In the 21st century three directions of science and human activities will determine the process of society development: information technologies, nanotechnologies and biotechnologies. The same may be said about agriculture, which should provide growing population with sufficient amount of food. On the 24th of April 2012, the Prime Minister of Russia V. Putin approved State Coordination Program for the Development of Biotechnology in the Russian Federation until 2020. The Program is meant to lay systemic foundation for bioeconomy development in Russia; to ensure formation of new subindustries intended to manufacture innovative biotechnological products for chemical and petrochemical industries and wood processing; to stimulate manufacturing and consumption development at existing Russian markets, mainly, in agri-food sector; to lay foundation for industrial development of bioenergy. The Program will be implemented in 2 stages: 2011-2015 years and 2016-2020 years. At the first stage the priority is given to development of internal demand and export of biotechnological products in biomedicine, in agri-food sector, bioenergy; to creation of engineering and technological base for formation of new subindustries, able to substitute, in the long term, part of chemical synthesis prducts for biological synthesis products; to creation of technological, experimetal and industrial base for formation of biofuel industry.

At the second stage institutional conditions will be set for deep modernization of industrial fileds technological base by means of mass introduction of biotechnology methods and products into production process. The importance of biotechnology for Russian economy development can hardly be overestimated. Modernization of technological base of modern industrial production is impossible without mass introduction of biotechnologies and biotechnological products. Moreover, for several industrial fields, including agri-food sector, modernization itself means the transfer to biotechnological methods and products. Biotechnological industry offers the following main groups of biosynthesized products for crop farming: microbiological plant protection products, biological plant growth regulators, fertilizers and soil inoculates.

Modern agricultural production has to solve two main problems: guaranteed protection of agricultural crops from pest insects and, at the same time, protection of natural environment and obtainment of eco-friendly and safe food products. Biological method of pest control is the main direction of plant protection improvement, decreasing of adverse effect from chemicals application, obtainment of eco-friendly products. Introduction of biological products into practice decreases risks of emergency, provides the opportunity to adhance self-regulatory mechanisms and, finally, to ensure harvest preservation with lower costs. The efficiency of biological products application is increased, when they are applied within integrated plant protection systems. The share of biotechnology in such integrated systems may achieve 25-30% in grains, 60-70% in vegetable crops, 40-50% in fruit crops and 50-70% in grapes. Biological products are essential element of the integrated plant protection system and provide transfer to agricultural technologies with minimum risk for people and environment, saving nonrenewable natural resources and without environmental discharge.

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The Production Association
“Sibbiopharm” Ltd.

BIOLOGICAL PRODUCTS FOR PLANT PROTECTION FROM INSECT PEST AND DISEASES. PLANT GROWTH REGULATOR

2016

SIBBIOPHARM® LTD.

Sibbiopharm Ltd is a modern biotechnological company, which:

·Manufactures and sells bioproducts,
·Delivers to specified destination,
·Consults on product application.

Sibbiopharm Ltd possesses appropriate technical and technological capabilities to manufacture new products for joint and contract manufacturing.
Sibbiopharm Ltd carries out large-scale production, based on technologies, providing aseptic conditions for microorganism cultivation and maintenance of parameters in automatic mode.
The company possesses modern laboratories, pilot equipment to scale up biotechnological processes, equipment to manufacture liquid enzymes, new warehouse complex. Sibbiopharm Ltd collaborates with over 20 leading research and educational centers in Russia and abroad, implements new products and technologies.
Since the year 2009 Sibbiopharm Ltd has been included to the Federal Register of Sustainable Suppliers and obtained the right to mark its products, packaging and supporting documents with “Sustainable Supplier”.
Since the year 2012 Company`s management system has been certified by certifying agent TÜV NORD CERT (Germany) in accordance with ISO 9001: 2008.

2009 2010 2011 2012 2013 2014 2015

MAIN PRODUCTS

Enzymes
AmiloLux®-A
Amilosubtilin
AmiloLux®-ATC
Protosubtilin
CelloLux®-A
CelloLux®-F
Glucavamorin
GlucoLux®-A
GlucoLux®-F
Fidbest P, W, WP, VGPRO
Poliferment™

Antibiotics for animals
Bacilichin™
Biovit™
Prebiotics
Kormomix® - complex
Kormomix® - molasses

Probiotics
Lactoamilovarin

Synbiotic
Rumistart™

Mycotoxin adsorbent
Fungisorb™

Feed mixes
Fermolux™
Fermolux™-P

Sillage agents
Biosib™
Bioferm™

Plant-protection agents
Lepidocide™
Bitoxybacillin™
Biovert™
Bactofit®

Plant growth regulator
Gibbersib®

Larvicidal agent
Bacticide

Agent for water and soil purification from oil pollution
Destroil®

BIOLOGICAL PLANT PROTECTION AGENTS

Within the last decades biological products based on microorganisms and their metabolites are applied to protect plants from insect pests and infecting agents.
Bioproducts active agents are the components of natural biocenosis and, thus, are environmentally friendly, safe for people, mammals, birds, fish and useful entomofauna.

SIBBIOPHARM LTD manufactures: biological insecticides **LEPIDOCIDE™**, **BITOXYBACILLIN™**, **BIOVERTT™**, biological fungicide **BACTOFIT®**, plant growth regulator **GIBBERSIB®**.
These products are manufactured by means of submerged cultivation of germ cultures followed by cultural liquid concentrating and product standardizing. Meeting regulatory requirements and controlling technological criteria at every production stage (starting from the tube with producer strain in the laboratory and ending with acceptance control of finished products) provides reliable high-quality products.

MAIN ADVANTAGES OF MICROBIOLOGICAL PLANT PROTECTION AGENTS

- Highly effective when properly applied.
- Selectively destroy wide varieties of insect pests and phytopathogens.
- Solve the problem of insect pests and phytopathogens resistance to chemical pesticides.
- Compatible with chemical and biological pesticides when applied in tank mixtures and within integrated plant protection system.
- Safe for people, warm-blooded animals, hydrobionts, bees, entomophages when applied at proper consumption rates.

NEW OPPORTUNITIES IN HARMONY WITH NATURE

LEPIDOCIDE™

BIOLOGICAL INSECTICIDE

LEPIDOCIDE™ is a biological insecticide meant to protect forest, agricultural crops and parks from caterpillars of lepidopterous insects, including silk moths, black arches, geometrid moths, pea moths, sod webworms, cabbage and turnip white butterflies, fall webworms, thorn butterflies, owl-moths, moths, etc. Lepidocide is approved to be applied in agriculture and forestry, farmland and urban plantations.

PRODUCT FORMULATION

Product active agent is bacterial spores and protein crystalls (delta-endotoxin) of *Bacillus thuringiensis var. kurstaki*. Inert fillers provide product integrity, flowability, adhesiveness and stability.

During first 4 hours after ingestion, contained in the product protein toxin causes general paralysis of insect alimentary tract. Later, during 12-24 hours, general bacterial hematosepsis develops in insect.

By sufficient dose, caterpillars stop feeding, moving, change their colour, shrievel, turn black and die within 3-7 days.

Sublethal doses provoke metamorphosis disturbance, lowering of reproductive performance and viability of next generations.

Product main characteristics

Item	Standard	
Commodity form	Suspended concentrate (SC and SC-M)	Powder
Appearance and colour	Grayish-brown thick suspension	Pale-gray to beige-brown powder
Biological activity, UA/mg, n.l.t.	2 000	3 000

Commodity forms:
Suspended concentrate Lepidocide SC and SC-M,
Powder Lepidocide P
Shelf life:
Lepidocide™ SC and SC-M – 12 months at (+5)-(+30)°C
Lepidocide™ P -18 months at (-30)-(+30)°C
Packaging:
Lepidocide™SC and SC-M is packed by 20-50 L into polyethylene drums.
Lepidocide™ P is packed by 15 kg, 20 kg into hermetically sealed polyethylene bags.

Lepidocide™SC, SC-M consumption rates to control forest pests

Crop	Pests	Consumption rate
Coniferous species	Siberian and pine moth, black arches, geometrid moths, pine noctuide	3 l/ha
Oak and other broadleaved trees	Gypsy moth, geometrid moths, brown-tail moth, Aleimma loeflingiana	3 l/ha

Lepidocide™ consumption rates to control most abundant leaf-eating pests

Crop	Pests	Product consumption rate	
		Suspended concentrate	Powder
Vegetable crops	Cabbage white and turnip butterflies, cabbage moth, grass moth, meadow moth	0,5-1,0 l/ha	0,5-1,0 kg/ha
Fruit crops	Apple, codling and ermine moths, fall webworm, moth	1-3 l/ha	1-3 kg/ha
Berries	Leaf-roller, gooseberry fruit and geometrid moths, gooseberry sawfly	1-1,5 l/ha	1-1,5 kg/ha
Grapes	Grape moth	2-3 l/ha	2-3 kg/ha

Lepidocide™ in forestry

Lepidocide™ in form of suspended concentrate (SC and SC-M) has been applied in forestry since 1997. Annualy Lepidocide™ effectivelly protects over 50-300 thousands ha of forest.

In forestry, Lepidocide™ is allpied by means of plant spraying with groud equipment or aircrafts. Suspended concentrate may be used as a finished product or diluted by water.

Maximum protective effect of Lepidocide application is achieved when treating trees and bushes at early (I-III) larvae instar at (18-30)°C air temperature.

Experience of applying Lepidocide™ to protect forest has demonstrated produt high efficiency (85-90%) to control phytophages and its harmlessness for beneficial entomofauna of biocenosis.

Lepidocide™ in agriculture

In agriculture, Lepidocide™ is applied by means of plant spraying with ground equipment.

Suspended concentrate is applied as finished product or diluted by water.

Prior to application, a aqueous suspension is prepared by dissolving powder in water.

The product is recommended to be applied in dry weather in the morning or evening.

Maximum protective effect of Lepidocide application is achieved when treating trees and bushes at early (I-III) larvae instar at (18-30)°C air temperature.

PRODUCT MAIN ADVANTAGES

- Selectively destroys wide variety of lepidopterous pests.
- Is not phytotoxic
- Is not accumulated in plants and fruits
- Ensures eco-friendly and safe products
- Is applied at any stage of plant growth
- Safety interval is 5 days, thus, crops may be treated shortly before harvesting
- Is compatible with chemical pesticides and biological products when applied in tank mixtures and within integrated plant protection system
- May be applied to solve the problem of pest resistance to chemical pesticides.

BITOXYBACILLIN™

BIOLOGICAL INSECTICIDE

BITOXYBACILLIN™ is a biological insecticide meant to protect plant from insect pests: red spider mite, Colorado beetle (larvae instar I-III), worms of cabbage, grass, meadow, silkworm, geometrid, apple, ermine moths, cabbage white, turnip and whitehorn butterflies, leaf rollers and others.

PRODUCT FORMULATION

Bitoxybacillin™ active agents are bacterial spores, protein crystalls (delta-endotoxin) and heat-stable -exotoxin of Bacillus thuringiensis var. Thuringiensis.
Inert fillers provide product integrity, flowability, adhesiveness and stability.

MODE OF ACTION

Crystalline protein of Bitoxybacillin™ determines its intestinal action. After ingestion by pest, the product causes intestine dysfunction, thus lowering pest feed rates. Product -exotoxin, permeating across intestinal tract and skin cover into insect body, supresses RNA synthesis in pest cells. Pest mass mortality begins on the 3rd-7th day. Sublethal doses od Bitoxybacillin™ inhibit feeding, break metamorphosis periods, decrease female prolificacy and next generation viability (antifeedant and metatoxical effects).

Product main characteristics

Item	Standards
Appearance and colour	Pale-beige to brown powder
Bioloical activity, UA/mg, n.l.t.	1500
Exotoxin content,%	0,6-0,8

Commodity form: powder Bitoxybacillin™ P
Shelf life: 18 months at (-30) - (+30)°C.
Packaging: packed by 15 kg, 20 kg into hermetically sealed polyethylene bags.

In agriculture, Bitoxybacillin™ is applied to vegetable and fruit crops and medicinal herbs.

Bitoxybacillin™ is applied by means of plant spraying with any available ground spraying devices.
Product is recommended to be applied in dry weather in the morning or evening. Maximum protective effect of Bitoxybacillin™ application is achieved when treating trees and bushes at early (I-III) larvae instar at (18-30)°C air temperature.
Bitoxybacillin™ is safe for people, warm-blooded animals, fish, hydrobionts, bees and entomophages when applied at proper consumption rates.

PRODUCT MAIN ADVANTAGES

- Effectively destroys wide variety of lepidopterous insects, red spider mites, Colorado beetle worms and other pests.
- Is not phytotoxic, not accumulated in plants and fruits
- Ensures eco-friendly and safe products
- May be applied at any stage of plant growth
- Safety interval is 5 days, thus, crops may be treated shortly before harve sting
- Is compatible with chemical pesticides and biological products when applied in tank mixtures and within integrated plant protection system
- May be applied to solve the problem of pest resistance to chemical pesticides.

Bitoxybacillin™ consumption rates to control most abundant leaf-eating pests

Crop	Pest	Consumption rate
Greenhouse crops	Red spider mite	10-30 kg/ha
Flowers and herbs	Meadow, noctuid, geometrid moths leaf rollers, painted lady	2-3 kg/ha
Nightshade family	Colorado beetle	2-5 kg/ha
Vegetable crops	White butterflies, meadow, noctuid, pyralid moths	1-2 kg/ha
Fruit crops and berries	Leaf rollers, fall webworm, apple worm, whitehorn butterfly, sawflies, red spider mite, pyralid, geometrid and silkworm moths	2-5 kg/ha
Grapes	Grape moth	6-8 kg/ha

BIOVERT™

BIOLOGICAL INSECTICIDE

BIOVERT™ is a biological insecticide meant to protect vegetable and ornamental crops from sucking insects: European (Californian) thrips and greenhouse whitefly. The product is based on entomopathogenic fungus Lecanicillium lecanii (Verticillium lecanii). Yellowish-ivory powder.

PRODUCT FORMULATION

The product active ingredients are blastospores of producer fungus, that are pathogenic for sucking pest larvae and imago in greenhouses and on the field, and group of metabolites with insecticidal activity.

MODE OF ACTION

Fungus pathogenic properties are associated mainly with its ability to permeate across pest cuticle due to product mechanical pressure and presence of cuticle destroying enzymes. Insecticidal metabolites, that are synthesized by fungus producer, include compounds of protein nature (bassianolide, beauvericin, aphidicolin), organic acids, phospholipids and compound, belonged to toxic terpenoids. Metabolites destroy pest vestiture, inhibit protein and nucleic acid synthesis.

Commodity form: powder Biovert™
Shelf life: 6 months at (-20) - (+20)°C.
Packaging: packed by 15 kg, 20 kg in hermetically sealed polyethylene bags.

In agriculture, Biovert™ is applied to protect vegetable crops and flowers in greenhouses and on the field.

Biovert™ is applied by means of plant spraying with any available ground spraying devices.
Product is recommended to be applied in dry weather in the morning or evening
Optimal conditions for producer: night temperature – 16-18°C, day temperature – 22-26°C; air humidity during first 2-3 days – 80-85%.
When product is applied in optimal conditions, first symptoms of pest destruction may be detected o the 4th-5th day and expressed as occurrence of farina. On the 8th-10th day white velvet mycelium appears in pest body.

PRODUCT MAIN ADVANTAGES

- Is not phytotoxic, not accumulated in plants and fruits
- Ensures eco-friendly and safe products
- May be applied at any stage of plant growth
- No safety interval
- Recommended for prophylactic use and within integrated plant protection systems
- Safe for people, warm-blooded animals, hydrobionts, bees and entomophages.

Biovert™ consumption rates when applied in vegetable and flower greenhouses

Crop	Pest	Application particularities	Consumption rate, kg/ha	Safety interval (treatment frequency)
Flowers and vegetable crops	European (Californian) thrips	Spraying with 0,75-1% dilution every 7-8 days during period of larva massive occurrence to protect from each new generation	10	-(5)
	Greenhouse whitefly	Spraying with 0,75-1% dilution every 7-10 days during period of larva massive occurrence to protect from each new generation	10	-(3)

BACTOFIT®

BIOLOGICAL FUNGICIDE AND BACTERICIDE

BACTOFIT® is a biological product meant to control fungal and bacterial diseases in grain, vegetable and fruit crops, in berries, flowers and medicinal herbs.

Bactofit® is manufctured based on ИПМ-215 strain of Bacillus subtilis,product commodity forms are suspended concentrate (SC) and wettable powder (WP).
The product remains active in soil and plants during 7-20 days.

PRODUCT FORMULATION

Bactofit comprises spores and cells of culture producer, metabolites with antagonistic and antibiotic properties, inert fillers providing product integrity and stability. Upon request, potassium (sodium) humate, Mn, S, Cu, B, Fe, Zn, Mo may be added into the product.

Main characteristics

Item	Consumption rate	
Commodity form	Suspended concentrate (SC)	Wettable powder (WP)
Appearance and colour	Brown to dark-brown liquid	Pale-gray to pale-brown powder
Biological activity, U/g (U/cm3)	N.l.t 10000	N.l.t. 10000
Diameter of zone of inhibited phytopathogens Verticillium dahlie, mm, n.l.t.	20	20
Spore titre, 10 9 spores/g (spores/cm3), n.l.t.	2,0	2,0

Shelf life:
Bactofit SC - 6 months at (-5) - (+30)°C.
Bactofit WP – 30 months at (-30) - (+ 30)°C.
Packaging:
Bactofit SCis packed by 10-20 L into polyethylene drums,
Bactofit WP is pecked by 15 kg, 20 kg into hermetically sealed polyethylene bags, then into multi wall paper bags.

Bactofit® is meant to:
- Treat seeds and tubers prior to bedding
- Treat root system by deplantation
- Plant spraying or root watering by vegetation period
- Application with herbicides.

Technology of Bactofit® application depends on plant development stage.
Maximum effeciency is reached when preseeding treatment accompanied by vegetative plant treatment.
Grain crops treatment with Bactofit® is recommended to combine with chemical weeding by herbicides.
In this case Bactofit has an antistress effect and increases grain yield capacity up to 15% (depending on herbisides applied).

PRODUCT MAIN ADVANTAGES

- Supresses growth and development of wide variety of infecting agents
- Has growth-stimulating, immunomodulating and antistress effects
- Active in moisture stress conditions
- May be applied at any stage of plant development
- One day safety interval makes it possible to treat plants at fruit ripening stage
- Is not phytotoxic
- Is not accumulated in treated plants and soil
- Is compatible with chemical pesticides in tank mixtures and within integrated plant protection system
- Does not cause phytopathogen resistance, thus may be applied continually untill positive result is achieved
- Safe for people, warm-blooded animals, birds, fish, bees and environmental friendly.

Most abundet diseases effectively controlled by Bactofit®

Crop	Consumption rate		Treatment stage
	Bactofit SC	Bactofit WP	
Grain crops (winter and Spring grains)	3 L/t	-	Seed treatment 1-5 days prior to bedding. Working liquid consumption rate: 10 L/t. Treatment quantity: 1.
	2 L/ha	-	Spraying at vegetative stage. Working liquid consumption rate: 200-300 L/ha. Treatment quantity: 1-2.
Vegetable crops	-	2-5 g/kg	Seed treatment prior to bedding
	-	2-14 kg/ha	Spraying at vegetative stage.
Fruit crops and berries	-	3-10 kg/ha	Spraying at vegetative stage, root watering.
Grapes	2-3 L/ha	-	Spraying at vegetative stage.
Flowers and medicinal herbs	-	2-5 g/kg	Seed treatment prior to bedding.
		1,5-7 kg/ha	Spraying at vegetative stage.

GIBBERSIB®

PLANT GROWTH REGULATOR

GIBBERSIB® is a natural plant growth regulator.
Gibbersib® increases yield and quality of vegetable, fruit and berries crops due to:
- Plant growth and development stimulation
- Increase of ovaries quantity
- Accelerated fruit ripening
- Increase of plant resistance to diseases and adverse weather conditions
- Formation of parthenocarpic fruits.

PRODUCT FORMULATION

Gibbersib® is obtained from microbial culture Fusarium moniliforme. Product commodity form: highly soluble in water powder.
The product active agent is a complex of highly active gibberellins A3, A7, iso-A3, iso-A7 sodium salts. Gibberellins are the most extensive and important group of phytohormones, belonging to terpenoids.

APPLICATION

Gibbersib® is applied by means of plant spraying at various growth stages, depending on the intended effect. For plant spraying, very slight aqueous solutions of Gibbersib are applied. If Gibbersib concentration is increased above the standard rate, its positive effect may be decreased.
Plant spraying with Gibbersib® provides formation of parthenocarpic fruits in tomatoes, bell peppers, grapes. It is of significant importance when plant pollination is not possible because of cold or very hot weather conditions, lack of light or small amount of insects.
Gibbersib® stimulates herbs and almost does not effect on root system development. That is why, favorable water and nutritive conditions are required for those plants, that have developed herbs and increased fruit formation due to Gibbersib® application, but root systems remain the same without any proportional development.

Shelf life:
2 years at normal temperature.
Packaging: packed by 0,1-5,0 kg, 15 kg, 20 kg
into hermetically sealed polyethylene bags, then into multiwall paper bags.

PRODUCT MAIN ADVANTAGES

- Has broad spectrum of activity (ripening acceleration, growth stimulation, formation of parthenocarpic fruits and others)
- Regulates main metabolic processes by application in small doses
- Safe for people, warm-blooded animals, birds, fish, bees
- Does not effect on the taste and colour of fruits and seeds of treated plants
- Does not pollute environment

Consumption rate and application efficiency

Crop	Consumption rate	Application efficiency
Tomatoes in greenhouses and on the field	30-40 g/ha	Threehold spraying increases yield up to 15-30% and decreases ripening time for 4-5 days
Cucumbers in greenhouses and on the field	21-30g/ha	Two-threehold spraying increases yield up to 10-20%
Premature ripening and late ripening cabbage	21g/ha	Two-threehold spraying increases yield up to 10-15%
Potato	15 g/ha	Spraying at the beginning of blossom time increases yield up to 20-30%
Grapes (seedless)	0,9-1,2 kg/ha	Опрыскивание в конце цветения увеличивает урожайность на 30-40%
Apple (under authorization process)	50-90 g/ha	Threhold spraying in blossom time increases yield up to 17%, increases harvest of marketable fruits
Sunflower (under authorization process)	20-40 g/ha	Twohold spraying at the stage of anthodium formation and in blossom time increases yield up to 15% and harvest of oil up to 30%.

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C O N T E N T

2016