

"Nanochemistry and biotechnology"

Application of aliminde nanoparticles for purification of sugar production semi-finished products from high-molecular compounds

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Process of saccharose extraction in continuous diffusion apparatuses with further pressing of spent chips (cake), according to the technological scheme of sugar production, contains 35-60% of cake-pressed water in addition to mass of sugar beet depending on the technological capabilities of the presses and content of dry substance in the pressed cake. Repeated use of such water with significant content of high molecular compounds requires additional refining, and draining of such water in water reservoirs is inaccessible [1].

Relevance of application of the cake-pressed water in process of saccharose extraction is related with reduction of saccharose lost at diffusion separation as well as necessity of implementation of efficient water consumption at sugar producing plants [2].

Different aluminum based coagulants are actively used in current schemes of water treatment at sugar production. Carried investigations used a hyrogel based on aluminum nanoparticles, produced by means of dispersion of encapsulated nanoaluminum in "polyethyleneglycol -water" system [3]. The results of investigations showed that treating of the cake-pressed water by reagent with nanoaluminum reduces amount of proteic and pectic substances by 50 and 70 %, respectively. At that, pectic substances are removed slowly than proteic ones. Rational temperature of the treatment process makes 55 °C that, in turn, requires additional heating or cooling of the treated water. Duration of treatment process at that makes 10-15 min. As a result the effect of water treatment rises to 23% in comparison with traditional aluminum coagulants. This provides for the possibility to use this water again in the diffusion apparatus and secure optimum process of saccharose extraction from beet chips.

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3. US 8491972B2 Method of producing encapsulated nanopowders and installation for its implement Ustinov A.I., Melnichenko T.V., Liapina K.V., Chaplyuk V.I., 23.07.2013.