

LABORATORY OF BIOTECHNOLOGICAL PREPARATION OF BIOPRODUCTS ENRICHED WITH BIOLOGICALLY ACTIVE COMPOUNDS AND ENZYMES

Description of main activities:

The research is focused on study and regulation of microbial production of biologically active lipophilic compounds (polyunsaturated fatty acids, carotenoid pigments, squalene, mycosterols, coenzyme Q10, fungal fibers, glycoproteins, etc.) as well as enzymes (amylases, lipases, xylanases etc.) by solid state and submerged fermentations and applications of these bioproducts in biomedicine, pharmaceutical and food/feed fields. Bio-engineering parameters for bioproducts preparation are optimized and regulated using semi-scale fermentation tank (it is unique in the Europe) with the aim to scale-up results from laboratory to industrial scale and to provide know-how for such biotechnological processes. An important part of the work also deals with gene engineering, characterization of the key gene coding biosynthesis of biologically active compounds and their functional expression in microorganisms and plants. The work links classical biotechnology and agrobiotechnology as well as microbial and plant genomic and metabolomic with the aim to improve nutritional properties of

agro-sources into high-valued bioproducts. The whole laboratory outputs create a unique part of the research aimed on biotechnological production of biologically active metabolites, where highly producing microorganisms are not only excellent study models and "cell factories", but also as useful donors of genes for production of "tailor-made" microorganisms and plants with new properties. The team of Assoc. Prof. Čertík is internationally respected and actively collaborates with several national and world-known universities, institutions and industrial partners.

Equipment available:

Biotechnological laboratories are equipped with a semi-scale fermentation tank BL-BIO-3055 as the only one in the Europe and with standard techniques used for submerged fermentations (shakers, fermenters) as well. Separation and purification methods of product/s after fermentations are determined by properties of isolated microbial metabolite/s (filtration and extraction instruments, centrifuges, rotation vacuum evaporator, freeze-dryer). The research group is equipped with modern instruments

for structural analysis of natural compounds based on chromatographic methods such as GC with FID and MS detectors and autosampler (Agilent Technologies), HPLC with DAD and RI detectors and autosampler (Agilent Technologies), TLC with autosampler (Camag automatic TLC sampler 4), and different elution chambers with following visualization and quantification using densitometry detector (CAMAG TLC Scanner 4, with range of 190 – 900 nm). UV/Vis measurements is carried out using NanoPhotometer™ IMPLLEN. Experimental laboratories for gene engineering are certified for GMO and are equipped with laminar and incubation boxes, PCR with temperature gradient, centrifuges and deep freezer.

CONTACT

**Faculty of Chemical and Food Technology
STU in Bratislava**

Radlinského 9
812 37 Bratislava 1
Slovak Republic

Assoc. Prof. Ing. Milan Čertík, PhD.
milan.certik@stuba.sk



Prefermented bioproducts enriched with polyunsaturated fatty acids and pigments prepared by fungal solid state fermentation and their application for preparation of functional cereal-based products



Highly oleaginous and pigment forming microbial strains prepared by gene engineering



Transgene cereals containing polyunsaturated fatty acids prepared by functional expression of fungal fatty acid desaturase genes (collaboration with Plant Production Research Centre in Piešťany)



Microbiological and cultivation laboratory