INFLUENCE OF ENZYMATIC FINISHING ON TASAR SILK FABRICS

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ABSTRACT

Tasar silk is one of the most sought after wild silk for its natural fawn colour, unique rustic appearance and texture. Major drawback of tasar silk is its rough feel and low dimensional stability issues when subjected to normal washing, which restricts its mass utilization. Chemical treatments to overcome such shortfalls have adverse effects on its natural color, surface properties, fabric strength and it even pollutes the environment. Hence, this article attempts to study the influence of eco-friendly protease enzymatic treatment on the dimensional stability, tensile strength, tear strength, bending, drape and comfort properties of tasar silk fabrics. It was obvious that the enzymatic finishing could impart improved aesthetic properties to tasar silk fabric such as fabric feel, drape and fabric bending properties along with decreased shrinkage.

Key words: Comfort properties, dimensional stability, enzyme finish, tasar silk.

INTRODUCTION

Silk fiber is known as the “Queen of Textiles”, due to its attractive luster, royal feel and elegant look. Tasar is a variety of vanya silk, famous for its natural fawn color and rich texture. But the drawback is its rough feel and dimensional stability issues related to normal washing, which restricts its mass utilization. Bio-finishing is a finishing process applied to textiles that produces permanent effects by the use of enzymes. Enzymes are biological catalysts usually derived from a fungal or a bacterial source. The enzyme and substrate form a ‘lock and key’ complex that requires the enzyme to have a specific molecular alignment in order to act as a catalyst. In an enzyme – catalysis reaction, the substrate first binds to the active site of the enzyme to form an enzyme –substrate complex, then the substrate is converted into product whilst attached to the enzyme, and finally the product is released, thus allowing the enzyme to start all over again.

Proteases are hydrolase class of enzymes which acts upon the protein substrate at optimum pH and temperature. Proteases precisely act on peptide bonds formed by specific amino acids to hydrolyze them. The degumming process in silk industry involves the removal of sericin and natural impurities from the silk filaments, which is being done usually by soap-soda boiling method. Application of 1-2% dosages of alkaline protease at pH 9 and temperature 60°C provides controlled, uniform degumming and enhanced handle besides being an eco-friendly process (Gowda et al., 2007; Das et al., 2011). Studies on acidic, neutral, and alkaline proteases to carry-out silk degumming have been conducted and it has been found that alkaline and neutral proteases performed better than acidic proteases in terms of complete sericin removal (Gulrajani et al., 1998; Gulrajani et al., 2000; Freddi et al., 2003). Nakpathom et al. (2009) have studied the degumming of Thai Bombyx mori silk fibers with papain enzyme and alkaline soap. Bio-finishing of silk to obtain the required aesthetic characteristics being an essential processing component of the industry, an attempt has been made to evaluate the effect of enzymatic treatment on the dimensional stability, tensile strength, tear strength, bending, drape and comfort properties of tasar silk fabrics.