QUESTIONNAIRE

(*) – mandatory fields

	Details about organization
* **Organization name**	Closed Joint-Stock Company "Institute of Biotechnology"
Organisation acronym	Institute of Biotechnology
* **Organization Activity** Type (**RES** - Research, **HE** - University, **SME** - Small and Medium Enterprise, **IND** - Industry, **OTH** - Other)	**RES**
* **Keywords of main research areas**	Genetics, asymmetric synthesis, microbiological synthesis, nonprotein amino acids, L- and D- amino acids, strain-producers, enzymes, biofertilizers
* **Head of organization (first name, family name)**	Ashot Saghiyan
* **Post code**	0056
* **Country**	Republic of Armenia
* **City**	Yerevan
* **Street, House**	14 Gyurjyan St.
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* **Description of organization and its research achievements for the last five years (~ 5000 signs)**

CJSC Scientific Research Institute of Biotechnology, Ministry of Economy of RA, was founded in 1971 within the frame of the governmental program of the USSR as a branch of VNII Genetika. Later the Institute became the Head organization of All-Union Ministry of Medical and Microbiological Industry aimed at producing high-purity amino acids for medicine and food industry.

Currently the Institute is the leading biotechnological research centre in Armenia. The main scientific directions are:

- genetics, gene-engineering & selection of microorganisms
- microbiological synthesis of biologically active compounds
- chemical & biomimetical synthesis of biologically active substances
- biocatalysis & enzymatic synthesis
- extraction of biologically active substances from natural raw material
- biodiversity & environment protection
- agricultural biotechnology.

Within the scope of the Institute activity the strain-producers of L-amino acids, particularly the high-yield L-proline, L-arginine, L-valine, L-alanine and L-ornithine strains have been obtained by genetic-selective and gene-engineering methods.

Technologies of L-amino acids production based on microbiological synthesis, biotrasformation and enzymatic hydrolysis have been developed. Effective methods for the asymmetric synthesis of nonprotein α-amino acids, the synthesis of peptides and other nonprotein α-amino acids-based enzymatic products were also developed.

Production technologies of D-amino acids: D-alanine, D-aspartic acid, D-proline, D-methionine, D-leucine were worked out.

More than 100 certificates of authorship and patents of the USSR, USA, Japan, France, United Kingdom and Republic of Armenia were registered by the Institute researchers. The results and achievements are represented in hundreds of publications in the International and local scientific journals and conference proceedings.

Nowadays the Institute expands the fields of its activity and carries out researches in the following directions:

- Construction of new hyper producers of L-amino acids and improvement of the available strains;
- Obtaining and improvement of strain-producers of enzymes;
- Small-scale production of non-protein L- and D-amino acids;
- Development of microbiological technologies of new insecticides, plant growth stimulators and biofertilizers production;

Scientific production of the Institute includes:

- Strain-producers of L-proline, L-arginine, L-valine, L-alanine, L-ornithine and L-histidine. Production technologies;
- Microbiological and enzymatic production of D-amino acids (D-alanine, D-aspartic acid, D-proline, D-methionine and D-leucine);
- Small-scale universal production technologies of nonprotein L- and D-amino acids;
- Technologies for enzymatic preparations production;
- Biopreparations for agriculture: new insecticides, plant growth stimulators, biofertilizers and antibacterial preparations for veterinary.

	Contact Information
* **Contact person (first name, family name)**	Gayane Avetisova

* **Department / Laboratory**	Laboratory of Genetics and Selection of Strain-Producers of Biologically Active Substances (BAS)
* **Position**	Leading Researcher, Secretary of Board of Scientists
* **Qualification and research experience**	PhD in Biology, 22-year research experience
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International co-operation / Participation in EU RTD programmes or other bilateral / multilateral actions

INTAS, TACIS, TEMPUS, COST, EUREKA, other RTD programmes (please specify programme/s, project title/s and year/s

- **INTAS** ***Synthesis of new chiral auxiliaries for the asymmetric synthesis of amino acids*** **(1996)**
- **INCO-Copernicus # IC15-CT96-0722** ***Development of new asymmetric catalysts for chemical manufacturing*** **(1997-1998)**
- **ISTC**
  - **A-356** ***New Chiral Auxiliaries and Catalysts for the Asymmetric Synthesis of None-proteinogenic Alfa-Amino Acids*** **(2000-2003)** (jointly with the Yerevan State University)
  - **A-683** ***Investigation of a New Type of Water Soluble Natural Biologically Active Melanin: Development of the Technology for Biosynthesis: Extraction and Purification; Study of the Chemical Structure, Physiological Activity*** **(2002-2005)**
  - **A-794** ***Investigation of Genes and Enzymes Involved in Pyruvate Metabolism in Coryneform Bacteria. Approaches to the Improvement of Amino Acid Strain Producers by Recombinant DNA Technology*** **(2003)**
  - **# 2780** ***Development of Novel Methods for the Synthesis of Enantiomerically Pure Fluorinated Amino Acids Labeled with Fluorine-18, Radiotracers for Positron Emission Tomography (PET)*** **(2004-2007)** (jointly with the Yerevan State University)
  - **A-1247** ***Synthesis and screening of Non-proteinogenic Amino Acids and Peptides as potential constituents of radio modifying and pharmacological agents (2005-2008)***
  - **# CI–073** ***Small-Scale Production Line for Optically Active Non-protein α-Amino Acids in the Institute of Biotechnology (RA)*** **(2007-2008)**
- **CRDF**
  - **AB2-2301-YE-02** ***Synthesis and Anticholinesterase Activity of Some Amides and Esters of N-Acyl-a,b-dehydroamino Acids*** **(2002-2004)**
  - **AAT-4-44229-01** ***Improving the Economics of Biomass-Derived Sugar Production via an Immobilized b-glucosidase Process*** **(2006-2008)**
- **Eurasia Foundation**
  - **Y01-6008** ***Creation of branch biotechnological marketing center*** **(2000-2001)**
- **ANSEF**

NS-97 ***New photosensitizers usage against infections of agricultural crops*** **(2003)**
N 04-NS-biotech-815-92 ***Application of new phtosensitizers against root ROT of corn crops*** **(2004)**
N 05-NS-biotech-0831-446 ***Improved Biotransformation Technology for L-Alanine Production*** **(2006)**
N 678-NS-biotech ***A New Antibacterial Preparation Against Infectious Diseases in Birds And Its Application*** **(2007)**
N 839-NS-biotech ***New Porphyrins Usage Against Fungal And Other Diseases Of Tomato And Pepper*** **(2007)**
N 537-NS-biotech ***Improvement Of Citric Acid And Its Salts Production Technologies*** **(2007)**
N 1270-NS-biotech ***Perspectives of the application of bacterial melanin as a new phytostimulator*** **(2008)**

- **NATO PROGRAMME FOR SECURITY THROUGH SCIENCE**
  SfP 982164 ***Study of antimicrobial and hypoallergenic products of lactic acid bacteria*** **(2007-2009)**

	* Please, use "X" to indicate the scientific area/s of your potential project
CHEMISTRY	X
SOCIAL AND HUMAN SCIENCES	
ECONOMIC SCIENCES	
ENGINEERING SCIENCE	
ENVIRONMENT	
AGRICULTURE AND FOOD	X
HEALTH	X
MATHEMATICS	
INFORMATION SCIENCE	
PHYSICS	
NANOTECHNOLOGIES	
ENERGY	
TRANSPORT	
SPACE	

*** Summary of potential research project envisaged hosting of European researcher for the period of between 1 and 2 years**

Development of the new production technology of ecologically safe complex biofertilizer based on nitrogen-fixing microorganisms and modified zeolites

The suggested proposal relates to applied biotechnology and aimed to produce a new, ecologically safe, universal, complex biofertilizer containing a combination of high-active nitrogen-fixing microorganisms and specially modified zeolites.

The role of nitrogen fertilizers is significant, since nitrogen being a part of proteins, nucleic acids, chlorophyll, vitamins and other biologically important compounds, is a vital element. However, their intensive exploitation considerably increases denitrification and biological immobilization of nitrogen resulting in soil and atmosphere pollution, accumulation of nitrates in plants followed by nitrites and at last by carcinogenic nitrosamines that in its turn increases the risk of oncological diseases. One of the ways to solve this problem is in development and manufacturing of biopreparations. Exploration of biofertilizers is an approach conceptually different from the available ones aimed to remediate the damaged soil and intensify its fertility, thus increasing crops and quality of cultures. Bacterial fertilizers are favorably distinguished among mineral fertilizers since with the increased productivity they preserve soil structure, its natural microflora, chemical composition and what is the most important - they are safe.

Nowadays biopreparations based on nitrogen-fixing microorganisms, free-living in soil and in symbiosis with plants, capable to consume molecular nitrogen are obviously preferable as nitrogen fertilizers for plants.

Zeolites, a group of minerals of volcanic origin, widespread on the territory of Armenia, can be also used in soil improvement and fertilization for their efficiency on soil and the growth of plants through the following parameters: cation exchange capacity, porosity and hygroscopicity. In fact, zeolites are natural mineral fertilizers.

Our idea of combining nitrogen-fixing microorganisms and zeolites in one preparation is based on our earlier experimental data on stimulating action of zeolites upon the growth and propagation of *Azotobacteriaceae* family. Zeolites were shown to lead to morpho-physiological changes of the strain, to promote increased culture titer and biomass that testify to their effect upon the metabolic activity of *Azotobacter*. The presence of modified zeolite in this biofertilizer provides soil softness, moisture, and aeration necessary for further growth and proliferation of useful microorganisms.

Production and implementation of the complex biofertilizer will contribute to the national programs in agriculture and environment protection. The new biofertilizer will ensure the efficient soil enrichment with nitrogen and is expected to be one more step in solving an urgent global problem of organic agriculture resulting in ecologically safe foodstuffs.

The goal of the project is commercialization of the obtained results that include development of the technology for the new biopreparation production in laboratory fermentors and pilot-scale facility at the Institute of Biotechnology CJSC followed by industrial production.

The new microbe-zeolite complex biofertilizer offers an advantage of multi-profile and prolonged action and has no analogs.

	Please, confirm your agreement on data publication and dissemination

I agree with the publication of the data on the web-site **http://www.inco-eeca.net**, and **dissemination** among Mobility National Contact Points of the EU MS and AC **(YES / NO)**	**YES**
Date	21.10. 2008