Production of Chitosan-Cellulose Blends under Conditions of Shear Deformation

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Cellulose is the most abundant natural polysaccharide; chitin, which is contained in the shells of crabs, is the second most abundant.

Natural cellulose is one of the most widely used commodity polymers. Its applications involve man-made fibers, films and the textile industry.

The interest in chitin and its deacetylated derivative chitosan is associated with the good film- and fiber forming properties and the biological activity demonstrated by chitin and chitosan derivatives.

The production and properties investigation of chitosan-cellulose blends under conditions of shear deformation in the absence of solvents is a very promising field of chemistry and physical chemistry of carbohydrates.

Earlier we have studied the solvent- free cellulose and chitosan interaction under these conditions with solid low-molecular compounds (alkalis, monochloroacetic acid, stearic acid, two-basic carboxylic acids, anhydrides of these acids) and their corresponding mercerized, alkylated and acetylated derivatives have been obtained. The mechanism of the reactions studied has been proposed and the structure and parameters of the products have been determined..

As a result of chemical interaction of cellulose and chitosan in the presence of catalysts or curing agents the products obtained demonstrate both unique properties of chitosan and the availability of cellulose. The mechanical, sorption, separation and colloid properties of these products have been studied. A possibility of using the products as polymeric films, membranes, matrices for immobilized enzymes and flocculants has been shown.