

# INNOVATION POTENTIAL OF THE AGROBIOTECH RESEARCH CENTRE



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## Biotechnics and Landscape Modelling

- Laboratory of Modelling of Urban Environment and Landscape
- Laboratory of Beverages "A"



Research activities of the Department of Biotechnics and Landscape Modelling correspond with concept of the Healthy landscape. The long term goal is to promote awareness of environmental quality in the settlements, the development of sound management of the country and the effective use of biological value of horticultural crops. The research is the stabilization of urban ecosystem, landscape structures and landscape elements, as well as innovative technologies supporting the content of health beneficial substances in fruit, vegetables and grapes.

## Food Technology and Biotechnology

- Laboratory of Cereals Technologies
- Sensory Laboratory
- Laboratory of Fats and Oil
- Experimental Brewery
- Laboratory of Beverages "B"
- Laboratory of Animal Origin Food
- Laboratory for Biologically Valuable Substances Analysis
- Laboratory of Animal Biotechnology
- Laboratory of Plant Biotechnology
- Laboratory of Experimental Biology
- Laboratory of Experimental Microbiology



Department of Food Technology and Biotechnology is divided into 11 laboratories in which the research activities are focused on current experimental food processing technologies with emphasis on their effectiveness, utilization of raw materials and ecological approach. The individual laboratories are specialized in analyses of primary and secondary metabolites; analyses of less-known plant species; oil production using novel extraction technologies; evaluation of barley and malt quality to determine high quality malt cultivars; analyses of embryos and embryonic stem cells; identification, differentiation and characterization of cereals, pseudocereals and legumes using molecular and protein markers etc.

## Integral Laboratories

- Laboratory of Spectroscopic Analysis
- Laboratory of Genetic Analysis
- Laboratory of Microscopic Analysis

### The main research activities of integral laboratories:

- identification of point mutations associated with functional characteristics of plants and animals;
- genotyping of different microorganism species;
- study of cell processes causing increased production of antioxidants against oxidative stress;
- assessment of the impact of particular factors on cell processes;
- isolation and purification of DNA and RNA for the use in gene chip technology and sequencing;
- preparation of gene libraries for sequencing;
- manipulation with embryos and sperm of livestock (freezing - cryopreservation, genetic modifications);
- embryotechnologies focusing on assessment of embryos and sperm quality;
- isolation and utilization of embryonic and somatic stem cells in agricultural and biomedicine, one of the most perspective area in animal biotechnologies.



## Transfer Centre

Along with the creation of the ABT RC, also the specialised workplaces titled Transfer Centre was established. It offers a space for creating closer linkages among universities, research and economic practice. Main task of the ABT RC is to promote the transfer of knowledge, technologies and innovations from research and development area into commercial sector and to evaluate and actively use the results in practice. Transfer Centre is also aimed at cooperation with small and medium enterprises; popularisation of the results of science and research; protection of intellectual property; demand-driven research and expertise and, of course, international cooperation. ABT RC also created a platform for cooperation of foreign experts with Slovak scientists. This is the place where experts from both partner and cooperating institutions can implement their projects and researches.



The AgroBioTech Research Centre (ABT RC) of the Slovak University of Agriculture in Nitra is a university-wide specialized facility, which performs innovative research in the fields of agrobiolgy, the processing technology of agricultural products and agrifood industry, biotechnology, genetic technologies, agroecology, bioenergetics and bioeconomy. The research is aimed at conducting new methods and procedures, especially within applied research, with transferring the results into practice via Transfer Centre (TC ABT RC).

## APPLIED RESEARCH

The ABT RC is equipped with state of the art research infrastructure, thereby enabling to conduct the research at the highest level, and consistent with the core needs of abovementioned priorities. The role of the ABT RC is to carry out research with a direct impact on social practices, in order to create innovation, develop modern technologies and consulting services for the implementation of results into practice.



## Agrobiolgy

- Laboratory of Production Physiology and Plant Ecophysiology
- Laboratory of Plant Nutrition and Ionomics
- Laboratory of Human Nutrition
- Laboratory of Explant Cultures
- Laboratory of Special Seed Production Techniques
- Laboratory of Agrobiodiversity and Genetic Technologies
- Laboratory of Experimental Botany



Laboratories are oriented on basic and applied research of plant food sources and were created to provide a complete equipment cascade allowing that type of research. Their infrastructure allows detailed botanical, physiological and genetic characteristics of plants in the relation to their production characteristics, as well as to the quality of the products for which they are planted. Specialized laboratory of human nutrition is focused on the analysis of the interaction of the human body and the food. Other laboratories provide the physiological analysis, the analysis of mineral elements in the soil, plants, water and other environments and materials, genomic and transcriptomic analysis.

## Applied Ecology and Bioenergy

- Laboratory of Applied Ecology
- Laboratory of Biomass Gasification

The competence and professional activities of the Department of Applied Ecology and Bioenergy include know-how in the field of technology of cultivation of energy crops and herbs developed on the basis of ecophysiological characteristics and the ability to carry out production potential in specific soil and environmental growing conditions, integrating the results from different researchers and the design of models for the woodworking and energy industry, based on quantitative experimental data, a wide range of applied research in the field of biofuels research and energy use of biomass waste from agriculture and food production, as well as municipalities.



## Bioeconomy

- Laboratory of Economic Studies
- Laboratory of Neuroeconomy and Consumer Decision-Making

Professional activities of the Department of Bioeconomy and its specialized laboratories are as follows:

- analysis of prices, production, consumption and trade of energy crops;
- analysis of agricultural and energy policies;
- business plan and analysis (costs, revenues, return on investment, market position, market trends, competition, environmental impact and innovation);
- popularization of energy issues and mapping of public opinion;
- cost benefit analysis of bioenergy production in conjunction with environmental impact assessment;
- analysis of return on investment in bioenergy production;
- econometric modelling of agricultural markets and the effects of agricultural policies.



## Biosystems Engineering

- Laboratory of Analysis of Biomass for Bioenergy
- Laboratory of Bioenergy Sources
- Laboratory of Innovative Technologies for Crop Production
- Laboratory of Raw Materials and Foodstuffs Physical Properties

Department of Biosystems Engineering deals with wide spectrum of research areas. Among all, following research topics may be mentioned: possibilities to utilise crop biomass for pellets and brickets production; assessment of quality parameters of input material used for solid bio fuels production; assessment of technological parameters of solid bio fuels which are based on biomass; assessment of physical and mechanical properties of obtained products; design of production lines for soil bio fuels production. Laboratory of innovative technologies in crop production is aimed at precision farming technologies. Laboratory of physical properties of materials and food products is aimed at: measuring the effect of heat stress during the drying process on macro/micro damage of grain; research of material heat behaviour; effect of temperature on physical properties as well as research of reologic and strength properties of materials.



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