

Silk Farms of the Future: The Impact of Sericulture 4.0

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Abstract

Resources for natural fiber are abundant in Asian nations, but they have not yet been fully utilized. In terms of pleasant national demand, there was a yearly difference of millions between 2014 and 2020. Enhancing economic potential and utilization requires a comprehensive analysis. The study aimed to demonstrate the economic advantages, technological processing, and availability of natural fibers. National R&D groups, government policymakers, and academic institutions working together are critical for producing national bio-products based on home innovation and advancing the circular economy. Sericulture, meaning the art of silk manufacturing, is a complicated enterprise with important economic, social, and environmental implications. It all begins with mulberry agriculture, which includes silkworm rearing and fabric weaving. Sericulture provides long-term employment opportunities, particularly in rural regions where over 60 percent of the workforce is female. Mulberry agriculture and silkworm rearing are profitable investments, making this a significant business. Silkworm *Bombyx mori* L. needs nourishment to grow, and premium mulberry leaves are needed for the best cocoon creation. Applying manures and bio-fertilizers after pruning can boost leaf production and enhance mulberry quality while preserving soil fertility. Bio-fertilizers, which contain live microorganisms, colonize the rhizosphere and stimulate growth by boosting the host plant's primary nutrition source. They are renewable plant nutrition sources that may be used in conjunction with chemical fertilizers. Mulberries require main nutrients from organic manures and bio-fertilizers, since organic manures promote soil microflora proliferation and supplement the crop with minor nutrients such as NPK. The interior micro-structure of cultivated and wild silkworm cocoons is investigated in this work via means of X-ray micro computed tomography (XCT). According to the statistics, fiber percentages first decrease as fiber widths increase from the inner to the outside layer. Because of the cocoon's modest diameter, the fibers in different layers are more aligned, which is advantageous for biomaterial development. The findings emphasize the relevance of knowing the interior microstructure of silkworm cocoons for biomaterial development.

Keywords

Sericulture, Natural Silk Fiber, Muga Silkworm, Silkworms, Bombyx Mori

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