SILK FIBERS – PART III

REF: TT/ SEPTEMBER 2018 / WK 2

The composition of raw silk (Approximate Value)

Fibroin - 70-80%
Sericin – 20-22%
Waxy matter – 1.5%
Inorganic matter - 0.7%

Sericin is the natural gum, which is left on the silk during reeling, throwing and weaving. It acts as a size which protects the fibres from mechanical injury. After the moths emerge, the cocoons should be degummed before they can be spun into yarn.

Degumming of Silk

Degumming is the process of removing the sericin, or silk gum, from raw silk. Removing the gum improves the sheen, colour, hand, and texture of the silk. As much as one-third of the weight may be lost when the gum is removed. Raw silk with the gum still on the filament is called 'Hard silk'. Degummed silk is 'soft silk'.

Sericin is insoluble in water. The long protein molecule of Sericin is broken down into smaller parts which are easily dispersed or solubilized in hot water.

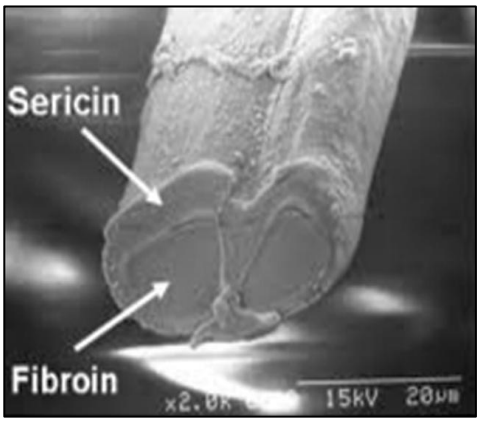

Fig 1.1 Cross- sectional view of Silk fibre

Methods of Degumming of Silk

There are different methods of silk degumming, conventional and new generation methods.

Following are some of them:

- Extraction with water
- Boil-off in soap
- Degumming with alkalis
- Degumming with acids
- Degumming with enzymes

Boiling Off in soap

- Soaking overnight or for 6 h in a bath with soap and wetting agent.
- Boiling off for 2–6 h at 90°C–95°C in a bath containing soap at pH 9.5 with soda ash.
- Repeat the treatment in a second bath similar to the first one for 2h, if necessary.
- Rinsing first at 50°C with ammonia.
- Followed by two rinsing, one at 40°C and another at room temperature.

Alkali Degumming - Alkalis hydrolyze protein by attacking the peptide bonds and are said to have a severe damaging effect on proteins. Hence, this process has to be carried out under controlled condition, so as not to result in over degumming.

Acid degumming - It is a comparatively safe method, as organic acids are used and they are less pronounced on silk than that of mineral acids.

Enzymatic degumming - The protease enzymes are used for silk degumming. They work at atmospheric pressure and in mild conditions (e.g. at 40°C, pH 8.0).

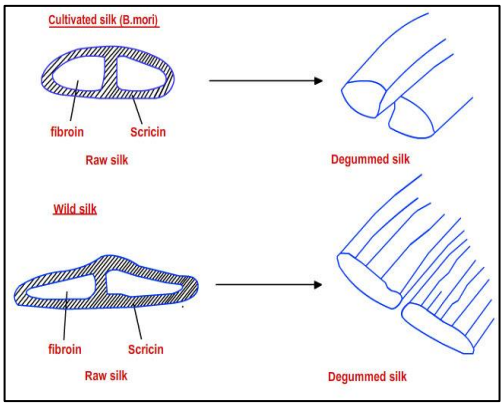

Fig 1.2 Raw Silk Vs Degummed Silk

To be continued…

Wishing you a great week ahead!

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