



biomedhim

Created by nature, made by us!

Product catalogue

A close-up, profile view of a middle-aged man with grey hair, wearing a dark grey suit jacket, a white shirt, and a red tie. He is gesturing with his right hand, palm facing up. A small lapel microphone is clipped to his tie. The background is dark. On the left side of the image, there are two large, light grey double arrow symbols pointing left and right, framing the text.

...isolated potentially productive bacteria-oil
degraders, which are the basis of the biological
agent Lenoil-NORD, refers to the most important
achievements of scientists in the field of biology.

*RAS Chief Executive, member of the
Academy of Sciences Fortov V.A.*

● INDUSTRIAL-PURPOSE AGENTS

Biological agents-oil degraders Lenoil™	
«LENOIL»® - NORD, DRY POWDER	8
«LENOIL»® DRY POWDER	9
Biological agents for waste-water treatment	
BAIDOS	10
BIOLOCKS	11
BIOLOCKS ZHIR	12
BIOCOMPOST 21-VK	13
Biological agents for farming	
BISEPTILON ZHIP	14
BIOCOMPOST 21 ZHIP	15
Fertilizers	
BIOLOGICAL FERTILIZRT «AZOLEN	16
BIOFUNGICIDE «ELENA» ZH	17

● Agents for private use 19

Improved soil fertility biological agents for farming	
AZOTIK	20
STIRORA	21
Biological agents for sewage caissons, cesspools and biocompost preparation	
BIOSEPTILON	22
BIOCOMPOST 21	23
Biological agents for private cattle breeding	
BIOCOMPOST 21 ZHIP	24
BIOSEPTILON ZHIP	25

● Advancements and projects 26

About company

«..bacteria alone could support the cycle of substances on our planet, while eukaryotes are not capable of it.»

(Shlegel H.G.)



In 1994, a group of young scientists from the Institute of Biology of the USC RAS under the guidance of a Ph.D, Biology (later a laureate of the RF Government Prize in Science and Technology, Ph.D, Biology, Professor, Deputy Chair for Research of the Ministry of Science and higher education of the Russian Federation UFITs RAS) created an enterprise based on a fusion of academic science and manufacture.

The main tasks have being solved at the enterprise are the study, preservation and implementation in manufacture the following:

1. The phenomena of microbial antagonism and the ability of microorganisms to stimulate the growth and development of plants.

The relevance of research is connected with the interest shown in biological farming all over the world. Obviously, from the point of view conservation agriculture, biological plant protection agents are the only alternative to chemical plant protection ones.

2. Selection of the most effective biotechnological methods for the disposal of oil pollution.

The urgency of this task is due to the huge scale of environmental pollution by oil products. Oil spills occurring during oil production and due to accidents at oil pipelines, are estimated at millions of tons. No less amount of oil refining waste in the form of oil sludge pollutes the earth.

At present, the company, together with the Institute of Biology of the USC RAS, has developed and introduced into production biological agents for agricultural, industrial, environmental and private purposes, which you can find in this catalogue.





**Industrial- purpose
biological agents**

Oil-Degrading Biological Products® TRADE MARK Lenoil™

The development of industrial production in the modern world is accompanied by increasing extraction and consumption of hydrocarbon resources. Existing technologies for oil field development, transportation and storage of crude oil and petroleum products do not eliminate the risk of accidents that may result in significant amounts of hydrocarbons being released into the environment. The most complete, environmentally safe.

LENOIL® NORD
Biological product intended for treatment of oil-contaminated soils, grounds and water surfaces in low positive temperatures of the Far North and Western Siberia. The microorganisms contained in the product are capable of degrading petroleum hydrocarbons in highly mineralized environments over a wide temperature range.



«LENOIL»® DRY POWDER

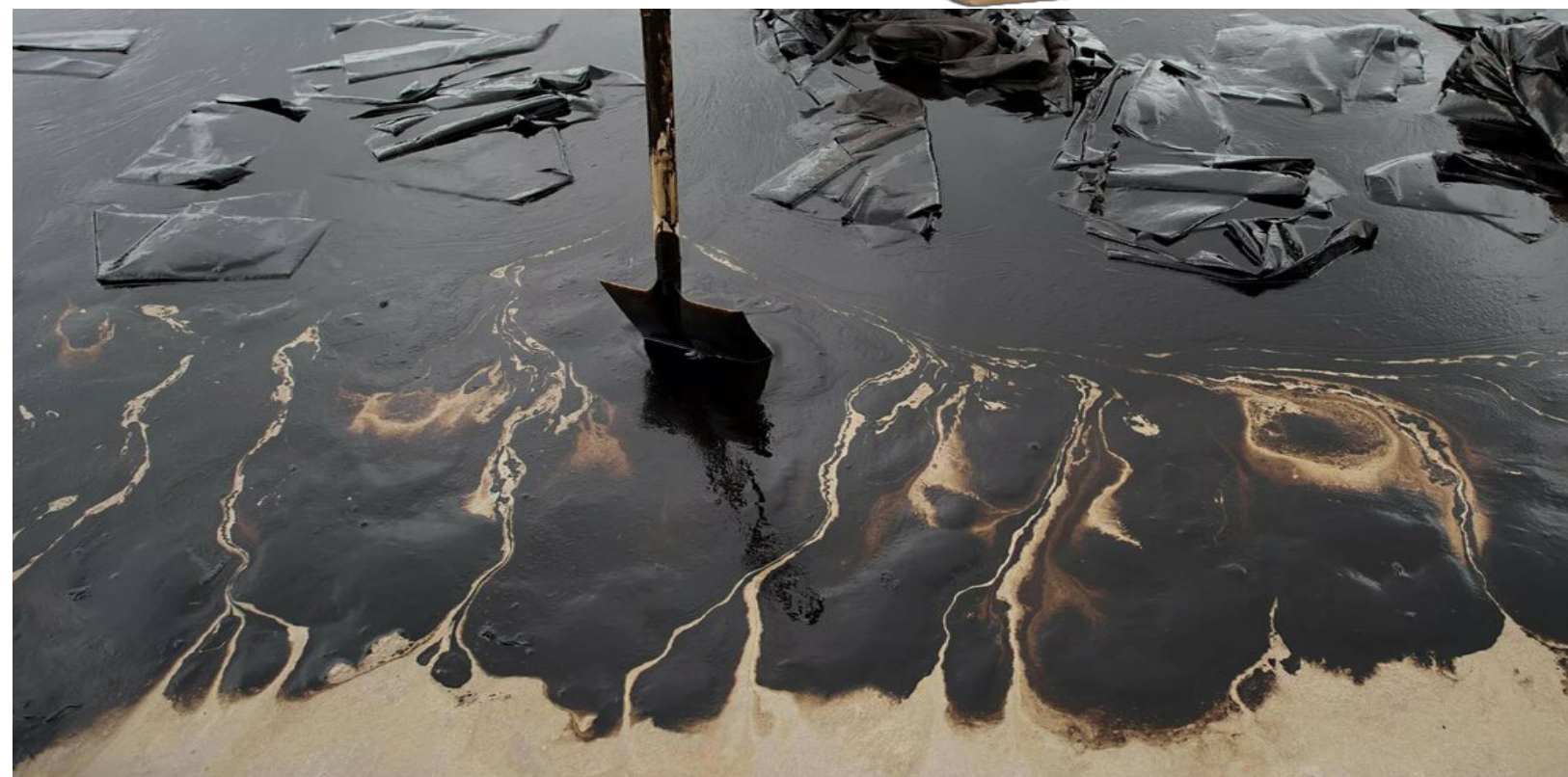
The microorganisms that make up biological products are capable of processing petroleum products (containing both linear and branched, cyclic and (poly) aromatic hydrocarbons) in environments with a high degree of mineralization (over 60 g/l) over a wide temperature range (3-45 °C) and concentrations of pollutants (up to 50%) in environmentally safe compounds (carbon dioxide and water).

A distinctive feature is the ability to fix atmospheric nitrogen and convert it into an easily accessible form, since excess oil and petroleum products affect the carbon ratio: nitrogen is present in the system and this requires an additional nitrogen source for the successful utilization of hydrocarbons.--+

Biological agents-oil degraders Lenoil™

«LENOIL»® – NORD

The composition of the biological product "Lenoil"® – NORD, SHP. They include *Pseudomonas sp.* IB 1.1. The main distinguishing property of which is the ability to decompose oil and petroleum products starting from 0°C.



● Industrial-purpose agents

Biological agents for waste-water

BAIDOS

BIOLOGICAL AGENT BAIDOS IS A MIXTURE OF NATURAL STRAINS OF AEROBIC AND ANAEROBIC MICROORGANISMS-PRODUCERS OF BIOLOGICALLY ACTIVE SUBSTANCES.

THE MICROBIAL COMPOSITION OF THE AGENT IS POSSIBLE TO OXIDATE A WIDE RANGE HARDLY DEGRADABLE ORGANIC COMPOUNDS, INTENSIFY PROCESSES OF NITRIFICATION, DENITRIFICATION, DEPHOSPHATATION, REDUCE COD, DECOMPOSE SURFACTANTS, FATS AND OILS, HYDROCARBONS AND THEIR DERIVATIVES.



The biological preparation «Baidos» is intended for the destruction of hardly decomposable organic substances in household and industrial wastewater with a high content of pollutants. Effectively decomposes surfactants of any type, reduces foaming.

It is used, among other things, for accelerated start-up and reaching the design capacity of treatment facilities, to reduce shock loads on biomass, to restore activated sludge biocenosis after emergency conditions.

For all types of biological treatment systems.

● Промышленного назначения

Biological agents for waste-water

BIOLOCKS

BIOLOCKS IS A COMPOSITION OF STRAINS MICROORGANISMS INTENDED FOR PROCESSING OF HOUSEHOLD WASTE OF PRIVATE HOUSES, HOUSING COMMUNITY, BOARDING HOUSES, HOTELS, SANATORIUMS, CITY BUILDINGS, SCHOOLS, ETC. AND WORKS IN ANY SEWER SYSTEMS.

Recommended for use at the first start of local biological treatment, after a long break in operation, as well as during emergency loads on the system.

The agent ensures the continuous operation of septic tanks of any type and engineering design (overflow, multi-chamber, with aeration, etc.) and local disposal facility in conditions of high surfactant content.



Bacteria and the enzymes produced by them, which are part of the agent, are not pathogenic and toxic for humans, plants and animals, and are biologically safe.

Regular use of the biological agent prevents the formation of fatty growths and deposits in the systems, ensures uninterrupted operation of waste water treatment in conditions of high levels of surfactants, fats and fat-like substances.

● Industrial-purpose agents

Biological agents for waste-water

BIOLOCKS ZHIR

BIOLOCKS ZHIR CLEANS WASTE WATER WITH HIGH CONTENT ANIMAL AND VEGETABLE FATS. THE BIOLOGICAL AGENT EFFECTIVELY REDUCES THE CONCENTRATION OF ORGANIC CONTAMINATION AND ODORS, SURFACE-ACTIVE SUBSTANCES.

RECOMMENDED FOR USE IN SEPTICS AND CASINS, WATER TREATMENTS, GREASE TRAPS, SYSTEMS OF WASTE WATER AND SEWER TREATMENT.



Bacteria and the enzymes produced by them, which are part of the agent, are not pathogenic and toxic for humans, plants and animals, and are biologically safe.

Designed to liquefy and reduce the mass of solid fat waste in grease traps, septic tanks, storage tanks, settling tanks, wastewater treatment from dissolved fats, nitrogen, phosphorus, pathogenic microflora.

Regular use of the biological product prevents the formation of fatty growths and deposits in systems with a high content of fats and fat-like substances.

The composition of the biological agent includes bacterial strains, enzymes and biologically active substances that contribute to the intensification of the processing of wastewater with a high fat content.

In addition to bacteria - fat degraders, the composition of the biological agent includes bacteria that decompose oil and oil products, microorganisms that mineralize phosphorus compounds and participate in the transformations of nitrogen-containing toxicants.



● Industrial-purpose agents

Biological agents for waste-water

BIOCOMPOST 21-VK

BIOCOMPOST 21-VK IS INTENDED FOR THE TREATMENT OF SEWAGE SLUDGE, EXCESS SLUDGE, THEIR MIXTURES AND OTHER WASTE OF PURIFICATION FACILITIES.

In the process of composting microorganisms, enzymes and biologically active substances that are part of the biological agent accelerate the processes of stabilization and mineralization of waste organic substances.

At the same time, the microbial composition of Biocompost 21- VK promotes disinfection and disinfestation of sediments, ensuring the occurrence of biothermal reactions, which result in the suppression of pathogenic microflora, the death of fly larvae and helminth eggs.

Biological agent Biocompost 21- VK intensifies the processing of waste from treatment facilities into organic fertilizer and soil.



The composition of the biological agent includes bacterial strains, enzymes and biologically active substances that contribute to the intensification of the composting process, the elimination of hydrogen sulfide, mercaptans and other foul-smelling compounds odors of wastewater treatment plants.

The bacterial-enzymatic composition of the agent is enriched with producers of proteases, amylases, cellulases, lipases, bacteriocins, etc. which are necessary for the decomposition of proteins, carbohydrates, fats, organic toxicants, as well as for the suppression of pathogenic microflora. Thermophilic and thermotolerant bacteria provide heating of the composted mixture.

The biological agent is a dry powder or liquid from light cream to dark brown color. The biological agent and all its components are completely biodegradable.

● Industrial-purpose agents

Biological agents for farming

BIOSEPTILON ZHIP

BIOSEPTILON ZHIP IS AN AGENT FOR HIGH EFFICIENT PROCESSING OF BIRD MANURE, MANURE AND MANURE GENERATED AS A RESULT OF KEEPING BIRDS, PIGS, CATTLES, GOATS AND SHEEP.



The result of the application of Bioseptilon ZHIP is the localization of an unpleasant odor, the complete decomposition of poultry and livestock waste with the formation of carbon dioxide and an easily soluble sediment, which is an organic fertilizer.

With regular use of the biological agent, the formation of ammonia, hydrogen sulfide and the development of pathogenic microflora is prevented.



● Industrial-purpose agents

Biological agents for farming

BIOCOMPOST 21-ZHIP

BIOLOGICAL AGENT IS BASED ON A COMPLEX OF MICROORGANISMS - «BIOCOMPOST 21» ZHIP AND INTENDED FOR ACCELERATED DECOMPOSITION OF PLANT RESIDUES AND ORGANIC WASTE OF ANIMAL HUSBANDRY AND POULTRY FARMING ON THE BASIS OF A COMPLEX OF MICROORGANISMS.

Accelerated composting with the introduction of microorganisms active strains is the most advanced and cost-effective technology used worldwide for the processing of organic waste from agro-industrial complexes. The quality of the resulting compost is better than with passive composting. Compost does not have pathogenic microflora, weed seeds, helminth larvae and can be used by both farmers and gardeners or for their own needs instead of or together with mineral fertilizers.



Each of the microorganisms groups of biological agent performs certain functions. Thus, proteolytic microorganisms carry out the ammonification of the protein components of the waste.

The presence of oligonitrophilic microorganisms is necessary to complete the process of mineralization of organic residues.

Lactic acid bacteria included in the biological agent are antagonists of most pathogenic microorganisms, including Pseudomonas aeruginosa, the causative agent of salmonellosis, Escherichia coli, etc., which leads to the disinfection of processed organic waste.

The composition of the biological agent includes bacterial strains, enzymes and biologically active substances that contribute to the intensification of the processing of manure, bedding, litter and other animal waste.

● Industrial-purpose agents

Fertilizers

AZOLEN

USAGE OF MICROBIOLOGICAL FERTILIZER WITH FUNGICIDAL GROWTH STIMULATING PROPERTIES AND NITROGEN-FIXING ABILITY ALLOWS TO REDUCE THE AMOUNT OF INTRODUCED NITROGEN FERTILIZERS AND OBTAIN ENVIRONMENTALLY FRIENDLY PRODUCTS.

Your benefits from the use of the biological agent

- Promotes the conversion of atmospheric nitrogen into a form suitable for plant nutrition;
- Significantly reduces the content of harmful nitrates in the soil and the toxic effect of fungicides on plant seedlings;
- Releases biologically active substances into the soil that stimulate the development and growth of plants and increase their resistance to diseases;
- Allows you to grow environmentally friendly products with a high content of protein and other nutrients;
- Promotes the development of the vegetative system (leaf, stem, inflorescence), increases productivity, restores soil fertility.



● Industrial-purpose agents

Fertilizers

ELENA

ENVIRONMENTALLY FRIENDLY ALTERNATIVE TO CHEMICAL FUNGICIDES AND PLANT GROWTH STIMULANTS.

Microorganisms - the basis of this biological product isolated from the soil in ecologically clean areas of the Republic of Bashkortostan.



Your benefits from the use of the biological agent Elena:

- Increasing in productivity up to 50%;
- Accelerating the mature growth of the crop;
- Stimulation of root growth and formation of green mass;
- Increasing the resistance of plants to diseases, drought, frost;
- Improvement of the crop safety;
- Increasing the content of vitamins and nutrients in vegetables and fruits;
- Harmless to people, bees, fish, birds and pets;
- Improvement and restoration of soil fertility;
- Compatibility with other plant protection products;
- Protection against root, stem and fruit infections (powdery mildew, Fusarium and Helminthosporium root rot, mold and fruit rot, brown patch and many others).





**Biological agents
for private use**

Agents for private use

Improved soil fertility biological agents for farming

AZOTIK

Polyfunctional fertility activator Azotik based on *Pseudomonas koreensis* PGPR is recommended for use in agricultural production and private farms as a multifunctional agent that combines fungicidal activity (antifungal metabolites), growth-regulating properties (phytohormones of the cytokinin and auxin series) and nitrogen-fixing ability (atmospheric nitrogen fixation, a significant reduction in the amount of nitrogen fertilizers applied, pure nitrate-free products).

Provides increased seed germination, reduced development of crop diseases, improved indicators of the phytosanitary state of crops.



Agents for private use

Biological agents stimulating soil fertility for private

STIRORA

Multifunctional fertility activator Stirora based on PGPR *Pseudomonas chlororaphis* is recommended for use in agricultural production and private farms as a plant growth stimulator with a fungicidal effect.

The mechanism of Stirora action on plants is manifested in improving seed germination, enhancing the growth and development of plants and, ultimately, increasing yields. This mechanism is explained by the production of antifungal antibiotics (such as phenazine, triglyceride peptides), plant growth regulators, as well as the ability to convert phosphorus into an available state.

The agent suppresses the development of pathogens of hard smut, brown and stem rust, helminthosporium, fusarium, ophioidisease of root rot of cereals, late blight, scab, rhizoctoniosis, bacteriosis, wet and dry rot of potatoes, bacteriosis of cabbage, cercosporosis.



Treat yourself to healthy foods and your garden with an environmentally friendly bio-fertilizer for soil restoration, intensive plant nutrition and higher yields.



● Agents for private use

Biological agents for sewage caissons, cesspools and biocompost preparation

BIOSEPTILON



Bioseptilon is an environmentally friendly and non-pathogenic agent for people, plants and animals for the accelerated processing of feces and household waste (fats, proteins, starch, paper, food waste, vegetables and other organic content) in septic tanks, toilets and cesspool.

The фпyte is based on natural microbial enzymes and the potent composition of ten strains of specially trained saprophytic bacterial cultures of natural origin located on a special carrier.

The agent formula begins to work only when it is placed in a nutrient medium (organic deposits in sewer and waste systems, such as drain pits, toilets, septic tanks).

The result of the Bioseptilon usage is the localization of an unpleasant odor, complete decomposition of fecal waste and heavy masses with the formation of carbon dioxide and an easily soluble precipitate, which is a nitrogen fertilizer.



● Agents for private use

Biological agents for sewage caissons, cesspools and biocompost preparation

BIOCOMPOST 21

Biocompost 21 is designed for the preparation of high-quality compost **FOR 21 DAYS!**

Its basis is soil microorganisms, which can significantly speed up the processing of waste of organic origin (manure, slurry, bird droppings, fallen leaves, weeds, sewage waste, food leftovers).

At the same time, harmful odors are neutralized and the complete absence of flies is guaranteed.

The result is a unique biologically balanced fertilizer that is ideal for feeding and transplanting plants.



● Agents for private use

Biological agents for private cattle breeding

BIOCOMOST 21 ZHIP



It is biological agent for the organic litter treatment in the private housing of animals and birds. The application of the agent ensures the neutralization of harmful and unpleasant odors, a decrease in the content of pathogenic microflora, as well as the complete absence of flies.

The fermentation process itself the breakdown of biological waste occurs in the litter. Working surface stays dry and clean.



● Agents for private use

Biological agents for private cattle breeding

BIOSEPTILON ZHIP



It is biological agent for highly efficient processing of bird droppings and manure resulting from the private housing of birds, pigs, cattle, goats and sheep.

The result of the application is the elimination of an unpleasant odor, the accelerated decomposition of organic waste with the formation of carbon dioxide and a precipitate, which is a nitrogen fertilizer.



Our development results



Biological lixiviating of nonferrous metals from wastes flotation sulphide ores degradation

Russia ranks sixth in the production of copper ore in the world. The concentration of copper and zinc in the wastes of mining and processing plants can reach up to 0.6 (six tenths)%, which corresponds to their content in poor ores. If we take into account the fact that more than 10 million tons of flotation wastes have been accumulated in Russia, subject to the development and implementation of technologies for their secondary processing, flotation dumps can become a good source for obtaining non-ferrous metals.

Unlike the countries of the top five ones, where this area is actively developing now, leaching technologies are poorly used in the process of sulphide ores treatment in Russia.

In 2015, employees of Research and Production Enterprise Biomedkhim ZAO received a government award in the field of science and technology for the development of a technology for the biological leaching of non-ferrous metals from wastes flotation sulphide ores degradation.

The presented technology in comparison with other processing methods has a number of advantages. Firstly, there are no high requirements for the quality of raw materials. Secondly, it provides a high depth of processing. Thirdly, it does not require large capital expenditures.

The developed units can be used at mining and processing enterprises to increase the degree of extraction of non-ferrous metals from sulfide ores, as well as reduce the environmental hazard of production waste. The volume of plant loading can vary from several tons to several hundred tons of waste, depending on the investors wishes.

The developed technology for the recycling of sulfide ore enrichment waste is not opposed to flotation enrichment itself, but complements it and can be introduced at existing enterprises without violating existing technological cycles.

Biological technology for the treatment of sea crafts waste waters, contaminated with petroleum hydrocarbons

Biological technology is intended for the treatment of oil-contaminated waters formed during the operation of ships individually and in combination with sanitary wastewater under the influence of developed biological agents of various microbial composition, based on the usage of specially selected communities of microorganisms capable of rapid and efficient decomposition of organic substances and xenobiotics, including those in marine waters and stable under a wide range of temperatures and salinity, in the conditions of an installation mounted on board a ship.

The developed technology can be used on ships of various types for deep purification from oil products and other organic pollutants, bilge waters, solutions from washing tanks with oil products individually and in combination with galley and household wastewater.

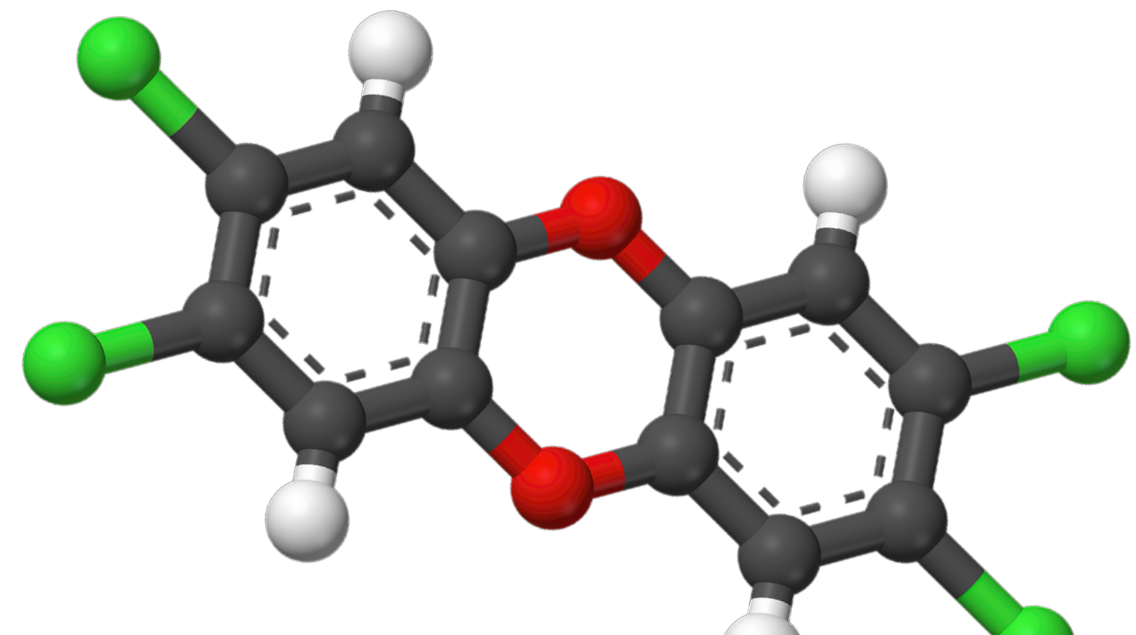
Biotechnology can be used as an improved alternative to the currently common physico-chemical methods for treating hydrocarbon-polluted ship-generated waters, such as separation.



Dioxin destruction

There is a biological agent based on a new strain capable of effectively decomposing a stable toxic compound - PFOS. This substance is listed in Appendix B of the Stockholm Convention on Persistent Organic Pollutants (POPs) Substances, which provides for the adoption of measures to minimize and, if possible, phase out production and use with subsequent destruction. PFOS, being extremely resistant to degradation, is currently found in many environmental objects and living organisms, being the most frequently detected pollutant.

The invention allows to increase the degree of purification of the environment from perfluorooctanesulfonic acid.



4 Production of β -cyclodextrins

A phenomenal property of cyclodextrins is the ability to form inclusion complexes with various organic and inorganic substances at the molecular level. Due to this ability, this product of bacterial fermentolysis has found wide application in pharmacology, cosmetology, food industry, etc.

In pharmacology:

1. Complex formation with vitamins and their derivatives.
Cyclodextrins can be used to create stable preparations with some vitamins and their derivatives, which have increased bioavailability and can be used in medicine.

2. Complex formation with non-steroidal anti-inflammatory drugs.

Complexation of non-steroidal anti-inflammatory drugs with cyclodextrins can reduce side effects, improve solubility, and make the drug more convenient for the patient.

3. Complex formation with drugs of steroid nature.

The main disadvantage of hormonal drugs is their almost complete insolubility in water, the most favorable solvent for the human body, which is eliminated with the help of cyclodextrins.

4. Complexation with cardiac glycosides.

The formation of inclusion complexes favorably affects the physicochemical and pharmacological characteristics of cardiac glycosides: solubility and stability increase, and a decrease in toxicity is observed.

5. Complex formation with sulfonamides.

A number of technological and pharmacological characteristics of preparations are improved.

6. Complex formation with barbiturates.

The main purpose of complexation of barbiturates was to increase their absorption in the human body.

In the food industry:

1. Protection against oxidation and aging under the influence of UV radiation during the shelf life.

2. Stabilization of flavors and spices.

3. Masking the bitterness and unpleasant odor of foods.

4. Converting liquid materials into dry forms.

5. Improve the solubility of substances with low water solubility.

6. Emulsification of hydrocarbons, steroids, fats and fatty acids.

7. Controlled action of the active components of flavors.

The employees of Research and Production Enterprise Biomedkhim ZAO have developed and implemented the technology of β -CYCLODEXTRINS production. The equipment and facilities of the enterprise allow the production of this product on an industrial scale.

5 Development and production of bacterial polysaccharide

Exopolysaccharides are high-molecular-weight exogenous products of microbial metabolism that have the ability to affect the rheological properties of aqueous systems and form gels of various densities at low concentrations of SER. Due to this property, they are widely used in the food, medical, pharmaceutical, agricultural industries, and are also successfully used to enhance oil recovery of developed reservoirs.

Polysaccharides whose aqueous solutions are characterized by high viscosity and particular stability at sudden temperature changes and in aggressive

environments, they are used in the oil and gas industry as stabilizers and structure formers of flushing fluids intended for oil and gas wells drilling, and provide a more complete extraction of oil from oil reservoirs. The use of polysaccharides in the oil industry is very promising from a technical point of view.

Research and Production Enterprise Biomedkhim ZAO has developed a technology for the production of a high-viscosity polysaccharide based on the bacterium *Azotobacter vinelandii*.

Clients and partners





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