3.4.1 Doctoral research – Abstract

Investigations on Coloration and Antibacterial Finishing of Silk and Wool Fabrics Treated with Natural Fungal Extract for Healthcare Applications.

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In this research work, pigment from the fungal species namely Thermomyces is extracted, characterized and applied onto silk, cotton and wool fabrics for imparting color and antibacterial activity. Two kinds of products namely silk suture and woollen socks are also developed and characterised. Color strength, fastness properties and antibacterial activity of silk and wool fabrics are found to be good compared to cotton fabric. The optimum concentration of the pigment is observed at 2% on weight of the fabric for both silk and wool fabrics and the optimum conditions for dyeing and antibacterial activity of silk fabrics are 60° C, 30 min at 3 pH and wool fabrics are 30° C, 60 min at 3 pH. The results showed that plasma pretreatment enhances both the wool and silk fabrics color intensity by 5%, wash fastness by 3%, rubbing fastness by 2% and antibacterial activity. The results showed that the pigment concentration in the selected range has no significant effect on friction, tenacity and knot strength of silk sutures. Antimicrobial test results showed that as the pigment concentration increases the antimicrobial activity also increases against both E. coli and S.aureus bacteria. The results showed that there is no loss in the tensile and abrasion behavior of pigment treated woollen socks but there is a significant improvement in the antimicrobial property. The pigment treated woollen socks also exhibits excellent perspiration fastness, good rubbing fastness and moderate wash fastness properties.