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CHITOSAN COATED COTTON YARN AND IT'S EFFECT ON ANTIMICROBIAL ACTIVITY

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ABSTRACT

A new cotton yarn with a chitosan coating was prepared by the oxidation of a cotton thread with sodium periodate at 60ºC in water and subsequent treatment with a solution of chitosan in aqueous acetic acid. Infrared spectra of the chitosan coated cotton yarn suggested the formation of Schiff's base between the chitosan and the oxidized cellulose. Scanning electron microscope (SEM) photographs showed that the surface of the chitosan coated cotton yarn was slightly changed after the series reaction. Furthermore, the antimicrobial activity of the chitosan coated cotton thread was evaluated.

Keywords: cellulose; sodium periodate; chitosan; cotton yarn

1. Introduction:

In recent years, great attention has been devoted to biopolymers because of their biocompatibility and biological functions and consequently, potential application in the biomedical and pharmaceutical fields [Alok R. Ray & Dinesh K. (2000)]. Chitosan, a polymer having ß-1, 4 linked glucosamine residues, is produced by deacetylation of chitin, the second most abundant polysaccharide found on earth next to cellulose. Chitosan has a great potential for a wide range of uses due to its biodegradability, biocompatibility, antimicrobial activity, non-toxicity and ability to improve wound healing and therefore, it is evaluated in a number of medical applications [Kailash C. Gupta (2000)].

The aim of this work was to modify the cotton yarn in such away that, it would react with chitosan polymer in aqueous acetic acid solution. The fixation of chitosan polymer on cotton was done by immersing the cotton yarn in chitosan solution for a specified temperature and duration with constant stirring. The infrared spectra analysis, scanning electron microscope analysis and antimicrobial activity of the chitosan coated cotton yarn were evaluated.

2. Experimental

2.1 Materials

All chemicals used for the following investigations were of analytical grade. Chitosan with an N-deacetylation degree of 0.82 (?=300 cps) was obtained from Central Institute of Fisheries Technology, Kerala and cotton spinning thread (11/ 2 Ne) was obtained from lab.