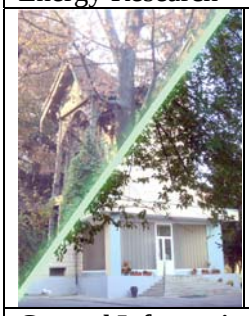
Institute of Food Biotechnology and Genomics, National Academy of Sciences of Ukraine

Technical Area Keywords: Biotechnologies, Agricultural Sciences and Medicine; Environmental and Non-Nuclear Energy Research



General Information

The Institute was organised in July of 2008 on the basis of former Institute of Food Chemistry and Technology and part of Institute of Cell Biology and Genetic Engineering. Staff of the Institute include 2 Full Members of the National Academy of Sciences of Ukraine, 4 doctor-of-science degree scientists (Habilitation Dosctors), 21 researchers with Ph.D. and other highly educated and experienced engineers and technicians. The Institute is comprised of the following core divisions:

- Department of Genomics and Biotechnology with Laboratory of Cell Biology and Biotechnology, Laboratory of Structural Biology and Bioinformatics and Laboratory of Detection of GMOs and Biosafety;
- Department of Biotechnology of Microorganisms;
- Department of Biotechnologies for Novel Food Products and Additives;
- Department of Biotechnology of Biofuels.

Institute's Focus

- Study of molecular and cellular mechanisms of main plant functions on the basis of structural and functional genomics and bioinformatics, structural biology and molecular genetics;
- Development of new biotechnologies and nanobiotechnologies for plants and prokaryotes;
- Development of resource saving technologies of agricultural raw materials processing and new food stuff and biofuel from biomass;
- Development of biotechnologies of food stuff production, its constitutive and biologically active compounds, molecular genetic and biochemical methods of phytosanitary, medical biological control of food stuff, food additives, feeds and scientific basis of biosafety.

Valuable Technology Offerings

Cell and genetic engineering. Efforts in the field of plant genetic engineering are targeted at the development of plant molecular biotechnology, namely:

- ***Agrobacterium***-mediated and biolistic genetic tranformation of plants;
- producing of transgenic plants with the traits of interest (resistance to herbicides and pests; producing of phstmaceutical proteins, etc.).

Research of the Institute resulted in development of transgenic plants of a number of agricultural species (sugar beet, potato, rape, cabbage, soybean, flax, finger millet) for further breeding.

Cell biology and structural bioinformatics. Other research area is the study of the structure and functions of cytoskeletal proteins with the aim of elaboration of biotechnological approaches for improvement of plant resistance to stress biotic and abiotic factors. As a result of these efforts, plant mutants have been created and the genes of microtubule proteins (tubulin) responsible for the resistance to herbicides and fungicides have been isolated and used for production of cell lines resistant to these substances. For the first time, such tubulin post-translational modifications as phosphorylation, polyglutamylation and acetylation have been identified. The Institute utilises the most modern methods of bioinformatics to identify new microtubule proteins and tyrosine kinases of plant origin. The Institutes has developed new biological approaches to create three-dimensional models of plant tubulin. These models are used for investigation of peculiarities of interaction of antimicrotubular compounds with different biological activities (herbicides, fungicides, antiprotozoan and anticancer activities) for new drug design.

Biosafety and GMO testing. Methods of quantitative and qualitative detection of genetically modified components in seeds, feed and food have been elaborated and are being introduced.

Industrial Microbiology. The technologies for production of irreplaceable amino acids (lysine, leucine and isoleucine) in crystal form by microbiologic method were developed.

Biofuel. The Institute is core organisation for R&D Program of Natl. Acadrmy of Sci. «Biofuels».

The Institute has established a Centre of specialized equipment for plant molecular biology, genomics and biotechnology. The specialised research facilities include synthesizer of nucleic acids, sequencer, real time PCR, confocal microscope, PALM unit, etc. This equipment is available for scientists from other research organizations. The Institute has also an educational department "Cell Biology and Genetic Engineering" for the students of the Biological faculty of Kiev University.

The following technologies are proposed for commercialization and collaborative production:

- techniques of plant somatic hybridization and genetic transformation of different crops;
- new gene marker systems for selection of transgenic cell lines;
- chemical design and screening of new antimicrotubule substances with herbicide or fungicide activity;
- PCR based techniques of qualitative and quantitative detection of genetically modified components in plant raw material and food products;
- The technologies for production of new food products: soybean milk, concentrated soybean milk, soybean cheese, protein soybean paste, soybean yogurt, soybean nuts;
- Experimental unit was developed for producing of carbon dioxide extracts of hops, belladonna, chamomile and other plants.

Scientific Cooperation and Technology Transfer

The Institute has cooperative relationships with a number of different institutions worldwide (Europe, North America and FSU) as well as some biotech companies. Technological transfer is . and abroad (e.g., National Institute of Hygiene, Poland), but its international ties are far from being extensive.
Working with some Ukrainian private companies.

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