



EFFICACY OF MICROWAVE CURING ON WATER SOLUBLE CHITOSAN TREATED ERI SILK FABRIC TO IMPART ANTIBACTERIAL AND EASY CARE PROPERTIES

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ABSTRACT

The present work relates to the efficacy of microwave curing system employed on cross linked eri silk fabric with non-formaldehyde finishes viz., glyoxal, glutaraldehyde and 1,2,3,4 butanetetracarboxylic acid (BTCA) to achieve easy care property. Water soluble chitosan with varied concentrations of 0.5 to 2 g/l was also incorporated in the finishing bath to impart antibacterial activity to the fabric along with the easy care characteristics. After application of finishing formulation, the treated eri silk fabrics were cured at two different conditions: microwave and conventional thermal curing. Crosslinker Glyoxal proved the best finish and, hence, it was studied under a variety of conditions including chitosan concentrations, power and duration of microwave curing. Antibacterial activity that resisted domestic laundering/progressive washing was tested using nonionic detergents besides the crease recovery and strength properties of the finished fabrics. The Fourier transformed infrared (FTIR) spectra revealed the cross linking reaction between the formaldehyde free finishing agent and the hydroxyl group of silk polymer and this reaction could form ester and ether groups in presence of catalyst under microwave and conventional curing system separately. The fabric was also characterized by using scanning electron microscope (SEM) and the micrographs showed the surface deposition of cross-linking agents on the finished fabrics. The study recommends microwave curing system as advantageous in production of chitosan and glyoxal treated eri silk fabrics with antibacterial and easy care properties, without a significant loss in strength properties when compared with conventional curing system.

Key words: Antibacterial, chitosan, cross-linking, glyoxal, microwave curing.