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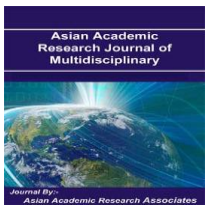

INFLUENCE OF THE DRYING TEMPERATURE ON THE ANTIMICOBIAL CHARACTERISTICS OF CELLULOSE FIBRES FUNCTIONALIZED WITH CHITOSAN

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Abstract

The anti-bacterial action of chitosan depends on the extent and availability of amino groups that are crucial for providing the anti-bacterial efficiency of the treated material. Owing to its structure being similar to cellulose, chitosan is ideal for cellulose fibres' surface modifications, in order to develop cellulose antimicrobial activity. In this study various cellulose fibres were used because cellulose is biodegradable substrate with good surface activity, and therefore represents a good matrix to create bioactive substrates. Throughout the experimental work, viscose, lyocell and a modal as representatives of regenerated cellulose fibres were also included in this research in addition to natural cotton cellulose. It is supposed that the drying temperature influences the specific orientation of applied chitosan on the surfaces of fibres. Namely, chitosan chain-bending may have taken place during the drying stage at certain temperatures, thus resulted in different moisture content, and in particular, in different proportions of available amino groups. Given all these features, we also tried to assess any influence of the supramolecular structure of cellulose when chitosan binding onto cellulose fibres as a function of a selected drying temperature, because the molecular and supermolecular structures of natural and regenerated cellulose differ. During this research, the moisture content was determined for each type of non-functionalized/references and with different concentrations of chitosan functionalized cellulose fibres, and the proportion of available amino groups, as the most important criterion in terms of antimicrobial effectiveness, respectively.

Key words: cellulose, cotton, viscose, lyocell, modal, functionalization, chitosan, supra-molecular structure, moisture content, Acid Orange VII