

Use of spent active sludge for the production of organo-mineral fertilizers «AgroBellum»

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Abstract – For the normal nutrition of plants, not only nutrients are required, but also the maintenance of biotic activity of the soil. AgroBellum NPK is also a unique microbiological fertilizer, in which live in useful biocenoses microorganisms that create soil fertility, promote better assimilation by plants of nutrients.

Keywords – fertilizer, aerobic silt, AgroBelum NPK's, biotechnological, complex organo-mineral fertilizer, mineral nutrition, macro- and microelements

Introduction

Enzim Company is a large Ukrainian company, which is the undisputed leader in the domestic market of yeast products and exports about 40% of its products to 13 European countries [1].

The enterprise uses biotechnological methods for industrial water purification using aerobic silt, which is represented by a fine dispersed suspension.

The whole process of dehydration is in automatic mode, but there is also the ability to manually manage the process to a certain extent by hand. The main task is to obtain an environmentally safe product that can be used as a complex fertilizer.

AgroBellum NPK is a highly efficient, balanced nutrient, ready-to-use, environmentally safe, complex organo-mineral fertilizer. Its use makes it possible to grow environmentally friendly agricultural production based on international standards [2].

AgroBellum NPK is a fertilizer of complex action and contains the necessary components for plant nutrition and soil fertility enhancement - organic basis, balanced mineral nutrition (NPK), macro- and microelements

Main part

The reason for the launch of the organo-mineral fertilizer production line is a significant increase in aerobic sludge (up to 50% of the consumption of CHC), which is used in the second stage of wastewater treatment.

Advantages of AgroBelum NPK over traditional organic and mineral fertilizers are the increase in the amount of mineral fertilizers introduced into the soil by intensive technologies, leads to undesirable environmental consequences. It was established that plants absorb only 40-50% of nitrogen, 20-30% of phosphorus, 50% of potassium, which introduced with mineral fertilizers. AgroBellum is an environmentally friendly fertilizer that does not have harmful toxic effects on humans and animals, enriched with trace elements, which in turn increases the time and reduces the loss when storing the crop. Also, fertilizers reduce the negative effect of chemical plant protection products. Nitrogen, phosphorus and potassium in AgroBellum are more effective due to the nature of their availability for the root system at the time of mineral nutrition of the plant, reduction of nitrogen losses due to nitrification and its washout in the case of the addition of mineral tukiv outside the root layer and losses in the processes of

denitrification. In mineral fertilizers faster pass processes retrogradation of phosphates (the formation of difficult soluble compounds) than in organomineral complexes, in which the highest factor is the use of plant nutrition elements. Mineral fertilizers have a one-sided influence on the agrochemical parameters of soil fertility, increasing the content of nitrogen, phosphorus or potassium with a one-time acidification of the soil solution due to the fact that all mineral fertilizers are physically or physiologically acidic compounds. Systematic application of only mineral fertilizers leads to decalcification and dehumidification of the soil. AgroBelum NPK's integrated action enables high yields at low doses of NPK in fertilizer and, at the same time, to obtain agricultural products with high quality characteristics, which in turn increases storage life and reduces crop losses and storage costs.

Nitrogen, Phosphorus, Potassium, Calcium is a compulsory component of all protein substances, its content in plant proteins varies within (14.7 - 19.5)%. With insufficient supply of nitrogen, the growth of plants is delayed, the size of the assimilation surface of the leaves decreases and the duration of their life, the content of chlorophyll decreases, the crop sharply decreases and its quality deteriorates. Insufficient provision phosphorus of plants at a young age can not be corrected by increased phosphorous nutrition at a later date and leads to a shortage of crops. Sufficient supply of potassium weakens the negative effect of excess nitrogen nutrition, increases the strength of the stem of cereals and their resistance to depletion, prevents for early maturing with excess phosphorus. Calcium in plants is required to convert absorbed nitrates into organic compounds.

Organic substance: 1) promotes the consolidation of individual soil colloids into larger aggregates with the formation of a stable soil structure that creates good conditions for intensive gas exchange, easy penetration of moisture into the soil, active root system growth and high biological activity; 2) serves as a transformer of nutrients in the soil; 3) promotes the development of soil microorganisms. Organic matter in the soil is constantly undergoing transformation, decomposition and mineralization, which results in a significant amount of nutrients available to plants.

Macro and microelements (magnesium (Mg), sulfur (S), iron (Fe), copper (Cu), manganese (Mn) - "elements of life", which are necessary for the normal life of plants that increase the immunity of plants, make it possible for the plant synthesize a full range of enzymes.

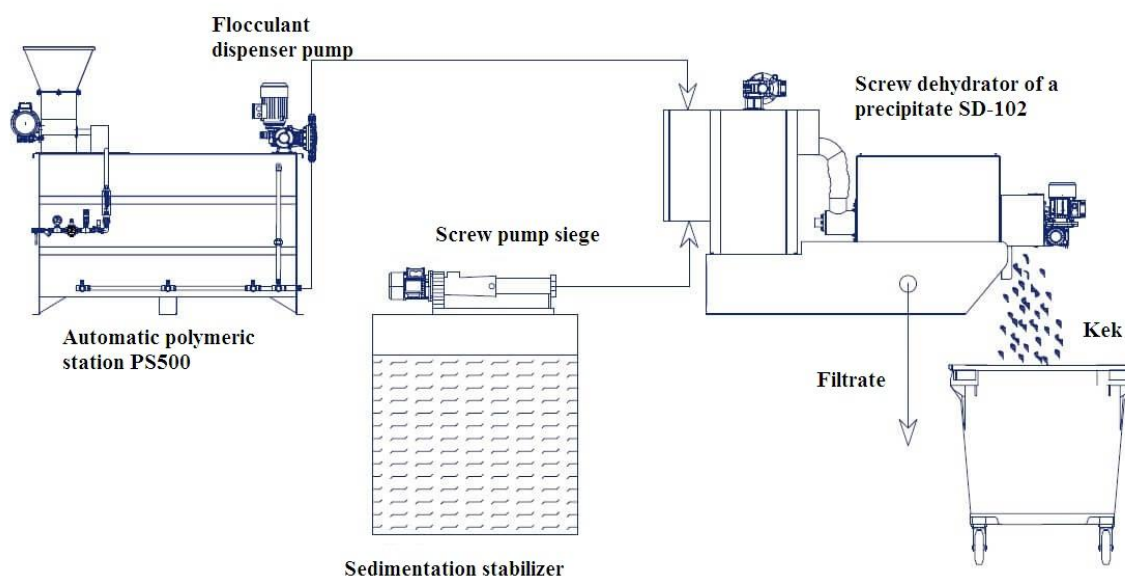


Fig.1. The technology of dewatering active sludge.

The technology of dewatering active sludge is shown in Fig 1. Dehydration of the active silt begins when excessive active silt, in a predetermined amount, pumps pumped from aerobic reactors to the sludge compactor. Then the silt through the pipeline gets to the sediment tank combined with the macerator. The macerator serves for grinding various kinds of coarse dispersion impurities. Next, the screw pump mules are fed to the decanter itself, where separation of liquid and dense phases occurs. To improve the effect section, a flocculent solution is also fed to the decanter, where he prepares at the flocculant preparation station Fig.2 . Further, the depleted silt is screwed onto the conveyor and shipped to the transport vehicle for export. The liquid phase, the so-called concentrate, falls into the reserve capacity, from where the pumping pumps 6 are pumped off to the beginning of the treatment facilities.

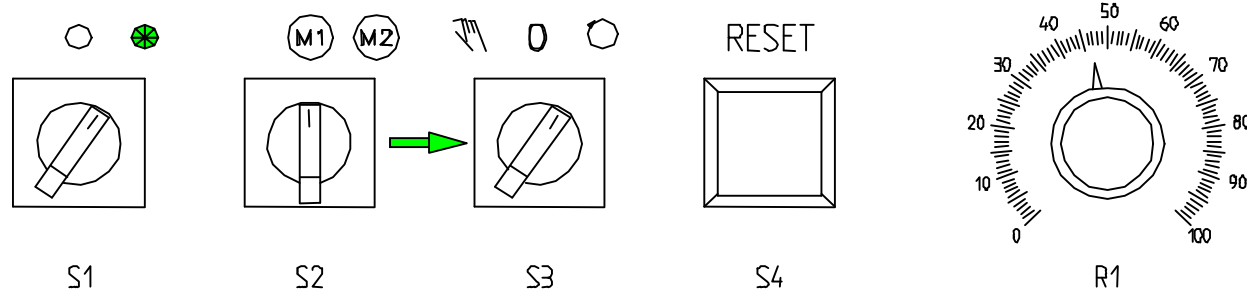


Fig.2. Control units of the flocculant dissolution station.

- S1 - Switch ON / OFF; S2 - Regime dosage, dry material / concentrate of liquid (M1 / M2);
- S3 - Dosage mode, Filling - 0 – Automatic; S4 - Failure Check (RESET)
- R1 - regulation concentration of solution

Conclusion

AgroBellum is an environmentally friendly fertilizer that does not have harmful toxic effects on humans and animals, enriched with trace elements, which in turn increases the time and reduces the loss when storing the crop. Also, fertilizers reduce the negative effect of chemical plant protection products. ecological fertilizer has no side defects - toxic effects of chemical fertilizers and a large number of bacteria remaining from the life of cattle: E. coli, etc. In addition, unlike manure, which slightly strengthens the soil, "AgroBellum" neutralizes it, because it alkaline environment

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