Agri Articles
(e-Magazine for Agricultural Articles)
Volume: 05, Issue: 04 (JULY-AUG, 2025)
Available online at http://www.agriarticles.com
©Agri Articles, ISSN: 2582-9882

Impact of Cocoon Quality and Reeling Parameters on the Quality of Raw Silk

*M. Parasuramudu
Post Graduate, Department of Sericulture, Sri Krishna Devaraya University, Anantapur-515003, Andhra Pradesh, India
*Corresponding Author's email: parasuram723b@gmail.com

India stands as the second-largest silk producer globally. However, in the face of changing global demands, there is an urgent need to focus on producing silk that meets international grading standards. Achieving this requires equal emphasis on both pre-cocoon and post-cocoon factors.

Quality of Raw Silk

The productivity and quality of raw silk are primarily governed by five critical factors:

1. Quality of cocoons
2. Process parameters
3. Water quality
4. Reeling equipment
5. Human expertise

Cocoon Quality

Cocoon quality is determined by the breed or hybrid of silkworm, rearing practices, and environmental conditions. These factors significantly impact raw silk quality, production efficiency, and cost.

Key Parameters of Cocoon Quality

Shape & Size: Oval cocoons have uniform shell thickness, enabling even cooking and better reeling performance, whereas irregularly shaped cocoons cause uneven cooking, negatively affecting silk quality.

Compactness: Dense, well-formed cocoons allow uniform cooking, resulting in higher-quality silk.

Shell Percentage: Higher shell weight enhances raw silk yield and quality while reducing reeling costs.

Filament Length: Longer filaments improve production rates and lead to more uniform silk threads, making them preferable for reelers.

Reelability: This is influenced by genetic traits and rearing conditions. Higher reelability increases yield and enhances silk quality.

Non-Broken Filament Length (NBFL): Greater NBFL ensures better productivity and improved silk quality by reducing the number of breaks during reeling.

Defective Cocoons: Defective cocoons lower raw silk output, produce inferior quality silk, and raise production costs.

Filament Denier: Filament thickness varies from coarser in the outer layers to finer inside, with a deviation of 25–40%. This variation impacts thread uniformity.

Raw Silk Percentage: The proportion of raw silk extracted from cocoons depends on silkworm race, rearing and mounting conditions, drying, storage, cooking, and reeling techniques.

Post-Cocoon Processes Enhancing Silk Quality

1. Cocoon Stifling: Stifling kills the pupae, removes moisture, and enhances reeling quality by maintaining proper temperature, drying duration, and cocoon layer thickness.

2. Cocoon Storage: Proper storage ensures moisture equilibrium, prevents fungal growth, and protects cocoons from pests by allowing ventilation and thin layering.

3. Cocoon Sorting: Sorting removes defective cocoons (e.g., double, stained, or deformed ones), improving reeling efficiency and silk quality.

4. Cocoon Mixing: Combining small lots into larger batches of uniform quality helps achieve consistent silk production. This involves testing cocoons for filament denier, NBFL, and reelability.

5. Cocoon Cooking: Cooking softens sericin, improving reelability, reducing thread breaks, and increasing silk recovery. This requires maintaining optimal temperature, treatment duration, and water quality.

6. Brushing: Brushing extracts the correct filament end from cooked cocoons, minimizing waste and ensuring smooth reeling.

7. Reeling: Reeling combines several cocoon filaments to create a single thread of specified denier. Proper machinery, skill, and control over speed, basin temperature, and croissure length are essential for producing high-quality silk.

8. Small Reel Permeation: This step wets the raw silk on small reels, softening gum spots to facilitate smooth unwinding and enhancing luster.

9. Re-reeling: Re-reeling transfers silk from small reels to larger ones, removes gum spots, ties loose ends, and eliminates thin sections to ensure smooth winding. Controlled machine speed, humidity, and temperature are crucial here.

Raw Silk Testing and Classification

Testing ensures the silk meets international standards. Evaluation includes visual inspection and mechanical tests (e.g., winding, size uniformity, cleanliness, neatness, tenacity, elongation, and cohesion). Accurate testing ensures fair trade and quality assurance.

Factors Influencing Profitability

- Cost of cocoons per kg of silk depends on raw material price and shell percentage.
- Reeling production cost is affected by productivity and labor, which in turn depend on filament length and NBFL.
- Selling price is determined by the final silk quality.