

# Biotech companies and projects of Science town Koltsovo and Novosibirsk region

## Pharmaceuticals, health-related products

### 1. “AvaxisBiotherapeutics”, LLC

*Development of vaccines and medical preparations for cancer treatment*

#### **1. Products**

The company develops personalized therapeutic vaccine against cancer, based on immune response therapy of patient. The vaccine is based on dendritic cells that are processed by DNA vaccine structures.

At the present time vaccines for breast cancer and vaccines for colorectal cancer are prepared for clinical trials.

The product is a medical preparation of patient’s blood, processed by a special technique, which is intended for stimulation of patient’s antitumor immune response.

As a result of a project, a new method of personalized immune therapy of breast cancer will be introduced to the service market of the treatment of breast cancer. The method is designed for patients with the most ominous form of breast cancer, with overexpression of HER2/neu gene.

#### **2. Innovations and product advantages**

- Personalization: medical preparation of immune therapy causes intensification of natural biological response for control of cancer cells.
- Systemic effect: fights against metastasizes regardless of their location, fills up traditional methods of treatment.
- Minimally invasiveness: blood sampling doesn’t require expensive technique; 200 ml of blood is enough for preparing of vaccine.
- Quickness: cycle of medical preparation s is 4 days.
- Simplicity: the developed vaccine could be used at any cancer center, hospital department, and clinic. Any oncologist will be able to practice this procedure after a shot training course.
- Medical preparation is planned to prolong the period of remission and increase survivability of the patients with the most aggressive form of breast cancer by 20-30%.
- Availability for the end user: calculated value of vaccine is at most \$10000. It is 10 times lower than comparable analogues.
- Vaccine may be used for other types of cancer immunotherapy.

### 2. “Vector-Vita”, LLC

*Development and production of pharmaceutical and veterinary preparations with nanosilver*

#### **1. Products**

The company develops and manufactures products based on cluster (colloidal) silver (nanosilver, biosilver).

Certified industrially-manufactured products:

- ❖ “Argovit”: veterinary drug intended for treating intestinal bacterial infections, of viral or mixed etiology, is used orally as diluted aqueous solution;
- ❖ “Argovit-C”: materials for the food industry intended for the production of dietary supplements, concentrated solution of nanosilver;
- ❖ “Vitargol” dietary supplement: the source of biosilver. It is intended for compensation of deficiency of silver and immunity strengthening, for prevention and adjunct therapy of different virulent and inflammatory diseases: gravedo, blennorrhinia, influenza, genyantritis, pharyngitis, adenoids, otitis, enteric infection, mycosis, herpetic fever, etc.
- ❖ Vitargol-spray – a remedy for oral cavity. It contacts colloid silver with antimicrobial properties. The spray is used for prevention and as an addition to the main therapy of

different infectious diseases – sore throat, angina, flu, stomatitis, others.

Cosmetic products with antimicrobial action:

- ❖ “Argogel”, nanosilver in gel basis with antimicrobial, anti-inflammatory effects, stimulates regenerative processes. It is recommended for prevention and adjunct therapy of different virulent and inflammatory processes in the skin, mucous membrane and in tissue: burns, bed sores, septic wound, whitlows, trophic ulcers, erysipelalous inflammations, carbuncles, furunculoses; for processing of mucous coat in tonsillitis, pharyngitis, adenoids, rhinitis, genyantritis, stomatitis, gingivitis;
- ❖ “Argocream”: nanosilver in form of cream that has antimicrobial, anti-inflammatory effects, stimulates regenerative processes. It is recommended for prevention and adjunct therapy of different virulent and inflammatory processes in the skin and subdermis: intertrigos, microtraumas, irritations, scratch marks, burns, bed sores, whitlows, acneiform rash, furunculosis, eczema, dermatosis, dermatomycosis, erysipelalous inflammations, herpetic lesions, trophic ulcers;

Silver powder: a powder modified by nanosilver; it has antimicrobial, anti-inflammatory, detoxicative (cleansing) effects. It is recommended for people with skin problems: acneiform rash, furunculosis, microtraumas, dermatosis, dermatomycosis, erysipelalous inflammations, herpetic lesions.

## **2. Innovations and product advantages**

- A wide range of antibacterial, antiviral, antimycotic activity, expressed anti-inflammatory and immunostimulative effect.
- High therapeutic effectiveness, integrated effect.
- Security application, no side effects. The essence of nanosilver is non-toxic, allowed for usage in food industry.
- Possibility of drugs production in various pharmaceutical forms (solutions, drops, sprays, powders, tablets, gels, embrocations, creams, enterosorbents, dusting powders, vulnerosorbents).

## **3. “VECTOR-INVEST”, LLC, “SIBERIAN SERPENTARIUM”, LLC**

*Creation and production of products based on chitosan and snake venom*

### **1. Products**

The company has developed and implemented a technology for production of gel from the polysaccharide chitosan. It is used as a basis for a series of anti-burns and anti-wound drugs: chitosan gel with the addition of ions of silver, propolis, iodine.

On the basis of chitosan gel the company developed a series of medical and cosmetic preparations for normal and problematic skin care, "Vasma": chitosan gel with the addition of peach, almond, coconut, grape and other oils, the company obtained gels with the addition of extracts of medicinal plants: flowers of lilac, rose, basket plant (*Callisia fragrans*), comfrey, and others. There are 20 different certified medical and cosmetic variants of chitosan gel.

Product range also includes supplements based on chitosan, good for restoring the functions of the gastrointestinal tract. Supplements are produced in the form of chitosan emulsions and suspensions.

A new product, a chitosan gel for massage with snake and bee venoms, is prepared for market.

### **2. Innovations and product advantages**

The developments feature an original and unique way to obtain chitosan gel, which allows for relatively cheap way to organize its industrial production.

In preclinical and clinical trials chitosan has been proven to be highly biostimulating, it enhances the process of healing of wounds of all kinds, many skin diseases, acne eruptions and others. It was shown that chitosan easily overcomes the transdermal barrier and it can be pulling other drugs through it. Based on this ability, chitosan have been established to have high anti-chondrosis and anti-arthritis preparations obtained by combining chitosan gel with snake venom, which is capable not only to relief pain, but also to treat such diseases.

Currently, the company works to ensure the delivery of other therapeutic agents to target tissues using chitosan gel.

#### 4. “Vector-Medica”, JSC

*Development and production of pharmaceutical drugs*

##### 1. Products

1. Immunobiological preparations based on recombinant interferon alfa-2b (“Reaferon-EC” and “Laifferon®”) are in the complex therapy of viral hepatitis, cancer, viral eye diseases;
  - “Infagel ®”: treatment of herpetic skin diseases and mucous membranes, prevention of influenza and acute upper respiratory infections;
  - “Reaferon-EC-Lipint®”: prevention and treatment of influenza and acute upper respiratory infections, emergency prevention and treatment of tick-borne encephalitis, treatment of allergic, urogenital diseases, viral hepatitis.
  - “Reaferon-LIPINT®” - ®”: prevention and treatment of influenza and other acute upper respiratory infections
2. “Ribavirin- LIPINT®”: treatment of chronic viral hepatitis C in the complex therapy with interferon alfa-2b (“gold standard of treatment for hepatitis C”).

##### 2. Innovations and product advantages

1. Liposome technologies protect the actual substance from destruction in gastrointestinal tract. They provide address delivery to the target organs, conduce improvement of the therapeutic effectiveness, decrease the risk of side effects and toxicity. Liposomes are harmless and biodegradable.
2. “Reaferon-EC-Lipint®” is the unique interferon preparation for oral intake in liposomal form. It creates a system of dual protection: influences on causative agent and induces the body to make its own interferon. “Reaferon-EC-Lipint®” is the unique capsular form of liposomal interferon for oral intake.
3. “Reaferon-EC” is the first Russian preparation of recombinant interferon alfa-2b: clinical trials have been running since 1985. The preparation is well-studied, has proven positive risk-benefit profile. In the clinical practice since 1998.
4. “Laifferon®” is the interferon preparation with high purification procedure (high tolerability). The absence of albumin eliminates risk of infections (hepatitis, HIV, herpetic fever and others), decrease antibodies production and increases the therapeutic effect.

#### 5. “Vitagor”, LLC

*Development of pharmaceutical drugs for oncological diseases treatment*

##### 1. Products

Development of prototypical sample of innovative medicinal preparation, based on oncolytic strains of the Newcastle disease virus (NDV). This virus was extracted from natural storage reservoirs in the Russian Federation.

##### 2. Innovations and product advantages

There are no direct analogues in Russia. In other countries (USA, Canada, the EU and others) such developments are carried out; there have been drugs at the stage of clinical trials already. Preliminary mouse studies confirmed the hypothesis that the products of “Vitagor” will have more pronounced oncolytic activity in comparison with the analogues.

Successful project implementation will allow treating some types of cancer without chemo- and / or radiotherapy. Also it will enable treatment of such types of cancer that don’t respond to the medical treatment at present time.

#### 6. “Research center”, Scientific and Production Company, LLC

*Development and production of preparations based on living microorganisms. Research studies in microbiology*

##### 1. Products

1. Bioactive substances and dietary supplements of “Vetom” series, “Komarov powder”, “Nozdrin” are preparations\* based on bacteria Bacillus. They are used as additional source of

probiotic microorganisms. The usage of these drugs allows restoring the natural protective systems of the body, restoring health, and significantly reducing the chance of infectious diseases of different etiology.

\* Intended for health improvement, not drugs.

2. Development and production of cosmetic products of "Bioseptin" series that provide rehabilitation of skin cover health, acceleration healing of traumas and stimulation of hair growth.

3. Medicinal preparations for veterinary usage "Vetom", "Veles", "Bioseptin", "Vetomgin" and others.

4. Bioactive substances for plants of "Fitop" series.

## **2. Innovations and product advantages**

The microorganisms from the natural environment are used as an active constituent in production of preparations. They can suppress the growth and development of opportunistic pathogenic and putrefactive microflora. As a result of their usage, microbial composition of microbiological cenosis changes in the direction of evolutionally normal one. It leads to health improvement of humans and animals. In case of soil application of these microorganisms, soil's fertility increases, plants suffer from diseases less frequently, bear more fruit, etc.

The products are environmentally friendly, have no harmful effects on health.

## **7. "SFM-Pharm", LLC**

*Electron-emitting center*

### **1. Products**

The first in Siberia specialized center for electron beam technologies was opened in Biotechnopark Koltsovo in 2012. The method of electron-beam immobilization is applied by the Centre to meet the challenges of customers in various industries:

- immobilization of biologically active substances;
- sterilization of medical products and supplies;
- production of gels (PEG);
- production of fine powders;
- synthesis of ceramic materials.

### **2. Innovations and product advantages**

- The effectiveness of the technology at a relatively low cost of radiation treatment;
- Ability to handle any material, including products in the final package ready for shipping;
- High degree of flexibility and adaptability of production process;
- The possibility of reducing capital and operating costs (through the use of services, without having to buy additional equipment);
- Products under irradiation are not heated and do not get wet, they are ready to use immediately after radiation;
- Radiation sterilization does not generate harmful substances in the adjacent areas

## **8. "Siberian center of pharmacology and biotechnology", CJSC**

*Production of pharmaceuticals*

### **1. Products**

The company is a part of SFM group of companies and specializes in the production of original pharmaceutical products using the technology of electron beam immobilization.

The main portfolio drug is "Trombovazim." The drug is certified, it is available in 2 forms: injectable and oral. An encapsulated form of "Trombovazim" is the first national oral thrombolytic. It is used in the treatment of chronic venous insufficiency (treatment of thrombosis). The drug is excluded from the list of prescription drugs. The injectable form is used in emergency medical care in acute myocardial infarction. The list of indications is being expanded.

### **2. Innovations and product advantages**

In production of all drugs the company uses the method of electron-beam immobilization. The basic principle of the new technologies is modification of a biologically active substance by radiation-activated polymer. This technology can improve the bioavailability of the active substance, allowing it to penetrate through the walls of the stomach and intestines, thus it is protected from degradation during the delivery into the bloodstream. This increases the effectiveness of the active ingredients of the drug, reduces toxicity and immunogenicity. The effect of "Trombovazim" is elimination of blockade of microvasculature and restoration of blood flow.

## 9. "Vector-BiAlgam", CJSC

*Production of pharmaceutical immunobiological preparations, probiotic products*

### 1. Products

1. Vaccine "ALGAVAK® M" for infectious hepatitis prevention.
2. Immunoenzymometric test-systems (diagnosis of infectious hepatitis): "Vektogep-A-IgM", "Vektogep-A-antigen", "Vektogep- antibodies".
3. Dietary supplements and biological products, based on bifidus bacteria and lactobacterium: "Bifidum BAG", "Trilact", "Ecoflor", "Probioflor-Lacto", "NariLak-Forte-B".
4. Ferments of probiotic microorganisms for homemade cultured milk products.
5. Ferments and technologies for diary industry.
6. Dried biomass of probiotic microorganisms "Astera" for the pharmaceutical and food industries.
7. Cultured milk probiotic products for functional nutrition of "BIFIDOM", series: Bifidokefir, Bifatsil, Bifatonic.
8. Liquid lysate of probiotic bacteria "BifiLiz", "LactoLiz", "PropioLiz".

### 2. Innovations and product advantages

In production process the company uses only its own developments and technologies, without participation of domestic or foreign companies. "Vector-BiAlgam", CJSC is the exclusive Russian producer of infectious hepatitis vaccine, which is as effective as foreign analogue vaccines. At the same time, there are no antibiotics and preservatives in the vaccine, manufactured by "Vector-BiAlgam", unlike in analogues.

The production of vaccine against Hepatitis A "ALGAVAK® M" is in compliance with GMP. According to this standard the following conditions are met: high quality of raw materials, state-of-the art technologies, well planned premises and high-tech equipment, high qualification of hired personnel.

In order to produce dietary supplements, ferments and cultured milk products the company has its own collection of strains of bifidumbacteria, lactobacterium and propionate bacteria. The strain probiotic composition is more adjusted to physiology and stable in biological indexes than competitor's strains. The manufacture is certified according to HACCP which guarantees control and safety at all stages.

The effectiveness of produced dietary supplements is confirmed by clinical tests. Usage of them normalizes digestion, eliminates dysbacteriosis, improves metabolic processes in the body, eliminates allergic reactions.

## Diagnostics

### 1. “BIOLINK”, LLC

*Science, medicine and health*

#### **1. Products**

The company Biolink, LLC is active in the following spheres:

- development of molecular and genetic tests for oncology and their introduction to the medical practice,
- finding genetic predisposition to oncologic diseases,
- determination of paternity by genotyping,
- selection of effective diet for weight loss based on genetic test,
- PCR-diagnostics of infectious disease.

The company develops and produces test-systems for molecular diagnostics in oncology. Such molecular diagnostics allows for:

- location of genetic predisposition to oncologic diseases. It is possible by using the kits produced by the company for finding mutations in genes BRCA1/2, CHEK2;
- conducting an effective therapy with target preparations, taking into account molecular and genetic characteristics of the tumor (using kits produced by the company which are aimed at finding mutations in genes KRAS, BRAF, EGFR, HER2/neu);
- avoiding of genetically proven toxicity of the preparation (using the kits for locating mutation in the gene DPYD).

The company also conducts tests for finding oncological diseases and provides services of laboratory diagnostics.

#### **2. Innovations and product advantages**

The main competitive advantage of the proposed test-systems is the use of innovation ferments (SNPase, SD-polymerase), allowing for increase of sensitivity and specificity of systems.

The advantages include:

- all the necessary registraions are obtained;
- approbation on wide clinical material;
- European certification for some of test kits;
- competitive price.

### 2. “BIOPALETTE”, LLC

*Development and production of medical diagnostics*

#### **1. Products**

The company develops and manufactures test systems for the simultaneous and separate immunoassay of human blood.

Currently, the range of products includes:

1. Palette HIV AG / AT - a set of reagents for the simultaneous and separate detection of antibodies to the human immunodeficiency virus and HIV p24 antigen (two-stage).
2. Palette HBsAg - a reagent kit for the simultaneous and separate detection of antibodies to the human immunodeficiency virus and HIV p24 antigen (single-stage).
3. Palette HCV-AT screen - a set of reagents for the simultaneous and separate detection of antibodies of classes G and M to hepatitis C.
4. Palette Syphilis antibodies - a set of reagents for ELISA detection of total antibodies to *Treponema pallidum* for automatic and manual setting.

#### **2. Innovations and product advantages**

- • Convenience: ready-to-use do not require the preparation of the positive and negative control samples, TMB; Conjugates are prepared.
- • Speed: the short incubation time.
- • Simplicity: color-coded reagents.
- • Shelf life of working solutions are not less than the shelf life of test systems.

### 3. “Vector-Best”, CJSC

*Production of medical diagnostic agents*

<b>1. Products</b>
The company develops and produces: 1) reagent kits for immune-enzyme analysis of infectious diseases and other human pathologies; 2) reagent kits for the diagnostics of infectious human diseases by the method of polymerase chain reaction in real-time mode; 3) reagent kits for clinical chemistry.
<b>2. Innovations and product advantages</b>
The company’s anchor product is the reagent kits of the “RealBest” series for PCR detection in real time mode. The advantages: - Several causative agents are determined simultaneously (safes time and budget); - Developed methods of nucleic acid extraction provide high analysis sensitivity without ultracentrifugation step; enable full automatic process (increases effectiveness of the lab and saves time); - The use of noncompetitive internal control allows for computer analysis of errors in nucleic acid isolation and determination of inhibitor in sample (improves quality significantly) - stability of all components of the kit provides high quality of research and possibility of transporting for 10 days in room temperature (all reagents are stored for 2-80C without freezing) - the sensitivity of kits is approximately 10 times higher than in analogues on market

### 4. “Diagen”, LLC

*Development and production of test systems for early detection of oncological diseases*

<b>1. Products</b>
Diagnostic test-system for 1) detection of oncological diseases at early stage, 2) control of oncological diseases relapse, 3) separation of benign tumors from malignant tumors.
<b>2. Innovations and product advantages</b>
New method of diagnostics of oncological diseases at early stage was developed. The principle of the method is changing of cytotoxic action of human peripheral blood mononuclear cells (MNCs) on the panel of specially selected passaged (cancer) cells culture. Analysis of cytotoxic index lets to determine the presence of cancer cells in the donor’s body. Advantages of the method: 1) universalism (detects all oncopathology in one research), 2) the relative cheapness, 3) a low percentage of false positive results (specificity is of over 96%), 4) the ability of diagnostics of oncological diseases at early stages.

### 5. “ImDi”, CJSC

*Production of medical diagnostic test systems*

<b>1. Products</b>
The company produces: 1) High-strung immunoenzymometric test systems for diagnosis of virulent human diseases, such as ✓ urogenital infections; ✓ TORCH-infections (toxoplasmosis, roetheln, herpetic fever, etc); ✓ zoogenous infection (animal-borne); ✓ helminthiases (parasitic infections); and others. 2) Multiphasic tests based on protein “immunochips”. Tests simultaneously, in one sample, without usage of any appliances detect from 4 to 12 markers in a group of infections with similar semiology. Currently the following kits are produced: ✓ for the diagnosis of child vaccine controlled infections (morbilli, roetheln, parotitis); ✓ for the diagnosis of prenatal infections (herpetic fever, toxoplasmosis, roetheln, cytomegalovirus disease);

✓ for the diagnosis of viral hepatitis C.

## **2. Innovations and product advantages**

Advantages of the test systems based on the protein “immuno-chips”:

- 1) simultaneous detection of 4-12 infections in one sample on one immuno-chip;
- 2) it enables to test samples in ill-equipped laboratories;
- 3) shortening of the time of analyzes to 1,5 hours;
- 4) lowered cost of production in 2-2,5 times in comparison with the ELISA diagnosticums and kits.

Test system “Biogripp”, based on the analysis of the viral DNA and RNA, can detect a subtype of influenza virus. Further it can analyze the factors of pathogenicity of virus for human and animals. The main advantage of the test system is the ability to detect genetic types of influenza accounting for specific features of epidemiological situation. So it will be able to evaluate drug sensibility of virus.

## **6. “Sibenzyme”, LLC**

*Production and disposal of ferments of metabolism of nucleic acids and concomitant drugs used in molecular biological researches and genetically engineered works*

### **1. Products**

Basic direction of the company activity is finding new ferments of nucleic acid metabolism and the organization of their production. Products of «Sibenzyme» are used in molecular biology and genetic research, in medical DNA diagnostics, criminal science and other fields. The company’s assortment is more than 200 kinds of ferments.

### **2. Innovations and product advantages**

The company «Sibenzyme» is the world leader in the development of new types of ferments that cleave DNA. In the laboratories of the company the first site-specific DNA-nicking endonuclease was opened and described. For the first time ever the ferments of a new type of site-specific 5-methylcytosine-dependent DNA endonuclease were detected and characterized in details. Only 14 such ferments are known in the world, 10 of them are developed and produced in the company "SibEnzyme".

The company received more than 15 patents for new ferments and methods of their usage. The developed test systems will allow identifying cancer at earliest stages. Technologically the method is a variant of PCR-test, which is quite simple in execution, is used widely, even in the most outlying regions of the Russian Federation.



## Agriculture, veterinary, ecology

### 1. “AGRO-VESTA”, LLC

*Development, production and introduction of probiotics into livestock and poultry breeding*

#### 1. Products

The company develops, produces and sells probiotic products of “Zoovestin” series in liquid form. “Zoovestin” is used in agricultural production of animals and birds.

A series of these preparations was developed and produced on the basis of the strains of bifidobacteria and lactobacteria and indigenous microflora of gastrointestinal tract of pigs, ruminants and birds. The company introduces the technologies of the product application on case by case basis.

#### 2. Innovations and product advantages

The production of environmentally safe agricultural products without antibiotics and GMO is possible due to specially selected strains of bacteria and their high concentration in preparations. The work on technology of long-term bacteria activity preservation has been completed by the company “Bio-Vesta”.

Methods and technologies of application of produced preparations were specially developed by the company. They allow for increased efficiency of products: preservation, weight-gain, feed conversion ratio, strengthened disease resistance. The use of probiotics in industrial agricultural manufacture enables increased production (meat, milk, eggs) by 12-18% in short-term without additional capital investments.

### 2. “Biooil”, JSC

*Development and manufacture of bioproducts for cleansing of soil and water basins from oil and other types of pollution*

#### 1. Products

Bioproducts developed by the company use associations of bacteria, which consume oil acting as a decomposer. Bacteria go through freeze-drying process (freezing without dehydration in vacuum), thus useful properties are kept for a long time. Products are issued in powder form and applied by water spraying. Concentration of oil toxic components decreases and allows vegetation to grow in 2-3 weeks after application of the preparation into the soil. Products were certified according to demands of GOST R ISO 9001-2001 (ISO 9001:2000) and GOST R ISO 14001-2007 (ISO 14001:2004).

The company also monitors biosecurity of territories or water areas after cleansing.

#### 2. Innovations and product advantages

1) Technological “know-how” allows creation of preparations with microorganism concentration in 1 gram of the product is 1000 times bigger than in the similar ones. So the required amount per 1 hectare of contaminated territory will be several grams, while similar preparations require kilos. In addition, preparations are better suited for shipments and storage.

2) Use of products doesn't tilt the microbiological balance or ecosystem in contamination area.

3) As far as preparations are used in light doses, the usage of special protective equipment for respiratory system and eyes is not required.

4) The products could be used at low temperatures starting from +1C. It is one of the 5 Russian preparations used in the North of Russia.

5) Preparations “Biooil” cost 2-3 times less than analogues.

### 3. “VECTOR-VIRIN”, LLC

*Agricultural sector, biological protection of plants*

#### 1. Products

The company develops products, which eliminate pests living on agricultural plants,

including cotton worm. The technology is based on the use of viruses that are safe for humans as well as for plants. In comparison to analogues, it has a more effective strain and a composition of the obtained preparation.

The viral product VIRIN HSK is aimed at controlling the quantity of cotton worm (*Heliothis armigera* Hbn). The active form of the preparation is a virus of nuclear polyhedrosis of cotton worm, strain HS-18 (Russian patent N 2511042). The trials in Uzbekistan have shown that the biological activity of the preparation on 8th day after the fields treatment is 65-85%, on 12th day - 83-94%.

Also the company has developed a viral preparation VIRIN NSHK, which is aimed at controlling the quantity of gypsy moth (*Lymantria dispar* L.).

## 2. Innovations and product advantages

The main innovation of the technology is the new strain of virus affecting only arthropoda, with a higher pathogenicity, as compared to analogues. Field tests have shown that the preparation based on the proposed technology is min. 5% more effective than the best analogues, the specific consumption being less. The technology has the following advantages: 1) the preparation remains active at high temperature (up to 50 degrees Celsius) for at least 1 week, which is twice longer than the chemicals, and almost 30% better than similar bioproducts. 2) a special strain and an original composition prevent parasite from acquiring resistance to the product based on the technology. 3) the product is GMO-free. 4) safe for humans, plants and warm-blooded animals. Baculovirus preparations are very specific. Each species of baculovirus is pathogenic for its particular insect species and harmless for others. Such specificity ensures their ecological safety. Technological know-how allows adapting the technology for producing baculovirus preparation against any kind of insects.

According to the results of drug tests of VIRIN HSC conducted on cotton (cotton variety "S 6524") fields and farms of Namangan, Andijan and Ferghana regions of Uzbekistan, the biological effectiveness of the drug on the 8th day after the treatment was 82 - 92%, 12 days - 87 - 97% . The analogues of foreign production (Elcar™, Gemstar™, ViVUS Gold, and others) have an efficiency of 80 to 85%. Cost-effectivity of the drug VIRIN HSC is 75%.

## 4. "Mycopro", LLC

*Production of biological preparations based on predacious fungi*

### 1. Products

Production of effective and safe biological preparations based on predacious fungi against parasitic nematode of plants and animals and intended for stimulation of plants growth:

- biological preparations based on predacious fungi for plants parasitic nematodes control;
- biological preparations-stimulators of growth of plants based on predacious fungi.

Preparations are produced in both dry and liquid forms.

### 2. Innovations and product advantages

Biopreparations based on nematophagous fungi, which are natural nematode enemies, have the following advantages:

- **Ecological and biological safety.** The product is safe for humans, animals and insects.
- **Plants growth and development stimulation** (1 month after cucumber seedlings are planted in soil, their height exceeds that in the control group by 20-25 cm), the product prevents root rot
- **Raising of the yield**
  - Nematodes soil contamination under preparation decreases to 14%;
  - Addition to harvest of cucumbers is 2 kg on 1 sq.m. and more;
  - Potato productivity increases in 1,5 – 2 times;
  - A big-berry fraction in strawberry harvest increases by 5 – 17 %;
- **Prolonged activity** – economy on annual soil treatment (introduction of preparation 1 time per 2-3 years)
- **Low preparation consumption on square unit**
- **Effectiveness** of fungi strain (*Duddingtonia flagrans*) in comparison with other extracted

- strains-analogs and in comparison with chemical treatment and steaming
- **Wide spectrum of action:** gall, cyst-making, caulis eelworms of plants, animal helminthes.
- **Flexibility:** treatment of tuber, while planting, soil treatment
- Effective even in combination with other products (data available for “Regent”, “Trikhodermin”, “Prestige”)

## 5. “Patriot-Agro”, group of companies

*Agriculture, textile industry*

### 1. Products

Key areas of activity:

- growing and processing of flax and hemp for fiber for the production of nonwovens and for insulation of wooden buildings;
- growing and processing of grain and oil crops (flax, hemp, rapeseed, mustard, buckwheat, rye, oats, peas, wheat, millet); oilseeds for the production of vegetable and edible oils and crops for the production of feed for animals.

The company also produces:

- micronized flakes from food grain as high-calorie feed for farm animals (pigs, cattle, poultry, rabbits).
- hemp and flax of different fractions as raw material for the production of building materials, insulation, litter for animals;
- biomat "dry grass" - the organic fabric with implanted seeds of perennial lawn grass. It is used for landscaping, slope protection.

### 2. Innovations and product advantages

The company is gradually introducing no-till technology, thus reducing the cost of finished products and increasing yields. The company has extensive experience in the cultivation of industrial hemp in the Novosibirsk region, and of using no-till technology.

The no-till system has several advantages over conventional processing based on tilling:

- saving resources - fuel, fertilizer, labor, time, reduction of depreciation costs;
- reduced costs significantly exceed a slight decrease in yield and in the end ensures increased profitability;
- conservation and restoration of fertile soil layer;
- reduction or even complete prevention of soil erosion;
- accumulation of moisture in soil, which is especially important in the conditions of steppe. It gives a significant reduction in harvest dependence on weather conditions;
- an increase in crop yields due to the factors mentioned above.

In the near future the company plans to introduce a new technology for extraction of cannabinoids from industrial hemp.

## 6. “SIBAF”, LLC

*Agricultural sector, development and production of feed additives for animal*

### 1. Products

Products of the company:

- 1) probiotic feed concentrates "SibMos-pro", "Normolife";
- 2) prebiotics, immunomodulators "Diterpenol" "Immufon";
- 3) adaptogen of vegetable origin "AFERR".

Feed additives are made from natural, environmentally friendly raw materials. Designed for the prevention and treatment of gastrointestinal diseases in animals, cleansing of the body from toxic components, reducing the impact of negative stress factors of the environment, enhancing the immune status of an animal’s organism. The products have complex effect on improvement of mortality rate, productivity and growth of animals.

### 2. Innovations and product advantages

The advantage of products (for instance, SibMos-pro) is in the living microorganisms capable of producing astaxanthin (a carotenoid) in a host, it allows for compensation of vitamin A deficiency in the required amount. For this type of product there are no analogs on the market.

## 7. “SibBioPharm”, LLC

*Industrial production with microbiological synthesis*

### 1. Products

For the agrarian sector of the economy "Sibbiopharm" produces feed additives (enzymes, feed antibiotics, probiotics, mycotoxin adsorbent) biopreservatives for feed, biological plant protection products.

- To protect the forests from leaf- and conifer-chewing insects, the company offers bio-insecticides, which allow for preservation of the natural biological diversity of forest ecosystems.
- For the food industry, the company offers enzyme preparations for the production of alcohol, beer, kvass wort and products of starch processing.
- For environmental protection and preservation from oil pollution "Sibbiopharm" produces biological oil destructor "Destroil" with high hydrocarbon oxidizing activity.
- To ensure comfortable living conditions and protection of public from dangerous infectious diseases, which are carried by blood-sucking mosquitoes, the company produces the larvicide "Bactacid."

### 2. Innovations and product advantages

The drugs produced by "Sibbiopharm" are not inferior to foreign analogs but have lower price, which enables the import substitution. Moreover, many products have no analogues not only in Russia but also abroad. Thus, a larvicide against mosquitoes "Bactacid" is one of the most efficient in the world, as evidenced by international research. In India large water surface, home to mosquito larvae, is treated with this drug. Drug No.1 among biological agents for the treatment of wood from silkworm is "Lepidocide": each year it is used on more than 100 thousand ha.

## 8. “Sibitech”, LLC

*Production of veterinary diagnostic test-systems and pharmaceutical drugs*

### 1. Products

The company develops immunoenzymometric test-systems (ELISA) for diagnostics of infectious animal diseases, immunostimulants and antiviral preparations for veterinary usage.

At the moment the company produces test-systems for diagnostics of diseases such as brucellosis, leptospirosis, listeriosis, yersiniosis, chlamydiosis, mycoplasmosis, ascariasis, toxocariasis, toxoplasmosis, ureaplasmosis, opisthorchiasis, girardiasis of farm and domestic animals. Veterinary anti-viral preparation “Vetostim” and anti-viral direct acting preparation “Aviral-Vet” were developed.

### 2. Innovations and product advantages

The company is the only Russian developer of immunoenzymometric test-systems for diagnostic of infectious animal diseases using its own technology of antigen production. A sensitiveness and specificity of the company’s diagnostic kits is 100%. Comparing to the traditional methods of diagnostics, the productivity of analyses was increased on the average in 5-10 times.

Radioprotective and adaptogene properties of preparation “Vetostim” were discovered. It was shown that use of the preparation fastens detoxication of hard metals, in particular, strontium.

The most interesting results were obtained in experimental X radiation of animals at sublethal dose. The use of preparation allowed reactivating of irradiated animal’s immune reactivity. It was shown that the preparation has radiotherapeutic effect to immune system stem cells. Analogous effect was obtained in conditions of T-cells immunodeficiency, which was caused by preceding hydrocortisone injection.

Cost effectiveness of the drug "Vetostim" was calculated for 1000 heads. Given the higher safety and live weight of poultry, the meat yield in the experimental group exceeded the control group by 219 kg. Yield of meat of chickens in the test group was 71.77%, which is 0.36% higher than the control group (71.41%). Average daily feed intake in chickens in the experimental group was more than 5.1 g / day, in spite of that feed conversion is less than 0.09 kg. for chickens in this group. Index of productivity in chickens in the experimental group is more than 19%. The economic effect of the drug amounted to 10317 rubles. Cost-effectiveness per 1 ruble of costs amounted to 18.7 rubles., and profitability in the experimental group was higher by 6.8%, compared with the control and amounted to 19.1%.

## 9. "ECOFACOR", LLC

*Production of innovation feed complexes based on microalgae and probiotics for cattle breeding*

### 1. Products

The company designs and manufactures innovative, natural feed based on microalgae and probiotics for feeding farm animals and poultry.

### 2. Innovations and product advantages

Feed complex Algalat, designed to improve the safety and productivity of agricultural animals and birds without the use of antibiotics and GMOs.

It is a symbiotic complex, it has detoxifying, anti-oxidant and sorbent properties due to the synergistic action of the main components (algae Chlorella, lactic acid bacteria and zeolites).

Algalat:

- enables the production of environmentally friendly products of high quality;
- increases the average daily gain;
- reduces feed consumption (minimization of cost per unit of production);
- normalizes the flora of the gastrointestinal tract;
- improves the immune system and improves health;
- improves metabolism, increases safety and productivity;
- act as an effective alternative to feed antibiotics - do not accumulate in the body, non-toxic and non-addictive;
- mix and match perfectly with traditional foods.

Algalat creates favorable conditions for the formation of the normal microflora of animals and birds that contribute to the development of the organism's own interferon, which boosts the immune defense.

## **Nutrition. Functional food and supplements**

### **1. “Abies”, Innovation and production company, LLC**

*Development and production of functional food, cosmetic products and feed supplements based on bioactive substances of coniferous plants, sea algae and probiotics*

#### **1. Products**

1. Fir sbiten (saloop) is a non-alcoholic honey drink with Siberian fir extract and spices (ginger, cinnamon, star anise, and others.). Products are made according to traditional recipes using modern innovative technologies.

2. Fructose syrups with an assortment of spices: mint, cinnamon, dragonhead and hyssop. It can be used as a flavor additive for tea, coffee, pastries and other products.

3. Low-calorie natural sweeteners "Stevioside" and "Sucralose" for people preserving healthy lifestyle.

4. Functional foods series "Siberian fir":

- Vitaprinol cream with phytosterols for people with particularly sensitive skin.

- Vitaprinol mask with phytosterols for people with irritable scalp suffering from the initial stages of alopecia.

- Vitapriol cream pencil - lubricant for intimate hygiene with anti-inflammatory properties, removes atrophic processes.

- Vitaprinol biocorrector - source of natural phytosterols for recovery and correction of disorders of lipid, carbohydrate metabolism, immune status.

- Abiflor, a line of cosmetics and food products with blood vessel strengthening purposes.

The product is used in case of natural weakness of the walls of blood vessels and / or vascular lesions after medical treatment or chemotherapy.

5. Biological products “Trikhodermin” and “Metarisin” are used in crop farming (root rots treatment, against Colorado potato beetles).

#### **2. Innovations and product advantages**

1. The company has developed and uses its own innovative low-waste technology of extraction of biologically active substances from plant material.

2. The entire product line is manufactured without the use of chemical dyes, flavors, flavor enhancers; food products do not contain preservatives.

3. All food products use natural sweeteners, stevioside and sucralose, and therefore have a low calorie content and are suitable for diabetic diet and nutrition.

### **2. Baybakov V.I., self-employed entrepreneur**

*Development and production of prophylactic and medical bioproducts and biostarters with probiotics*

#### **1. Products**

New bioproducts were developed and launched into industrial production. Those products are based on bio-fermentation process of milk and meat and use specially selected starters and strains.

1. Starters are produced for bioproducts under the brand "Kefinarnaya"

2. The lyophilized starter is used for the production of fermented milk "Kefinar."

3. The freeze-dried starter "Kefinar" with prolonged shelf life (one year) is a starter for dairy, and dietary supplements, has high export potential.

4. In 2014 the first time in the meat processing industry of Russia the company started production of probiotic biosausage products "Kefinarnaya" (30 types).

5. Biosausage products have a number of useful properties, and contain:

- unique microbial substance kefirin with proven antibacterial and anti-tumor properties.

- Significantly reduced levels of sodium nitrite (colorant for sausages).

- Increased levels of antioxidants, vitamins, protein, lactose and bifidobacteria.

The bifidum and lactobacteria strains in "Kefinarnaya" bioproducts are recommended by the Institute of Nutrition for children and dietary products.

## 2. Innovations and product advantages

Biosausage products are based on unique technology of meat processing with phased use of starter “Kefinar” and industrial meat raw materials. It doesn't have analogues in meat processing industry.

Biosausage products contain significantly less of sodium nitrite (colorant for meat) comparing to conventional sausages, more of digestible proteins and aminoacids. The increased amount of bacterial antioxidants in biosausages decrease its oxidizing damage, which is important for storage, and it also improves useful properties.

Metabolites and probiotics make them useful during dysbiosis.

Thanks to the natural substance “kefiran”, produced by ferment "kefinar", bio sausage products could be used for additional prevention of cancer.

Special set of probiotic strains, used in microbial fermentation of raw meat, modify it by reducing the level of "wicked" low-density lipoproteins and increasing the level of "useful" high-density lipoproteins. Microbial symbiosis of living (not dry) probiotics in ferment «kefinar» conditions increased versatile enzymatic properties of meat. Also it provides acid resistance of products in gastrointestinal tract.

"Kefinarnaya” biosausage products can be used for preventing of atherosclerosis and obesity without special dietary restrictions in meat food.

## 3. “BIOAVANTA”, LLC

*Products and active substances for food, cosmetics, medicine and health industries*

### 1. Products

1. Food concentrate for production of energetics and functional food. It contains natural polyphenol with adaptogenic influence on human organism. It is used in production of lollypops “Bodryachok”.

2. Chitosan sol. It can be used in production of different cosmetics and pharmaceutical compositions. It is resistant to freezing and thawing. It can be used for production of aerosols (sprays for skin, spray for throat). A perspective cardiologic preparation based on sol is undergoing preclinical trials.

### 2. Innovations and product advantages

The company intentions are directed at creating of different lab and small scale productions of full cycle – from raw materials and up to final biological active substance in preparational qualities. The company staff uses original methods of production and synthesis.

## 4. “Bio-Vesta”®, the group of companies

*Development and production of dietary supplements and biobased products on the basis of pure culture of probiotic microorganisms*

### 1. Products

1. Dietary supplements “**Biovestin**”<sup>®</sup> and “**Biovestin-lakto**”<sup>®</sup>
2. Biobased products «**Biovestin-A**», «**Biovestin-lakto-plus**»
3. Products of functional nutrition «**Bifilin M**», «**Tonus**», «**Acidovestin**».
4. Acidified infant food for the first complementary feeding (kefir, bifidokefir, curd).

Product range is designed for system health enhancement and life quality increase. This is happening because of improving of human “internal ecology” (microbiological internal environment). In particular, products could be used for prevention and complex treatment of enteropathy and digestive apparatus diseases, in improving of metabolism and immune system reinforcement, cancer patients rehabilitation after chemotherapy, elimination of wastes and other goals.

### 2. Innovations and product advantages

“Bio-Vesta” was the first company in Russia which began to produce liquid probiotic products. The company applies its own innovative technologies and unique developments of the Research Institute of dairy products of the USSR. These technologies were improved by specialists of “Bio-Vesta” for the industrial production. Thank to these technologies, the

company has such advantages as:

- products are based only on active living microorganisms without any preservatives, lyophilization techniques and so on;
- the concentration of bifidus bacteria is  $10^9$  CFU in 1 ml, that's why clinical efficiency is 5-6 times higher than efficiency of analogues;
- technological "know-how" allows preserving high activity of living bacteria during the period of validity;
- formulations of nutrition products are developed to increase healthful effect. It happens because metabolism resultants of one kind of bacteria make positive effect on the livelihoods of another kind of bacteria.

Effectiveness of "Bio-Vesta" products was proved by numerous clinical trials in the leading clinics in Russia and confirmed by the Research Institute of nutrition of the Russian academy of medical sciences.

## 5. "BIOKOR", LLC

*Production of biobased products, probiotics for healthy nutrition*

### 1. Products

The company produces liquid probiotic bioproducts, which contain bifidum bacteria and acidophilic bacteria. Products are used for dysbacteriosis treatment, reactivation of microflora of gastrointestinal tract, immunity improvement.

Products:

- 1) Dietary fermented milk bioproduct "Narine-Forte".
- 2) Bioproduct "Bifidumbacterin "Bifishka".
- 3) Bioproduct "Bifidum N791BAG with antioxidants".
- 4) Active living ferments of bifidum bacteria and acidophilic bacteria.

The company produces insulated containers for protection of the products during long-distance shipments.

### 2. Innovations and product advantages

The products are produced by usage of special strains of microorganisms: "Narine TNSi" and "B.Bifidum N791BAG". Bacteria of these strains have increased acid tolerance and oxygen resistance, so they exercise their functions more effectively. They improve a microflora of gastrointestinal tract, provide a synthesis of essential vitamins, amino acids and other substances and down-regulate deleterious microorganisms.

Strain "Narine TNSi" is the only one "Narine" strain that was recommended by the Institute of Nutrition of the Russian Academy of Medical Sciences for production of dietary and protective nutrition. It was included in the Russian collection of industrial microorganisms for specialized storage.

The uniqueness of the strain Bifidum N791BAG and the original production technology ensure high effectiveness this bioproduct.

## 6. "Dia-Vesta", LLC

*Production of healthy food*

### 1. Products

The company produces:

- muesli and muesli bars of whole grains, seeds, nuts, dried fruit, prebiotics;
- jams and jellies from fresh-frozen Siberian berries based on fructose;
- vitaminized cookie with flakes of wheat germ and dietary brans;
- waffles and muesli bars with probiotics (bifidobacteria and lactobacterium);
- muesli bars for weight loss with goji berries;
- berries puree based on fructose;
- ingredients for food industry: cream line «Dia-Vesta»: concentrate of probiotics microcapsules with prebiotics - bifidobacteria and lactobacteria.

### 2. Innovations and product advantages



- 1) Products contain vitamins A, B1, B2, E, PP, C, folic acid and microelements K, Ca, Mg, P, Fe, Mn, I, Se, Cr, Zn, fibers.
- 2) The technology of manufacture provides the preserve of probiotics, vitamins and healthful microelements.
- 3) “Dia-Vesta” is the only one company in Russia that produces muesli bars and waffles with bifidobacteria and lactobacteria. Products are aimed at prevention of dysbacteriosis and improvement of the gastrointestinal tract. The microcapsule technology allows for sustained viability of probiotics for more than 6 months.
- 4) Products are useful for people with deficit of vitamins, vascular heart diseases, gastrointestinal tract diseases. Products are also suitable for patients with diabetes.
- 5) The products have low calorie content.

## 7. “Vector-BiAlgam”, CJSC

*Production of pharmaceutical immunobiological preparations, probiotic products*

### 1. Products

1. Vaccine “ALGAVAK® M” for infectious hepatitis prevention.
2. Immunoenzymometric test-systems (diagnosis of infectious hepatitis): “Vektogep-A-IgM”, “Vektogep-A-antigen”, “Vektogep- antibodies”.
3. Dietary supplements and biological products, based on bifidus bacteria and lactobacterium: “Bifidum BAG”, “Trilact”, “Ecoflor”, “Probioflor-Lacto”, “NariLak-Forte-B”.
4. Ferments of probiotic microorganisms for homemade cultured milk products.
5. Ferments and technologies for dairy industry.
6. Dried biomass of probiotic microorganisms "Astera" for the pharmaceutical and food industries.
7. Cultured milk probiotic products for functional nutrition of “BIFIDOM”, series: Bifidokefir, Bifatsil, Bifatonic.
8. Liquid lysate of probiotic bacteria “BifiLiz”, “LactoLiz”, “PropioLiz”.

### 2. Innovations and product advantages

In production process the company uses only its own developments and technologies, without participation of domestic or foreign companies. “Vector-BiAlgam”, CJSC is the exclusive Russian producer of infectious hepatitis vaccine, which is as effective as foreign analogue vaccines. At the same time, there are no antibiotics and preservatives in the vaccine, manufactured by "Vector-BiAlgam", unlike in analogues.

The production of vaccine against Hepatitis A “ALGAVAK® M” is in compliance with GMP. According to this standard the following conditions are met: high quality of raw materials, state-of-the art technologies, well planned premises and high-tech equipment, high qualification of hired personnel.

In order to produce dietary supplements, ferments and cultured milk products the company has its own collection of strains of bifidumbacteria, lactobacterium and propionate bacteria. The strain probiotic composition is more adjusted to physiology and stable in biological indexes than competitor’s strains. The manufacture is certified according to HACCP which guarantees control and safety at all stages.

The effectiveness of produced dietary supplements is confirmed by clinical tests. Usage of them normalizes digestion, eliminates dysbacteriosis, improves metabolic processes in the body, eliminates allergic reactions.

## Cosmetics and ingredients

### 1. “Laboratory VID”, LLC

*Production of cosmetics, concentrates for balneal procedures*

#### 1. Products

Products manufactured by A.N.Detsina’s recipe:

1. Concentrates for medical and preventive balnea, 14 types. Purpose:

- sustentation of skin well-being (cleansing, anti-inflammatory effect, lifting of skin, improvement of microcirculation, regenerative process).

Trials confirmed the following results:

- detoxication;
- lymphatic drainage effect;
- removal of allergic manifestations.

Theoretically it is possible to apply balnea in case of professional and community-acquired toxication to decrease concentration of environmental hazards in human body. Also it can be used for precipitation of clearance of antibiotics and other drugs or their metabolites after treatment.

2. Concentrates for washing-up and SPA-wraps, 14 types. Properties are similar to the balnea. Additionally, each type has its own purpose (to block the development of youth acne, implement soft peeling, to improve microcirculation, and so on.).

3. Cosmetic products for face and body skin care: cosmetic serum, toner- promoter of cell system, masks and botanical gels with cleansing, antibacterial, softening effect.

#### 2. Innovations and product advantages

1) The volume of osmotic activity of balnea and SPA-wraps with usage of company products corresponds to the osmotic activity of plasma and lymph of human body (300±15 mOsm/l). This promotes efficient metabolic processes between the human body and the aqueous solution in balnea. Detoxification and lymphatic drainage effect is provided.

2) Physiologic concentrations and balanced content of macro and microelements are kept in production. According to this parameter as well as the content of other biologically active supplements (amino acids, vitamins and others), preparations are comparable with human blood plasma.

3) Product does not contain chemical preservatives, flavoring agents or other ingredients that are dangerous for skin cell systems and human body.

### 2. “MICROLIZ”, LLC

*Production of cosmetics and perfumes*

#### 1. Products

The company is a producer of natural probiotic cosmetics based on the latest achievements, developments and research in the field of microbiology and biotechnology.

The composition of cosmetics include bacterial lysates and culture medium, and exclusively natural ingredients: honey, propolis, milk whey, resin, cedar and fir needles, leaves of stevia, echinacea and willow-herb.

The main objective of probiotics in cosmetics and beauty products is to affect the state of microflora of skin, thereby improving its protective function, preventing moisture loss, reducing the symptoms of inflammation, removing redness, coping with dryness and intensifying the work of fibroblasts, which stimulate the production of structural components of the skin - collagen and elastin. The numerous studies have shown that probiotics can exert a pronounced tightening effect, increase the skin's ability to regenerate and repair, reduce the number and depth of wrinkles, restore skin vitality. In addition, the company recently received the results of studies showing that when applied on skin probiotics reduce defects caused by acne.

Product range:

Cream-probiotic for the skin around the eyes with *Micrococcus Luteus*, 30 ml  
 Daily cream probiotic with anti-aging properties, 40+, 50 ml  
 Cream probiotic for night with anti-aging properties, 40+, 50 ml  
 Kefir hand cream: kelp and flax seed, 75 ml  
 Probiotic cream for sensitive skin, 25+, 65 ml  
 Cream with sea buckthorn and cedar sap, 65 ml  
 Cream with willow-tea and fir-tree, 65 ml  
 Face cream: stevia leaf and echinacea for enrichment and hydration of skin, 65 ml  
 Spray emulsion for dry and sensitive skin, 50 ml  
 Mask for hair and scalp with *Lactobacillus*, 200 ml  
 Face mask with anti-aging properties 40+, 75 ml  
 Fir foot cream with propolis and larch turpentine, 150 ml

## 2. Innovations and product advantages

Использование только натуральных компонентов и уникальных инновационных идей в производстве продукции.

Реализация косметики по доступным ценам для широкого круга потребителей.

### 3. Scientific and agrarian center “Oblepikha”, LLC

*Production of raw materials and ingredients for food, cosmetic and pharmaceutical industries*

#### 1. Products

The company operates in the segment of B2B, specializes in the production of raw materials and ingredients for food, cosmetic and pharmaceutical industries.

The list of products includes natural oils, extracts from plants and frozen fruit, dried (obtained by low temperature vacuum drying) and in powder form.

Products meet quality and safety requirements (standards of GMP, ISO 22716-2007).

#### 2. Innovations and product advantages

An important advantage is that the company uses its own raw material base, growing the raw materials for the production of oils and extracts - raspberry, currant, honeysuckle, buckthorn, valerian.

Main attention is paid to the introduction of modern varieties of local breeding, originating in Novosibirsk, Barnaul, Bakchar, Yekaterinburg.

The innovative potential of the company is sustained by the use of high-tech equipment in processing: a low-temperature vacuum drying, extraction with organic solvents and high pressure sterilization of finished products with fast electron beam.

### 4. “Pharmogel”, LLC

*Development and production of cosmetic products based on recombinant angiogenine, blood vessels growth factor, for prevention and treatment of skin and mucous membranes in conditions caused by vascularization malfunction*

#### 1. Products

In collaboration with “The center of vortex technologies”, LLC, the company manufactures products based on recombinant angiogenine (ANG) by patented technology:

- essence of recombinant angiogenine
- a line of cosmetic products “Pharmagen” and “Angiopharm”, which include:

Cosmetic gel “Angiopharm “Reactivating”, which is used for prevention and for complex therapy of skin cover damages as additional remedy.

Cosmetic gel “Angiopharm “Blue vessel tonic” promotes reactivation of local blood supply, skin elasticity and plasticity. Appliance of this gel decreases pain and visible appearances of enlarged capillaries (vascularity spots)

Oral care balm “Angiopharm” Dental” for the prevention of gingivitis, atrophic gingival mucous processes, parodontosis, quaggy, bleeding gums. People with crownworks or overlay dentures can use the balm for reduce of inflammation processes and excitations of tissue in a field of apposition of crownworks and overlay dentures with gingival.

## **2. Innovations and product advantages**

At the present time high efficiency medications, which specifically regulate growth of blood vessel, don't exist in Russia and abroad. Similar medicinal drugs are on the front burner for patients with open trophic ulcers, bed sores, diabetic foot, high degrees of burns, freezing injuries.

One of perspective directions in clinical medicine is development of methods of reactivation and growth of own arteriolo-venular bridge (controlled process of angiogenesis). Angiogenesis is necessary for normal growth of embryonal and postnatal tissue, wound repair, forming of collateral blood flow, stimulated by ischemia. It's difficult to regulate a growth of blood capillaries because of too many conditions and biologically active substances which take part in this process. However, it's known that angiogenin protide plays the key role in the angiogenesis process.

Angiogenin belongs to a group of angiogenic proteines that stimulate a growth of blood vessels. It evinces a high angiogenic activity and causes a vasifaction at extremely concentrations: one part per quadrillion (1:10<sup>15</sup>).

Preclinical trials of recombinant angiogenine demonstrated its high reparative properties. It is proved that this protein can be the base of the creation of high efficiency medications for treatment of trophic ulcers, burns, post-procedure recoveries and other diseases, related with vascularization abnormality.

Unique effects of wound and skin damages healing without cicatrixes must be noted. An immunomodulatory function of treatment is also important. Activation of local skin immunity has a high therapeutic effect in diseases, connected with disturbed circulation, and skin diseases.

In case of application of angiogenin preparations on healthy skin an express antiaging effect takes place: angiogenin penetrates through stratified epithelium and basement membrane in dermis and connects with actin of endothelial cell surface. So it reactivates and improves the work of fibroblasts on making and regenerating of elastic components of dermis (collagen, etc.).

## Equipment and medical products

### 1. “Vertical M”, LLC

*Development and production of medical devices*

#### **1. Products**

The company develops and produces micro drainages for ophthalmology based on synthetic and biological polymers; medical devices, composite porosity drainage for surgical treatment of glaucoma (“Surgical micro drainage”).

#### **2. Innovations and product advantages**

At the moment there is no ideal solution for drainage system for surgically treatable glaucoma, which could provide an effective and long-term drain from inner eye compartments.

The company’s product offers such solution.

Drain tube is composite, consists of biological and synthetic polymeric materials, structured for shaping of micro channels with the diameter less than 100 micron.

A phenomenon of capillary liquid flow and pressure gradient between the Schlemm's canal and subsclerotic spatium was applied in producing of the drain tube.

Competitive advantages of the product are: lower primary cost of development, effectiveness in usage. The latter is determined by the usage of capillary effect, constitutive and composite properties of materials, used in production.

### 2. “SibBioGas”, group of companies

*Environment, processing of organic waste, renewables*

#### **1. Products**

The company specializes in providing services for the design of a biological process in biogas plants. Employees of the company have unique experience in designing, equipment selection and study of the project to launch the station as well as in the modernization, the development of equipment or turnkey solution. The process is carried out in collaboration with experts from Germany.

The complex of works includes the following:

- Pre-project analysis, feasibility study and design of systems for the environmentally friendly recycling of waste products to produce more marketable products - organic fertilizer, heat and electricity;

- Development and approval of energy projects based on renewable energy sources (RES) - biomass, solar energy (heating, domestic hot water, electricity) for industrial enterprises, agricultural producers, private homes, cottages, recreation centers;

- Selection and organization of the supply, installation and commissioning of equipment in projects for renewable energy sources (gas-fired generators, solar panels and collectors, cogeneration plant);

- Selection and organization of the supply, installation and commissioning of equipment for the processing (extruders, turners, etc.);

- The organization of project financing with the involvement of some European banks and funds, up to 85% of the total cost of the project;

- The organization of training courses in the field of "Security in the handling of hazardous waste. Resources and energy saving technologies" on companies abroad (Italy, Germany).

#### **2. Innovations and product advantages**

The company operates on the turnkey principle on issues related to waste management, including analysis, feasibility study, selection of equipment and technological solutions, software delivery, installation, configuration and start of the process. The company also provides assistance in obtaining funding for projects with the involvement of a European bank on preferential terms.

The company's specialists have the required education and high work qualifications, trainings at plants in Italy and Germany. The company is constantly involved in various business

missions, presentations, exhibitions, including abroad (China, Germany, Italy, Czech Republic). The company actively cooperates with the Coordination Council on the ecology and conservation of the natural heritage in Siberia.

### **3. “Siberian innovation center”, LLC**

*Development and production of medical equipment*

#### **1. Products**

The company has developed a new treatment in the sphere of chrono-magnetic therapy. Chronotechnology is implemented on the basis of magnetotherapeutic device “PhysioMag”. It is suitable for treatment of all tissues and organs, which biological rhythms fall into the range of its working frequencies. The device is intended for treatment of different diseases on the basis of medical and prophylactic establishments.

#### **2. Innovations and product advantages**

The device is developed based on the fundamental feature of living matter – rhythmicity of biological processes and lability (changes of biorhythm characteristics in time). All biological processes in organism are accompanied by the biological rhythms. Rhythm is an oscillatory process, which main characteristic is frequency. So every tissue of the organism has its frequency. In case of a disease the disturbance of physiological and oscillatory processes take place and the frequency of ill tissue changes from a healthy one. Chronomedicine thinks that treatment of diseases can be implemented not only by restoring metabolic activity, but also but correction of deviations in oscillatory processes. Based on that assumption, treatment by the method of chrono-technology, unlike chemotherapy, is directed at restoration of disturbed oscillatory processes by method of frequency synchronization of biological rhythms of sick tissue. Depending on the type of disease, the positive dynamics increases by 10-12% and the recovery period shortnes by 10-15%. The cost of the device is comparable to conventional magneto therapeutic devices.

### **4. “The center of vortex technologies”, LLC**

*Development and production of gas-vortex bioreactors for various industrial and medicine sectors*

#### **1. Products**

The company produces:

- laboratory gas-vortex bioreactors of second generation for scientific researches of different directions;
- industrial gas-vortex bioreactors for the biotechnology industry;
- technological lines for production of feeding sugar from grain material.

#### **2. Innovations and product advantages**

Gas-vortex bioreactor is an apparatus with a fundamentally new way of mixing the liquid. It is carried out by controlled vortex at the expense of pressure fall over the surface and frictional force of airstream on the liquid.

Vortex is formed by special activation dopant, installed over it.

Vortex method of mixing allows overcoming weaknesses of traditional bioreactors, such as mechanical damage to cultured cells, low mass exchange, existence of turbulent and stagnant zones, high power consumption, low characteristics at working with viscous fluids, problems of scale operations, limited use and low effectiveness in many industrial processes.

Gas-vortex bioreactor provides high economical efficiency in the industrial use. It also decreases an environmental impact due to lower resource consumption (electricity, etc).