



BIOECONOMY at CRI

CROP RESEARCH INSTITUTE (CRI)

Research Station Chomutov, Černovická 4987, 430 01 Chomutov
„Technologies for Sustainable Agriculture and Landscape Restoration“ (TESALAR)

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A. MISSION

The Bioeconomy at TESALAR vision, is a research area oriented to the use of biological resources from land and organic wastes, as inputs for the production of raw materials, energy carriers and other goods and services. TESALAR is research group to become the leading regional centre for the development of knowledge within the field of bioeconomy in the North Bohemia.

The goal of the research station is to contribute to raw material security for technical use, sustainable resource management, innovation and value creation through research and knowledge production within agriculture, agroforestry and other biobased industries. TESALAR offers research, managerial support and knowledge for use in regional and national preparedness, as well as for businesses and the society at large.



C. BIORESOURCES AND RECYCLING TECHNOLOGIES

- Anaerobic Technologies:** providing of process studies, process optimisation and technology development of biogas production including the assessment of various feedstocks and organic waste-streams, pre-treatment and potential studies, and post-treatment of liquid digestates from the biogas process.
- Aerobic Technologies:** providing of process studies, process optimisation and technology development of composting for improved biofertiliser production.
- Microbial and Algae Biotechnologies:** providing of process studies, process optimisation and technology development of different microbial and algae applications in the production of special raw materials, and for utilisation and concentration of nutrients.
- Waste Processing Technologies:** application and evaluation of pre- and post-treatment of waste streams, creation of new products from waste for different purposes.
- Organic waste products as fertiliser/soil improver:** methods and product development for utilising nutrients and stable organic materials as fertiliser and soil improvement.
- Evaluation of environmental and climate impacts:** evaluation of the environmental effects, climatic effects and hygiene from organic waste treatment.
- Environmental monitoring:** environmental monitoring of waste treatment facilities, composting and BGP, odour statistics, leachate treatment, waste management.

The majority of the department is localised at the Research Station of Chomutov in North Bohemia, which is well equipped with a variety of AD reactors, AE reactors and a multitude of relevant analytical instruments. The department also has activity at Prague and is available for projects throughout the Czech Republic.

1st APPLIED RESEARCH AREA

UTILIZATION OF BIO-WASTE FROM AGRICULTURE AND INDUSTRY AS FEEDSTOCK FOR NEW TECHNOLOGIES AND PRODUCTS ACCORDING TO THE PRINCIPLES OF CIRCULAR ECONOMY

Utilisation of bio-waste from agriculture and industry as input raw materials for new technologies and products with higher added value according to the principles of circular economy and bioeconomy, especially applicable in sustainable agriculture. The aim is to research, develop and innovate technologies for the conversion of bio-waste from agriculture and industry as feedstock into new products with higher added value according to the principles of circular economy, mainly applicable in agriculture. This is followed by addressing the safe use of treated bio-waste as an alternative source of organic matter and nutrients on agricultural and especially anthropogenic soils, by determining the impact and assessing the risks of using new products based on bio-waste conversion, especially fertilisers and reclamation substrates for soil improvement, landscape restoration and the promotion of sustainable agricultural development, including their ecological and economic evaluation. The uniqueness of the team's approach to addressing this issue lies mainly in the application of combined and multi-stage bio-waste treatment methods using thermal, hydrothermal, chemical, catalytic and biological processes to ensure environmentally viable and economically acceptable production of useful products with higher added value.



B. WORK DESCRIPTION

Research and development of agro-biotechnologies for production, complex processing and multi-purpose material and energy use of agricultural biomass and biodegradable waste as renewable sources of raw materials and energy for the needs of sustainable agricultural development, soil improvement and landscape revitalization.



2nd APPLIED RESEARCH AREA

CROPS, CULTIVATION SYSTEMS AND TECHNOLOGIES FOR SUSTAINABLE PRODUCTION AND SUBSEQUENT USE OF RENEWABLE, RECYCLABLE AND DEGRADABLE BIOMATERIALS

Crops, cultivation systems and technologies for the sustainable production and downstream use of renewable, recyclable biomaterials. The activity will address the selection of suitable non-food crops and downstream systems and technologies for their cultivation and processing applicable to industrial production and agriculture.

This involves the selection and validation of suitable non-food and multipurpose crops, including non-traditional crops and newly developed varieties with greater adaptability to climate change. The crops are followed by the development and validation of innovative systems and technologies for their cultivation, harvesting and processing into renewable, recyclable and degradable biomaterials applicable in industrial production and agriculture according to the principles of sustainable development and bioeconomy. The main object of research and source of unique knowledge are long-term field trials of the team in different soil and climatic conditions of the Czech Republic (mainly Chomutov, Prague and Lukavec) used for verification of selected non-food crops. Important is the determination of the influence of non-traditional crops and corresponding cultivation technologies on the composition and activity of soil microorganisms, the balance and quality of soil organic matter, soil properties and fertility.



3rd APPLIED RESEARCH AREA

SUSTAINABLE PRODUCTION AND CONVERSION OF BIOMASS FOR BIOENERGY AND OTHER INDUSTRIAL PURPOSES

Research, development and innovation of technologies for sustainable production and conversion of biomass for bioenergy and other industrial purposes according to the principles of circular economy and bioeconomy.

The objective is research, development and innovation of technologies for sustainable production and conversion of biomass for bioenergy and other (paper, construction, etc.) industrial purposes according to the principles of bioeconomy and circular economy. The uniqueness of the team's approach to solving this problem lies mainly in the application of combined and multi-stage methods of biomass conversion using hydrothermal-pressure, chemical-catalytic and biological processes to ensure an environmentally viable and economically acceptable production of a series of useful products (mainly biofertilizers and biofuels) with an overall higher added value. More complex technologies for the production of liquid and gaseous biofuels, with the simultaneous production of biofertilisers or biochar preparations for soil improvement, etc. to ensure the return of organic matter and carbon compounds to the soil, will be favoured over simple biomass burning or solid biofuel production.

