

## OUR PROJECTS

Following global trends in the development of efficient production of alternative protein, we were able to create almost ideal conditions for the production of highly digestible alternative protein and other alternative products from strains of edible fungi (Fungi based protein) and other microorganisms.

All our technologies have been tested and confirmed by the possibility of actual production. Using existing process equipment, we can produce three main components of alternative protein:

- Highly digestible alternative protein;
- Natural red color;
- Taste and odor;

### **Highly digestible alternative protein**

Based on the results of many years of research, experiments and selection to modify existing publicly available strains of microorganisms, using our own proven technology with predetermined conditions, we obtain actual results in growing an alternative protein based on the deep fermentation of of edible fungi (Fungi based protein).

Solving the problem of biological growth cycle reduction and most effective yield of biomass, we adapted our own strain of a edible fungus to the nutrient medium, that has a high growth rate (yield), relatively easy production technology, rapid adaptation to deep fermentation conditions, and resistance to bacteria, fungal and viral diseases.

As a nutrient medium, flour of food grain crops (wheat, rye, barley) is used; moreover, the stems and cobs of food grain crops and wastes of winemaking, viticulture and production of ethyl alcohol and ethanol can also be used after relevant pre-treatment.

The resulting own culture of the strain differs significantly from other generally available microorganisms in all qualitative parameters including the ability to convert carbohydrates, cellulose and starch into protein.

**The microbiological methods and algorithms used to obtain our own strain culture are our know-how.**

The chemical composition and purity of the protein, which is a product of the food fungi metabolism, make it possible to be used for humans as highly digestible alternative protein that is rich in amino acids and vitamins, does not have animal origin and is considered a product of microbiology.

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The arrangement of fermentation process makes it possible to control the composition and ratio of amino acids (9 essential and 11 recommended), vitamins A, E and B-group, macro- and microelements in the biomass obtained as a result of the metabolism of edible fungi.

If it is necessary to give the biomass a fibrous structure typical of animal meat (texturing), it is exposed to high pressure and temperature.

In addition to solving issues related to texturing, when exposed to pressure and temperature, the accessibility (digestibility) of protein increases and makes amino acids more accessible due to the transformation and destruction of secondary bonds in protein molecules, while amino acids remain intact.

If it is necessary to provide a color and taste typical of animal meat to proteins, the following can be added to the biomass after structuring:

- lipids (fats);
- **food yeast autolysate**, which provides necessary taste to the protein;
- natural red powder that gives relevant meaty color to the protein.

If necessary, vitamins, natural energy shots, herbs and spices can also be added to the protein to provide special taste and odor.

To further enrich the protein composition with amino acids and vitamins, a certain amount of Spirulina microalgae grown in our production premises under own technology and having no odor can be added to the biomass.

**Unlike existing alternatives, the technology developed by us makes it possible to obtain highly digestible alternative proteins richer in amino acids and to achieve a higher growth rate (yield) in less fermentation time using relatively inexpensive raw materials.**

### **Natural red color**

Natural red color is achieved by using natural red powder that is produced using own technology by fermentation as a product of microorganism metabolism obtained by us through selection and modification of existing publicly available strains. Yeast extract and

sucrose are used as a nutrient medium. Red powder belongs to E120-class of carminic acid and is a natural dye of non-animal origin that makes it unique for for vegetarian use by vegetarians and vegans.

Red powder is a fine powdery substance of dark red (burgundy) color, light-resistant, heat-resistant that does not undergo oxidation, does not change color depending on pH (stable at pH = 3.5-9), and is soluble in water, vinegar, egg white, ethanol, etc.

The red powder does not cause any allergic reactions and, according to studies, it is completely harmless to the human body even at the highest concentrations.

**Unlike existing alternatives, the technology developed by us allows us to obtain natural red color that is lightfast, temperature-resistant and stable at various pH values.**

### **Taste and odor**

If it is necessary to obtain the taste of animal meat, we use **food yeast autolysate**, the composition and content of amino acids, vitamins, macro- and microelements in which exceeds that of the meat of animal origin.

Having conducted relevant research and experiments, we were able to adapt food yeast to a state in which, during the fermentation under microbiological method, the microorganism can absorb the necessary nutritional medium.

The biomass formed as a result of the metabolism of the microorganism undergoes autolysis to create the conditions that activate the enzymes located in the pulp and completely destroy its own cell membrane with the extraction of useful substances from the inside without external intervention.

Autolysate is subjected to heat treatment, during which a transition between the tastes of different types of meat, poultry and fish occurs.

If it is necessary to produce alternative protein with no taste of meat, poultry or fish, other yeast is used, and the autolysate obtained as described above is not subjected to heat treatment.

**Food yeast autolysate** gives the desired taste to highly digestible alternative proteins, increases protein content, and enriches them with amino acids and bioactive additives.

**Unlike existing alternatives, the technology developed by us make it possible to obtain nutritional yeast autolysate richer in amino acids, vitamins and beneficial elements without the use of various chemicals.**