Extraction of Liquid and Powder Fibroin from Cocoon Shell of Silkworm (*Bombyx mori* Linn.)

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ABSTRACT

The silk fiber is a natural protein filament made-up of sericin and fibroin secreted by the silk gland of silkworm, *Bombyx mori* Linn. To make the silk fibre in liquid form and subsequently convert into powder form for biomedical use was the aim of the study. The degummed fiber of PM, CSR_2, CSR_4 breeds and PM x CSR_2 and CSR_2 x CSR_4 hybrids of *B. mori* were dissolved in different ratios (1:6.6, 1:13.33, 1:20, 1:26.6, 1:33.33, 1:40, 1:46.66 and 1:53.33) in dissolving solutions I, II and III. The degummed fibers with dissolving solution were kept at 55 ºC temperature for dissolving the fibroin for 15 to 180 mins. The degummed fiber of all the breeds and hybrids completely dissolved in solution I at 55 ºC temperature for 1 hour in 1: 20 ratio.

Key words : Extraction, fibroin protein, cocoon shell, dissolving solution, dialysis, *Bombyx mori.*

INTRODUCTION

Natural silks, spider dragline silk and silkworm *(Bombyx mori* Linn.*)* silk have received extensive attention not only for their excellent mechanical properties but also for the process of converting aqueous spidroin or fibroin proteins. Like other proteins, fibroin protein also has its own structure and the structure of protein is determined by the sequence of amino acids. Amino acids are the basic structural building units of proteins. They form short polymer chains called peptides or polypeptides. It has two important functional groups i.e., carboxylic acid group –COOH and amine group $–NH_2$. When an alkali is added, the -COOH group combines with OH^- ions from the alkali by loss of H^+ to form $–COO^-$. Whereas, when an acid is added, the $-NH_2$ group combines with H^+ ions from the acid to form $-NH_3^+$ (Lehninger *et al*., 1993). Fibroin protein exhibits excellent mechanical