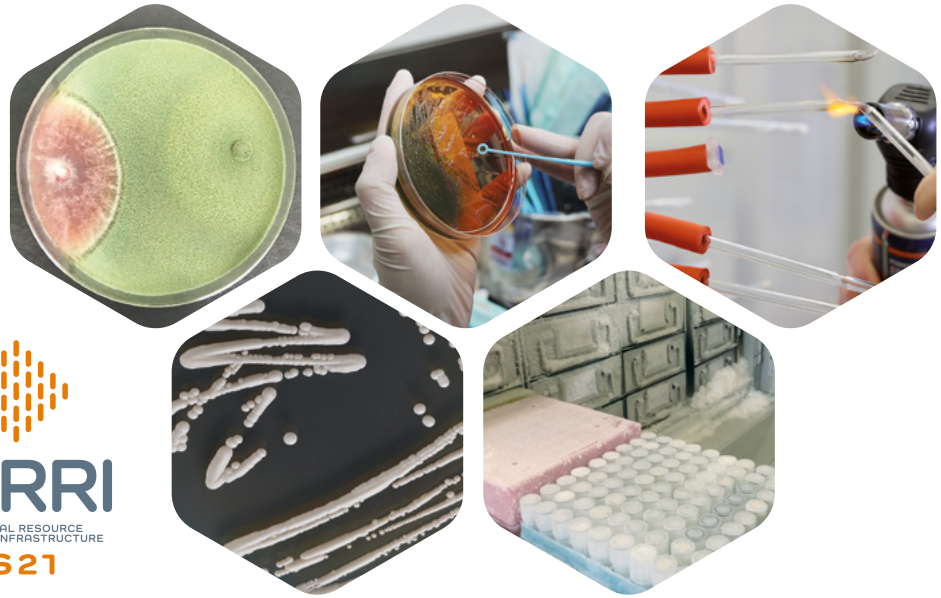
- testing of the quality and microbiological safety of raw materials, semifinished products and food products,
- identification of microorganisms in food, and the environment of its production and distribution,
- opinions on the quality and microbiological safety of food products,
- consultations and solutions to microbiological issues occuring in production plants of agri-food sector,
- development and improvement of new analytical methods, including molecular biology, used in research in the quality and microbiological safety of food products and for the identification and characterization of microorganisms,
- research on the effectiveness of new, alternative methods of food preservation, including inactivation of microorganisms,
- trainings on food safety and quality and analytical techniques used in the microbiological food analysis,
- organizing internships for students of biology, biotechnology, food technology.

Research activities:

- Identification and functional analysis of the metagenome and metatranscriptome of microorganisms and their metabolites for potential application in industrial biotechnology.
- Functional genetic modification of microorganisms, including over-expression of functional proteins, as well as the interaction of microorganisms with eukaryotic cells.
- Identification of new metabolic pathways and their protein metabolites to use their natural bacteriocinogenic activity in developing new bio-innovative products for food disinfection and preservation.
- Research on applying specific, lytic bacteriophages in the food chain as natural, unconventional preservatives using genome and transcriptome analysis methods.
- Research on in *vitro culture* of intestinal epithelial cells to assess the adhesion of intestinal bacteria and molecular mechanisms of transmembrane transport of xenobiotics and nutrients.
- Research on the influence of bioactive components of the diet on the physiology of the intestinal mucosa and the pathogenesis of civilization diseases.

Collection of Industrial Microorganisms – Microbiological Resource Center

Microbiology Culture Collection - Collection of Industrial Microorganisms is the largest institution of this type in Poland. It contains about 3,000 strains of industrial microorganisms, such as yeasts, bacteria and filamentous fungi, isolated from food and its production environment.



MIRRI
MICROBIAL RESOURCE RESEARCH INFRASTRUCTURE
IS21

Collection of Industrial Microorganisms – Microbiological Resource Center research activity includes preservation, storage, identification and sharing of microbial strains. Storage techniques include freeze-drying, cryopreservation and inoculation to suitable media. To ensure the safety of deposits, the Collection employs two methods of long-term storage for each microorganism. In addition, microorganisms are identified with classical (microscopic analysis, selective media) and molecular biology methods. Open collection deposits can be used for academic, scientific or industrial purposes. The Collection belongs to the European Culture Collections Organisation (ECCO), World Federation for Culture Collection (WFCC) and Organization for Economic Cooperation and Development (OECD). From 2003 to 2004, the Collection participated in the European Biological Resource Centers Network project. The participation in this project allowed for the adaptation of European standards and their introduction to the work of the Collection. An electronic catalog of open deposits was also created. Since 2005 the Collection has participated in the National Information Network on Biodiversity in Poland, a part of the Global Biodiversity Information Facility.

Collection of Industrial Microorganisms – Microbiological Resource Center is a Partner in the IS_MIRRI21 project (Implementation And Sustainability Of Microbial Resource Research Infrastructure For The 21st Century) supported by the European Horizon 2020 research and innovation program.

The Collection offers the following services in the field of microbiology:

- isolation and purification of strains, microbial counting,
- identification of bacteria, yeast and fungi,
- basic bacteria characterization including gram staining cultivation-based assays including salt and pH tolerance and temperature range,
- long term storage,
- safe deposit; public deposit; patent deposit services,
- microorganisms facilitating for academic, scientific or industrial purposes.

Research activities:

- Identification and functional analysis of the metagenome and metatranscriptome of microorganisms and their metabolites for potential application in industrial biotechnology.
- Functional genetic modification of microorganisms, including over-expression of functional proteins, as well as the interaction of microorganisms with eukaryotic cells.
- Identification of new metabolic pathways and their protein metabolites to use their natural bacteriocinogenic activity in developing new bio-innovative products for food disinfection and preservation.
- Research on applying specific, lytic bacteriophages in the food chain as natural, unconventional preservatives using genome and transcriptome analysis methods.
- Research on *in vitro* culture of intestinal epithelial cells to assess the adhesion of intestinal bacteria and molecular mechanisms of transmembrane transport of xenobiotics and nutrients.
- Research on the influence of bioactive components of the diet on the physiology of the intestinal mucosa and the pathogenesis of civilization diseases.

Department of Refrigeration Technology and Technique

Vegaburgers

Vegaburger - industrial production. Metering and production line.

Parcel machine for food - a prototype

Lab conducts research to develop innovative carbon footprint (CF) counting methodology for basic frozen food basket

The Department of Refrigeration Technology and Technique is located in Lodz and conducts scientific research, development and implementation works in the field of technology and technique for the production of frozen and refrigerated food. The Department also designs the refrigeration systems and equipment in the context of reducing their energy consumption, especially with the use of natural refrigerants, while remaining neutral to the environment and climate.
Moreover, the Department offers research on the environmental protection with regard to refrigeration, air conditioning and heat pumps.

Research activities:

- Research on forming the structure of frozen and chilled food products through the use of innovative raw materials and functional additives.
- Innovative technologies for the production of frozen and chilled products produced in an environmentally friendly way, i.e. packaged in a vacuum or protective atmosphere.
- Use of proteins obtained from alternative sources, such as plants, microorganisms and insects, to create new food products with reduced environmental footprint.
- Development of a methodology to determine the carbon, water and environmental footprint in the agri-food industry and understanding of the interrelationship between these parameters.
- Research in the field of environmental protection in refrigeration, air conditioning and heat pumps.
- Cold chain safety - use of thermal imaging, gas chromatography.
- Safety of refrigeration systems.

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Department of Sugar Technology

The Department of Sugar Technology conducts research and laboratory analyses in following areas:

- Improvement of the technological processes and techniques of beet sugar production and ensuring maximum efficiency and high-quality sugar.
- Selection of technological parameters for the development of processes and guidelines for the raw material of variable quality processing.
- Development of technological guidelines for the construction of instrumentation used in sugar industry as well as its testing and evaluation.
- Development of production technology of new types of sugar.
- Research and evaluation of the suitability of chemical reagents for the needs of the sugar industry with regard to their effectiveness, optimal dose and application methods.
- Research, evaluation and selection of auxiliary materials applied in the sugar production, such as: filter fabrics and non-wovens, limestone, coal etc.
- Development of methods for reducing secondary microbial contamination of sugar with particular emphasis on air quality and sanitary conditions of production facilities.
- Development of effective methods of managing waste from the sugar industry in the field of green energy production and replacing mineral fertilization with natural fertilizers.
- Reduction of the consumption of energy carriers in the sugar production processes.
- Development of rational thermo-technological systems of sugar factories.
- Improvement of heat and energy management in sugar factories.

Inter-Department Group for Dairy

Research activities:

- Quality assessment of milk and dairy products.
- Microbial fermentation for dairy.
- Selection of defined starters with specific phenotypes .
- Development of higher value-added dairy products with bioactive compounds.
- Application of molecular approaches to investigate microbial-related quality defects in dairy products.
- Development of technologies for innovative dairy products with functional properties.
- Advising on fortification of milk and milk products with health-promoting ingredients.
- Advising on the selection of starter cultures for the production of cultured dairy products.
- Advising on the development of new products with the addition of probiotic cultures and prebiotics.
- Development of modern technological solutions and implementation of new technologies in the dairy industry.

Training and cooperation activities:

- Customized science-based trainings in the field of milk and dairy products technology.
- Cooperation with industry in the field of research and implementation of modern technical and technological solutions.
- Cooperation with universities with regard to diploma theses in the fields of food technology and human nutrition and food safety.
- Consulting in the field of milk and dairy products safety, shelf life, texture, flavour and technology aspects.
- Preparation of expert opinions on milk and milk products.

Innovative High Pressure Process to Increase the Preservation of Ready-to-eat Organic FOOD (HO-FOOD)

The HO-FOOD project was realized within ERA-NET SUSFOOD2 in cooperation with: the University of Padova (UNIPD, Italy), Research Center for Olive Citrus and Tree Fruit (CREA, Italy), Université Ahmed Benbella Oran 1 (UNIO1, Algeria), Ataturk Central Horticultural Research Institute (TAGEM, Turkey).

The overall goal of the project was to foster the whole fresh vegetable food chain via the development of a new food pasteurization technique, based on the use of high-pressure CO_2 at low temperature, efficient to inactivate microorganisms and enzymes present on the surface which are responsible for food spoilage.

By using low temperature (< 45°C), sensorial and chemical properties are preserved, resulting in healthy and palatable food with preserved phytochemical components of organic foods. The beneficial impacts of the new technique are reflected in safety, shelf-life duration, nutritional value, sensorial profile and the potential to improve business and environmental sustainability. Small and medium equipment were designed, set up and validated for the use by local organic farms, SMEs and retailers to develop innovative wholesome products, reduce food waste, energy costs and support the development of sustainable supply chains.

WHEATBIOME – Unravelling the Potential of the Wheat Microbiome for the Development of Healthier, More Sustainable and Resilient Wheat-derived Food & Feed Products.

WHEATBIOME project is realized within Horizon Europe programme and aims to promote healthy & sustainable food systems by protecting the soil, crops and the plant-based feed and food via microorganisms. The Consortium consists of 13 partners based in Portugal, the Netherlands, Spain, Poland, Hungary and Lithuania.

WHEATBIOME

WHEATBIOME follows a translational, multidisciplinary and multi-actor approach to achieve a greener and healthier Europe, including cooperation between the private sector, academia and the government.

Key expected results:

- Increasing the knowledge on microbial communities related to wheat farming and delivering best agricultural practices to boost sustainable farming procedures as well as restoring soils and ecosystems' biodiversity.
- Determining the best performing microbial communities/species to generate enriched and more resilient wheat crops and delivering novel sustainable and healthy wheat-based microbial-derived feed and food products.
- Characterizing the nutritious and healthy properties of wheat crops and derived products, ensuring their sustainability and safety for animal and human use. Reducing food waste by promoting recircularization of wheat discards/by-products in food and feed lines.
- Identifying the needs of the food system actors regarding microorganisms for their adherence to environmental and economic-balanced agronomic practices.
- Delivering a digital decision support tool for wheat farming.

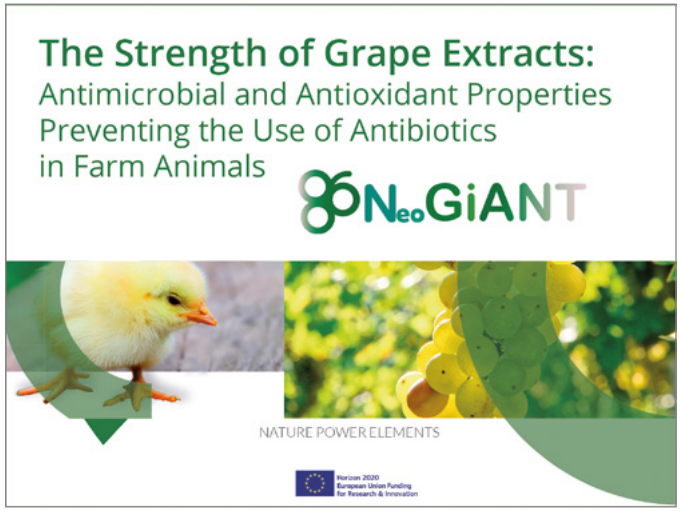
IS_MIRRI21 Implementation And Sustainability Of Microbial Resource Research Infrastructure For The 21st Century

IS_MIRRI21 is a Horizon 2020 project that supports research, development and innovation in the use and preservation of microbial life for the purpose of basic and applied scientific research through the implementation of the Microbial Resource Research Infrastructure (MIRRI) and securing its long-term sustainability.

The project is implemented by the consortium of 14 Partners from 10 European countries as well as the European Strategy Forum on Research Infrastructures (ESFRI). The consortium aims to integrate existing public collections of microorganism cultures. The tasks include the creation of pan-European research infrastructure, harmonization and standardization of procedures used in culture collections and creating a codified offer targeted at scientific communities and industrial clients. IS_MIRRI21 will implement and sustain the collection, preservation, study and exploitation of microorganisms through microbial collection infrastructures attained in the preparatory phase of MIRRI.

The Strength of Grape Extracts: Antimicrobial and Antioxidant Properties Preventing the Use of Antibiotics in Farm Animals (NeoGiANT)

The NeoGiANT project was realized within the Horizon 2020 programme presenting a sustainable extraction process on a pre-implementation scale, to enable the extraction of polyphenolic compounds from pomace biomass, from white grapes, in order to produce natural, high-value products with antimicrobial and antioxidant properties. The project was carried out in cooperation with key players, who are involved in its implementation. The new products are the response to the demands for more affordable, natural, functional products from alternative sources.



The key objectives of the NeoGiANT project were to develop and test the functionality of the project products, taking into account animal health, reduction of the negative impact on the environment and the inclusion of products into the circular economy.

The NeoGiANT deliverables such as enriched feed, medical drugs for animals and sperm preservatives, will not only prevent the development of undesirable microorganisms, but will also improve animal health and welfare, increasing the profitability of breeding.

AGROBIOTECH
SZKOŁA DOKTORSKA

The AgroBioTech Doctoral School was established upon the initiative of three Polish research Institutes: The Institute of Agricultural and Food Biotechnology, the Institute of Plant Breeding and Acclimatization and the Institute of Horticulture.

The Institute of Agricultural and Food Biotechnology is the coordinating institution of the AgroBioTech Doctoral School.

Doctoral students can pursue their dissertations in the field of agricultural sciences in 2 optional disciplines: food and nutrition technology as well as agriculture and horticulture.

PROF. WACLAW DABROWSKI
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AND FOOD BIOTECHNOLOGY
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International Cooperation

The management of the Institute of Agricultural and Food Biotechnology puts strong emphasis on the international cooperation within the field of the scientific research. On the one hand, placing great weight on the collaboration with foreign partners and stakeholders reflects the Institute's strategy to achieve the position of one of the best research institutes in Europe in its field of expertise, but on the other hand contributes to the foreign policy of the Polish government and the overall enhancement of the scientific competitiveness of the European Union.

The management as well as the scientific and academic staff of the Institute have always recognized the importance and high potential of effective international cooperation within the field of scientific research, which keeps the reasonable balance between the bottom-up and top-down approach. Well-coordinated science diplomacy and building of efficient soft power are means to increase the Institute's share in the scientific and R&D projects carried out in Europe and overseas, constituting an important aspect of the foreign policy of the national government.

Globalization of the industry and scientific research market requires collaboration among specialists from all over the world. The advancement of information technologies, knowledge-based management as well as the continuously increasing number of international projects make it necessary for all academic, R&D and industrial entities to join forces and conduct research in the area of all global competencies, in order to meet the needs of particular countries and organizations.

The Institute of Agricultural and Food Biotechnology is involved in long-term academic and research partnerships with R&D institutions from Europe and Asia. Our international partners include research centers and universities from eg.: China, Ukraine, Spain, Italy, Portugal, Germany, Hungary, Romania, Tunisia and many others.

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The Institute of Agricultural and Food Biotechnology is also a member of various international scientific and technology organizations and is involved in joint multidisciplinary research projects as well as national cross-sectoral missions in order to make the Polish biotechnology R&D sector more visible on the global market. The Institute of Agricultural and Food Biotechnology is a partner in the EU-FORA projects coordinated by the European Food Safety Authority (EFSA).

The Institute is also an associate member of the Bio-based Industries Consortium **(BIC)**.

Our scientific and research staff are actively involved in the Central-Eastern European Initiative for Knowledge-based Agriculture, Aquaculture and Forestry in the Bioeconomy **(BIOEAST)** and are members of the BIOEAST Thematic Working Groups.

The Institute is also a member of other international organizations, such as:

- Microbial Resource Research Infrastructure European Consortium MIRRI
- World Federation of Culture Collections WFCC
- World Data Centre for Microorganisms WDCM
- European Culture Collections'Organisation ECCO
- World Intellectual Property Organization WIPO
- Grain and Feed Trade Association GAFTA
- French National Research Institute for Agriculture, Food and Environment INRAE
- European Committee For Standarization CEN
- European Flour Millers Association EFMA


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