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**THE MINERAL FERTILIZER GRANULES ENCAPSULATING
IN A MULTISTAGE SHELF APPARATUS****R.O. Ostroga, S.P. Shevets**

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Currently the production and rational use of fertilizers is extremely important for agriculture, and before science there is a task to develop environmental friendly technologies of manufacturing and use of fertilizers. Nitrogen fertilizers (ammonium nitrate, urea) and phosphorus ones (superphosphate, ammophos) dominate in the range of mineral fertilizers used in all edaphic-climatic zones all over the world. They are transformed in the system soil - plant and provide the needs of growing plants in nutrient components. But along with the well-known advantages these fertilizers have significant drawbacks. They are highly soluble and they are quickly washed out from the arable layer, which leads to surface and groundwater contamination. Also, due to inefficient plant nutrition at different stages of growth, nitrite and nitrate accumulate in the main agricultural products.

One of the promising ways of improving the properties of various materials is modification of the starting materials by layering the protective shell on their surface. Such coating modifies physical and chemical properties of the substances, improves their quality and extends their functionality; it enables to improve their performance characteristics.

The main purpose of fertilizers encapsulation is to provide slow or controlled release of target components and it increases the efficiency of the produced fertilizers and it enables to reduce the quantity of fertilizers applied into the soil. There are developed different types of capsules and various methods of their application. However, in most cases, for the obtaining of high-quality protective capsules one requires expensive polymer coatings and further additional processing of raw granules.

Methods of improving fertilizers quality which are not very complicated and which don't require tight and expensive reagents are of great practical interest. At the same time there is rapidly spreading organic production in the EU countries and in the world. Since it is an integrated system of management and food production.

This system, first of all, takes into account preservation of the environment, biodiversity level, natural resources and application of high standards and methods of fertilizer production. Organic farming aims to improve public health by the production of high-quality food, soil conservation and environment preservation, as well as the promotion of local and regional production units. Therefore, use of organic waste as a capsule shell is very relevant, because it solves the task of obtaining organic-mineral fertilizers of prolonged action and at the same time it solves the problem of organic waste disposal.

Using a many-stage countercurrent contact of a fluidizing agent and dispersed phase in the fluidized bed during the heat exchange process is a perspective way of reducing economic and energy costs. Therefore, in order to reduce the cost of processing wet materials and increase the uniformity of particle size distribution of the final product one offered to carry out the process of granules coating with organic substance in a many-stage shelf apparatus with the suspended layer.

The proposed technology for producing organic-based granules in a fluidized bed apparatus enables to increase the obtained fertilizers efficiency and to minimize quantitative incorporation of fertilizers into the soil, and so it provides much less environmental pollution.

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