

Thematic priority of the conference is Nanobiotechnology

The hydrogel nanocomposite for artificial soil. Efficiency and rheological properties

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Modern biotechnologies assume obtaining ecologically clean agricultural products under controlled conditions. In this regard, acrylic hydrogels saturated by nutrients necessary for plant growth are of great interest as a base for artificial soils.

To prepare the artificial soils the polymer hydrogels on the base of copolymer of acrylamide-acrylic acid (AA) were used. Monomers ratio was 5:3, concentration of crosslinking agent - 0, 654%. The hydrogel matrix was saturated by micro- and macroelements from solutions in accordance with [1] and used as an artificial soil separately or as a mix with sand at ratio 4:100 [2]. As a result of incorporation into the hydrogel matrix, nanocomposites of bioelements were formed from slightly soluble metals compounds capable to prolonged release from the hydrogel template through its nanopores under the influence of root exudates of plants. The rheological properties of dispersions of gel, sand, natural soil and gel-sand mix were studied by means of rotational viscometer Rheotest 2. Structure-mechanical properties of the dispersions were characterized by interparticle connection parameter (ICP). It is shown that mixed sand-gel system has maximum ICP value, which indicates rather high hardness of this system, whereas gel dispersion ICP is 10 times less; minimum ICP value – in sand dispersion. ICP parameter value of natural soil dispersion takes an intermediate position between gel-sand and gel dispersions. The high efficiency of the received artificial soils was established in vegetation experiments of cucumber seeds cultivation.

1. *Soldatov V.S., Peryshkina N.G., Khoroshko I.G. Ionite soils.-Minsk: Nauka i tehnika.-1986.-272p.*
2. *Nikovskaya G.N. et al. Artificial soils on the base of acrylic hydrogels // Dopovidi Natl. Acad. of Sci. of Ukraine.-2012.-№8.-P.97-101.*