



OBTAINING AND APPLICATION OF CARBOXYMETHYLATED CHITOSAN

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Chemical transformations of chitin and chitosan attract attention of a number of specialists of different fields because functional groups of these chemicals are close to cellulose but they have different properties. Presently researches are being developed aimed at use of chitosan and its derivatives in different fields.

One of the most modern techniques of modification of chitosan is carboxymethylation. Derivates of aminopolysaccharides generated due to such modification are more effective complex-builders than original chitosan.

We extracted chitin from the *Bombyx mori* silkworm pupae using technique of heterogeneous deacetylation and conducted chemical reaction of carboxymethylated chitosan (CMCH) by method of alkylation in isopropyl alcohol media. Carboxymethylation reaction proceeds on N, O-alkylation of amino- and alcoholate groups and leads to formation of a product predominantly replace by hydroxyl groups of elementary parts of macromolecules.

Conducted research allowed to detect concentration of nitrogen in samples which was amounted to 4,57%, yield of CMCH - 91,4%, humidity – 1,02% and solubility – 94,6%.

We also carried out Infrared spectroscopy, X-ray and biological examinations of CMCH. Infrared spectra of CMCH have one intensive band near 1600 cm^{-1} in the range of 1510 cm^{-1} - 1610 cm^{-1} , which can be caused by variations of C=O groups in CMCH. In order to transfer of CMCH into H-form it has been treated with hydrochloric acid. After acid treatment the CMCH spectra showed absorption band in area of 1740 cm^{-1} which undoubtedly proves transfer of CMCH chitosan in



H-form. At the same time a quite intensive band near 1610 cm^{-1} also remains. Apparently we can be sure that imposition of C=O bands of the CMCH sodium form on the band of Amid-I chitin takes place.

X-ray examinations demonstrate that CMCH samples don't have pronounced peaks on diffractogram which proves amorphous structure of the obtained CMCH.

Conducted biological trials of the CMCH in form of 1% and 2% solutions during pre-sawing treatment of cotton seed showed that seeds processed by these solutions of CMCH had germination of 99,2% and 98,5% accordingly (control value is 97%) and germination energy of 97,0% and 96,0% accordingly (control value is 95%).

Research outcomes demonstrate identity of molecular structure of synthesized sample of carboxymethylated chitosan and its positive impact upon germination energy and germination of cotton seeds.