

MANUFACTURING TECHNOLOGY, STRUCTURAL AND MECHANICAL PROPERTIES OF A NEW COMPOSITE AGRICULTURAL MATERIAL «CHITOSAN-TITANIUM DIOXIDE»

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The granular form of the composite material «chitosan-titanium dioxide» has prospects for use as bioprotective additives for plants that meet the various requirements of modern agriculture. The article presents two methods for obtaining a composite material «chitosan-titanium dioxide» in a granular form with different content of titanium dioxide in the resulting composite material: 25, 37.5 and 50% of the mass. The methods differ in the final drying of the composite material: in air and freeze-drying. As a control, we used chitosan granules without the addition of titanium dioxide, obtained by the same methods. The structural features of the obtained samples are considered using optical and electron microscopy. The mechanical properties for compression of the obtained granules of a composite material were studied in comparison. It is shown that the use of various types of drying dramatically affects both the structure and the mechanical properties of the resulting material. The described effect of the type of drying on the properties of the obtained material can become the basis for the technology of industrial production of various types of new bioprotective additives for plants based on chitosan.

Keywords: Chitosan, titanium dioxide, composite material, agriculture, bioprotector, mechanical properties, structure.