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POTENTIALLY WOUND HEALING VISCOSE TREATED BY USING DIFFERENT CHITOSAN-EUGENOL FORMULATIONS

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Abstract

The purpose of this research work was to develop an additive formulation of chitosan and eugenol in different structural forms (macromolecular solution, nanoparticle dispersion, and precipitate suspension) as a viscose fiber coating. From the perspective of additive formulation of different structural forms that are crucial for the availability of chitosan antimicrobial amino groups and the proportion of available eugenol included in the system with chitosan, it was assumed that individual structural forms impact the targeted antimicrobial and anti-oxidative properties of functionalized viscose. After adsorption of all the mentioned systems onto viscose fibers, potentiometric titration was used to examine the proportion of the amino groups. The later technique was supported by the spectrophotometric Acid Orange 7 method. Bioactive properties were examined regardless of microbiological activity using the standard method ASTM E2149-10 whilst viscose anti-oxidative capacity was measured by the radical scavenging activity method (ABTS⁺-(2,2'-azino-bis-3-ethylbenzothiazine-6-sulfonic acid)). In addition, desorption of formulations from fibers was determined by the use of the Acid Orange 7 method. It has been proved that all formulations are a suitable antimicrobial and antioxidant functional coating for the development of functional bioactive textiles that may be used potentially in medicine, preferably in the field of wound and oral mucosa healing. In addition, it is confirmed that various structural forms of chitosan and chitosan in combination with eugenol affect the antioxidant and antimicrobial properties of functionalized viscose differently.

Keywords: cellulose, viscose, chitosan, eugenol, structural form, antimicrobial, antioxidant

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