

## SELENIUM-ENRICHED FODDER YEAST: PRODUCTION AND APPLICATION IN STOCK BREEDING

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CZU:636.087.7

<https://doi.org/10.52757/imb22.74>

The growing market demand for selenium-containing food and feed products is accounted for by their vital role in ensuring normal life activities of humans and animals. This microelement displays antioxidant, immunomodulating and detoxifying properties; it is directly involved in formation of active sites of some enzymes. The shortage of selenium results in disbalance of metabolic processes, growth retardation, degenerative changes in organs and tissues, reproductive dysfunction.

So far to upgrade fodder selenium was added as inorganic compounds distinguished by poor assimilation rate, inadequate biological efficiency and high toxicity. Lately organic Se-containing substances of synthetic and microbial origin came into use. The latter are represented by selenium-accumulating yeast species where this trace element is localized in readily digestible, bioaccessible form. Moreover, selenium-enriched yeast contains high-quality protein, minerals, vitamins and essential amino acids. Application of selenium-supplemented fodder yeast raises metabolic, biochemical and immune status of reared animals, improves digestion, diminishes risks of pathologies caused by malfunction of gastrointestinal system and metabolic disorders due to selenium deficiency, increases productivity, saves feed expense, enhances survival rate of farm stock and poultry.

To manufacture fodder premixes upgraded with organic selenium the adapted to the microelement yeasts of genera *Saccharomyces* and *Candida* find most wide-spread use. They lay the basis for readily available, economically grounded and ecologically safe technology of commercial production of organic selenium additives.

The top manufactures of selenium-upgraded alimentary and fodder yeasts in the world are the following companies: Pharma Nord, Garuda, Angel Yeast, Lesaffre, Alltech, Miro Chembiotech, Lallemand, ADM, ABF and some others. According to the Global Market Insights Inc. report, the overall volume of this biotechnological commodity by 2027 is expected to surpass 285 mln US dollars. The forecast for global demand of Se-enriched fodder yeast is likely to exceed 175 mln US dollars. The rising consumption of this market product was provoked mainly by imposed ban in European Union on introduction of antibiotics and growth promoters into feed rations.

There is no production of similar products in Belarus, while in the conditions of intensive development of animal husbandry and moderate deficiency of trace elements in water and soil, the demand for selenium-containing feed additives in the country is increasing, as well as in the world as a whole. Now a pilot-plant process for production of Se-enriched fodder yeast based on adapted to the microelement strain *Candida* sp. 4-ASe is being developed at the Institute of Microbiology, National Academy of Sciences of Belarus.

The preliminary trials of pilot batch of feed additive into the rations of sucking calves indicate 4,7–7,3% increase of average daily live body weight gains as compared with the control group. It was also found that Se-yeast consumption by sucking calves results in recovery of gut microbiota represented by bacteria of genera *Lactobacillus*, *Bifidobacterium*, *Bacillus*, *Clostridium*, *Enterococcus*, whereas the ratio of coliform bacteria (*Escherichia coli*) tends to decline.

Generally, supply of new additive into feed rations of sucking calves is conducive to their physical and reproductive health, normalizes composition of intestinal microbiota, raises the yield and quality of farm produce, contributes to output of foodstuffs intended for prevention of diseases associated with selenium deficiency.