



INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

An Inventory On Organic Cotton, Lotus And Muga Silk Fabric Manufacturing

Author 1: VEENAB.P.

JUNIOR RESEARCH FELLOWSHIP

DEPARTMENT OF FASHION DESIGN, FACULTY of ART & DESIGN.
M S RAMAIAH UNIVERSITY OF APPLIED SCIENCES, BANGALORE,
KARNATAKA, INDIA.

Author 2: DR. MAMATHA G. HEGDE. ASSOCIATE PROFESSOR AND HEAD OF DEPT,
DEPARTMENT OF FASHION DESIGN, FACULTY of ART & DESIGN.
M S RAMAIAH UNIVERSITY OF APPLIED SCIENCES, BANGALORE,
KARNATAKA, INDIA.

Abstract:

Textiles have progressed from being a source of ornamentation to a widespread application. Textiles have gone through a revolution to spread such a broad spectrum. The use of natural fabrics is a solution to the problems arising from the use of natural and synthetic textiles. The toxic substances used to synthesise natural or artificial textiles has adverse effects, such as the consumption of a lot of water and pesticides for their production from their starting stage until the end of the line, which can result in damage to human health, soil, water, air, etc. The use of organic and sustainable fabrics is an environmentally safe solution to compensate for toxic fabrics. This article gives an overview of such silk fabrics namely organic cotton, lotus, and muga silk, and contains the ethnographic study of the same.

Key words: Organic Cotton, Crop Rotation, Sericulture, Muga Silkworm, Degumming.

1. Introduction:

1.1. Organic cotton:

The cultivation of conventional cotton contains the use of excessive agricultural chemicals; coercion by the use of indispensable, unadulterated organics that has a negative impact on the environment and human health and also leads to a higher cost of production.

Adoption of organic in cotton production is the best solution for the problem of conventional cotton production, but its parallelism with investment, infrastructure, maintenance of records, losses, etc.—synthetic fertilisers, synthetic pesticides, etc.—is replaced by sustainable environmentally friendly alternatives in the case of organic cotton production. The practice of crop rotation will be practiced in the production of organic cotton; it increases the soil health Crops such as barley, peanuts, chickpeas, corn, sesame, etc. can be used for the purpose of crop rotation. To manage weed, practices such as tillage and hand-weeding, organic herbicides are used in

organic cotton production. Organic cotton production faces some problems; changes in climate, chemical drift, insufficient rainfall, markets, etc., will cause a hindrance to organic cotton production.

1.2. Lotus fabric:

We can decrease the dependency on the soil for the cultivation of fibres and opt to go for hydroponics. Lotus is an example of hydroponics and is also considered sustainable as it does not require any pesticides or hummus. Lotus fabric is smacked with silk fabric. Lotus belongs to the small family of Nelumbonaceae. The lotus is one of the traditional flowers in China. It is a horticultural plant with religious and ornamental values attributed to its gorgeous, nutritional, and medicinal values. Lotus possesses a self-cleaning phenomenon that is heavily dependent on the contact angle because rolling water droplets help to remove the dirt particles adhering to the leaf surface.

1.3. Muga silk:

Assam is globally celebrating its own corner in the production of golden silk that is muga silk. In foreign exchange, it possesses a remarkable domain. Be a member of the non-mulberry silk Muga silkworm, *Antheraea assamensis* Helfer is reared in an outdoor environment where high mortality occurs, particularly at the early stage of rearing. The rearing of Muga silkworm is an outdoor assignment; it should withstand the fluctuations of the environment, which may cause crop failure. To meet future demand, it is necessary to modify the traditional technologies of host plant management and rearing. Post-cocoon factors consisting of growth and development largely depend upon the quality and quantity of leaves consumed, so that the cultivation of host plants plays a major role.

2. LITERATURE REVIEW

2.1. Organic Cotton:

Organic cotton has proven that it is sustainable and free from toxic chemicals, pesticides, humus, etc. Natural and eco-friendly tools and methods are used instead of synthetic products in the production of organic cotton. Soil health is the main focus in this regard, and reduced and full use of water resources follows next. So it is far better than conventional cotton. The production of organic cotton fabric is also free from chemicals. Natural dyes are the preferred ones over here. Water resources gain a precious place in the production processes. Less water is consumed, and the wastewater generated at the time of production can be easily made usable for other processes.

2.2. Lotus Fabric:

Lotus is easy to cultivate and has a lot of ethical and health benefits. The fibres pull from the sliced ends of a handful of stems that gathered in the morning. A long strand of fibres will tug from the stem with a twisting motion, spinning a long thread. Then the thread is washed, dried, and later woven on hand looms. In short, the fibres are rolled into a single yarn; left-over threads can be used as wicks for votive candles.

2.2.1. Weaving of Lotus Fibres:

In a Thai or Burmese frame loom, skeins on a bamboo spinning frame will be filled with stalks of 20–30 fibres for wrapping. 40 metres of yarn can be wound and wefted on bamboo bobbins. The lotus fibres have to be kept cool because, while weaving, frequent moistening of the fabric with water is needed. To avoid breaking and damaging the fibres, the production of handloom fabric should be immediate and completed within a day after the formation of the yarn. It is estimated that to weave the fabric for a costume, fibres from around one and a half lakh lotus stems are required. But the excess warp is stored behind the weaver and released as the weaving progresses, so the width of the cloth woven is around 24 inches, and the use of a temple keeps the selvages straight.

Later, the fabric is dyed either with chemical or natural dyes to a reddish-brown shade before being cut into patches of different sizes and machine-sewn together in rows to resemble the mosaic-like appearance. As the treatment time increases, the rate of impurities decreases, the whiteness factor increases, moisture is regained, and fibre fineness gets better.

2.3. Muga Silk Fabric:

Muga silk fabric will be soft and lustrous, a golden greenish yellow that resembles the colour of the three seasons in which it is grown. Muga silk fabric is one of the costliest silk fabrics because of its rare availability. It is grown in a specific region of Assam, so that's why it is also called Assam silk. The sericulture of muga and raw silk will be the same except for a few steps in their initial stages of sericulture. As muga silk belongs to the non-mulberry silk group, these will be formed on the trees. The rest of the production process will be the same as for raw silk. Muga silk finishing consists of some of the processes such as degumming, bleaching, dyeing, printing, laundering, etc.

Degumming can be done at the fibre or fabric stage. In the degumming process, we can go with the soap and soda method, acid degumming, or enzymatic degumming. Bleaching of muga silk will be done when there is a demand to dye the fabric. Dyeing is done very rarely because MUGA is attractive with its natural colour. Dyes such as acid dye, metal dye, or reactive dyes can be used in the dyeing of muga silk if there is a need for dyeing. Printing is usually done for sarees and mekhal chaddar, and there are options for printing such as direct, discharge, or resist printing. Some functional finishing, like crease-resistance, wash and wear, antistatic effect, etc., can be given according to the end use. After laundering, muga silk will have some changes in abrasion resistance, crease recovery, and shrinkage.

3. Objectives

To study about the organic fabrics

To collect information about organic cotton, lotus and muga silk fabrics

To research on manufacturing of organic cotton, lotus and muga silk fabrics

4. Methodology:

4.1. Organic Cotton

For the present study the data would be mainly collected through a primary survey by interviewing the respondents and also through observation and questionnaire schedule method a sample of 100 Farmers of Koppal and Dharwad districts was chosen 50 respondents have been selected by simple random sampling.

A visit was conducted to industries such as Sri Krishna Spinning and Weaving Mills (P) Ltd., Gopala Krishna Textiles Mills (P) Ltd., and Weavers Service Centre, which are involved in the production of organic cotton fabric. The interaction with the concerned officers and workers was carried on, and the framed questions were asked to collect sufficient data related to the production of organic cotton fabric.

- Sri Krishna Spinning and Weaving Mills (P) Ltd., Subramanyapura, Bangalore-560061
- Gopala Krishna Textiles Mills (P) Ltd., Subramanyapura, Bangalore-560061
- Weavers Service Centre, Okalipuram, Srirampura, Bangalore 560021



Figure 1: Sri Krishna Spinning and Weaving Mills (P) Ltd.,
Gopala Krishna Textiles Mills (P) Ltd.



Figure 2: Weavers Service Centre.

4.2. Lotus Flower Fabric

A broad survey was conducted, and data related to the cultivation, production, and weaving of lotus fabric in Cambodia, Myanmar, and Vietnam was collected using a questionnaire as a tool online.



Figure 3: Pictures of

Lotus Plants and Flowers

4.3. Muga Silk Fabric

A survey was conducted on the raw and Muga sericulture processes and production of fabric. An interview with a sericulturist in Kestoor, Tumkur district, Karnataka state, is used as a tool to collect data about sericulture. The on-site visit was conducted at the Central Silk Board, Karnataka State Sericulture Research and Development Institute, and Weavers Service Centre, and data related to sericulture was collected by the concerned officers and workers.

- Central Silk Board, Madiwala, Bangalore
- Karnataka State Sericulture Research and Development Institute, Thalagattapura, Bangalore
- Weavers Service Centre, Okalipura, Bangalore



Figure 4: Silk Rearing Frames

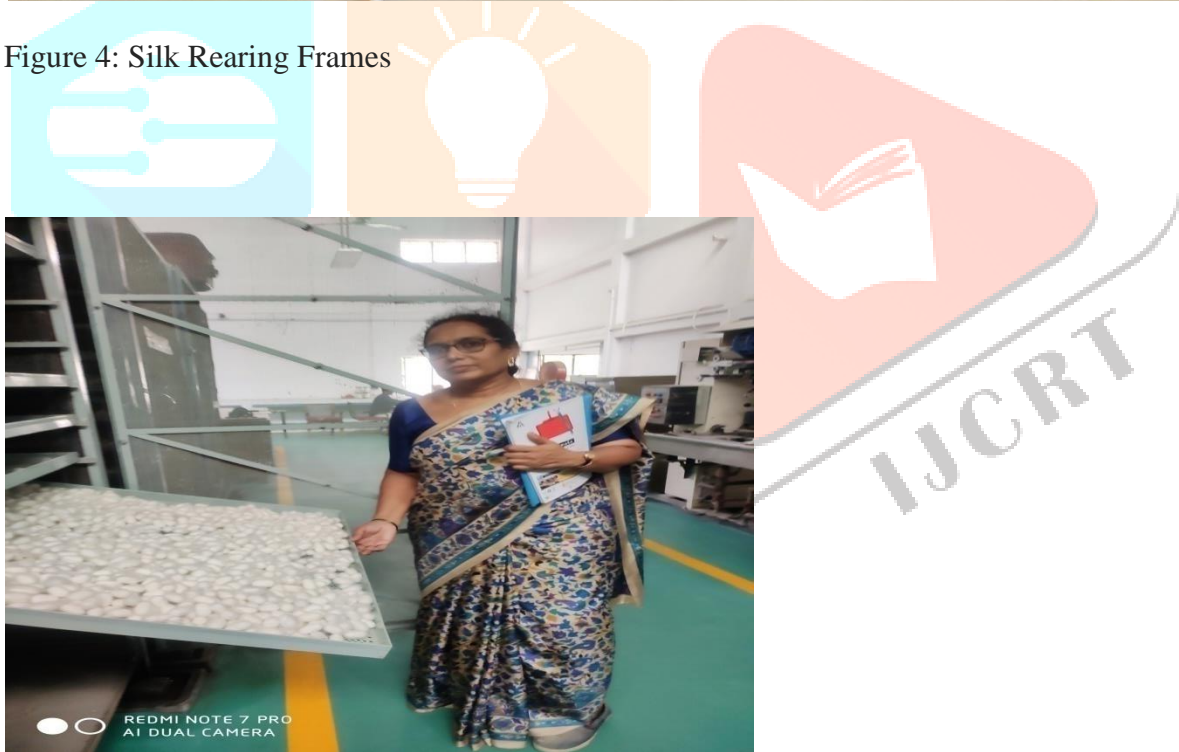


Figure 5: Silk Cocoon Storage



Figure 6: Reeling of Silk Threads from cocoons

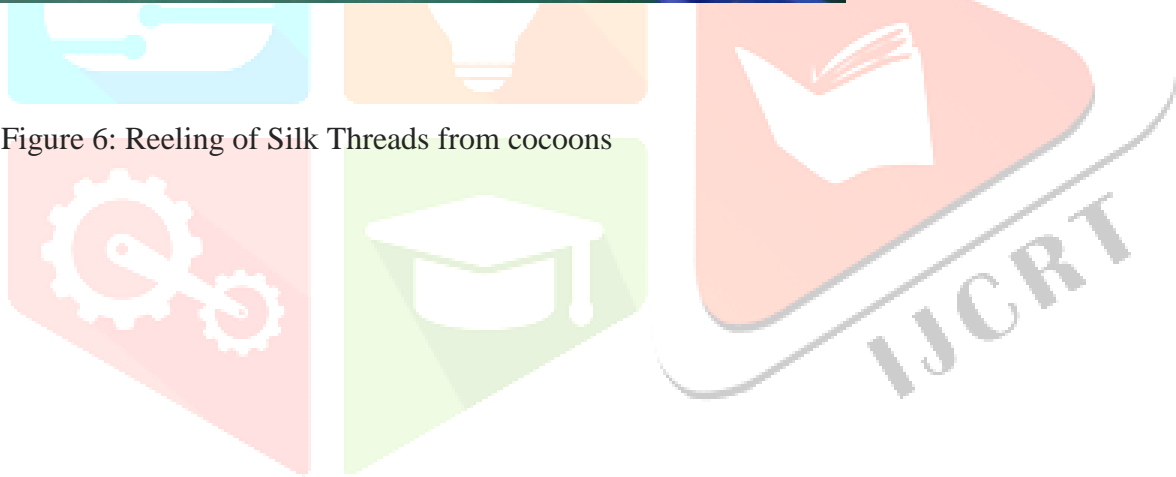




Figure 7: Muga Silk Cocoons





Figure 8: Muga Silk Yarns.

5. Result and discussion:

For analysis of data, column chart has been used to draw inferences on the data collected.

5.1. Organic Cotton Fabric

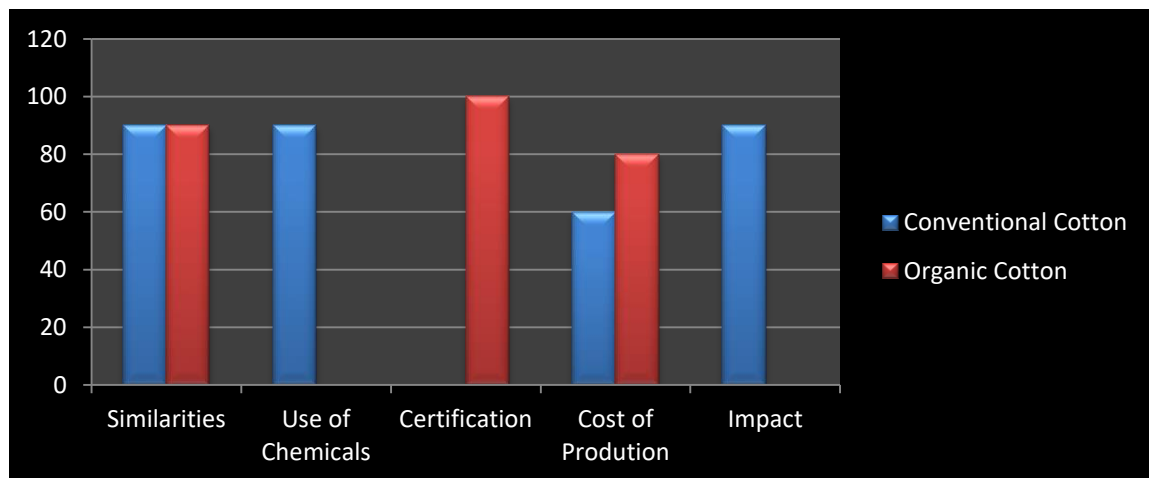


Figure 9: Similarities and Dissimilarities between Cultivation Process of Conventional Cotton and Organic Cotton

Data collected from the cultivation process of conventional and organic cotton revealed that 90% of the similarities are there between these, such as the plant species *Gossypium hirsutum* being the same for both and the requirements of climatic and soil conditions being the same. In conventional cotton, 90% uses chemicals and pesticides for pest control and manure production, while 0% chemicals and pesticides are used for organic cotton production for pest control and manure production. 0% certification is required for the cultivation process of conventional cotton, and 100% certification is required from the recognized organization for the cultivation of organic cotton. The cost of production is 60% in case of conventional cotton and 80% in the case of organic cotton cultivation. So the impact of the cultivation of conventional cotton is 90%, so negative impact on human health as well as environment is more and in the case of organic cotton, it is 0% because natural compost is used in organic cotton and crop rotation will be taken place to maintain or improve soil health so in the initial stages which the contribution of toxicity is less or nil but the cost of production will be higher than that of conventional cotton.

5.2. Production of Organic Cotton Fabric:

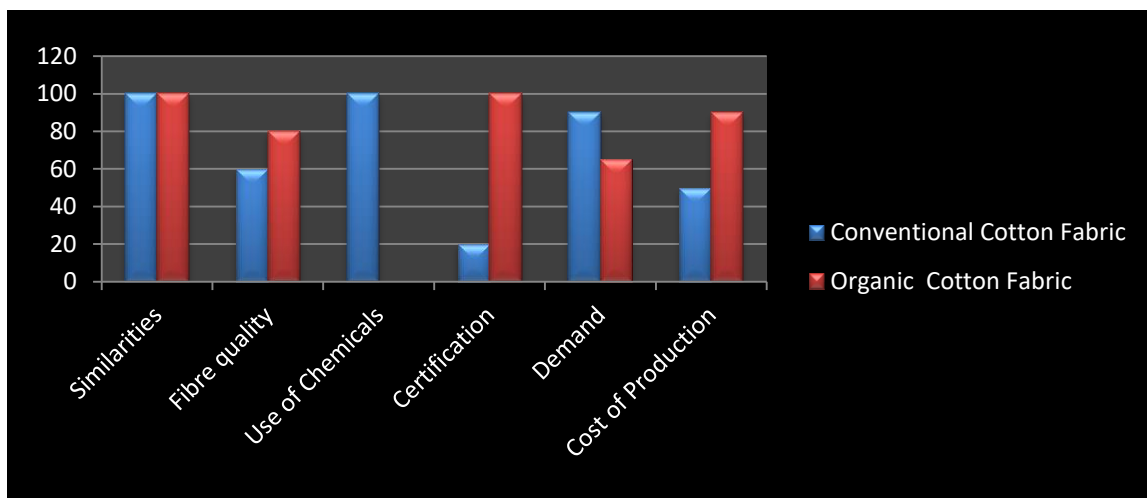


Figure 10: Similarities and Dissimilarities between Production Process of Conventional Cotton

Data collected for the production process of organic cotton and the production of organic cotton fabric revealed that the initial processes are the same. There are 60% similarities in the production process of conventional cotton and 80% in the case of organic cotton fabric, such as ginning, spinning, weaving, knitting, and fibre quality for conventional cotton fabric will be 60% and 80% in organic cotton fabric production. 100% of chemicals are used in the production process of conventional cotton production, while 0% are used in organic cotton fabric production. Production of conventional cotton requires 20% authorization from authorised organisations. but 100% certification from authorised organisations is compulsory for certification from authorised organisations. The demand for conventional cotton fabric is high because of its popularity. Due to its uniqueness, the demand for organic cotton fabric is 65%. The cost of production of conventional cotton fabric is 50%. and it is 90% in organic cotton fabric production due to the installation of specialised machines for the purpose of finishing, such as the installation of effluent treatment plants, etc.

5.3. Lotus:

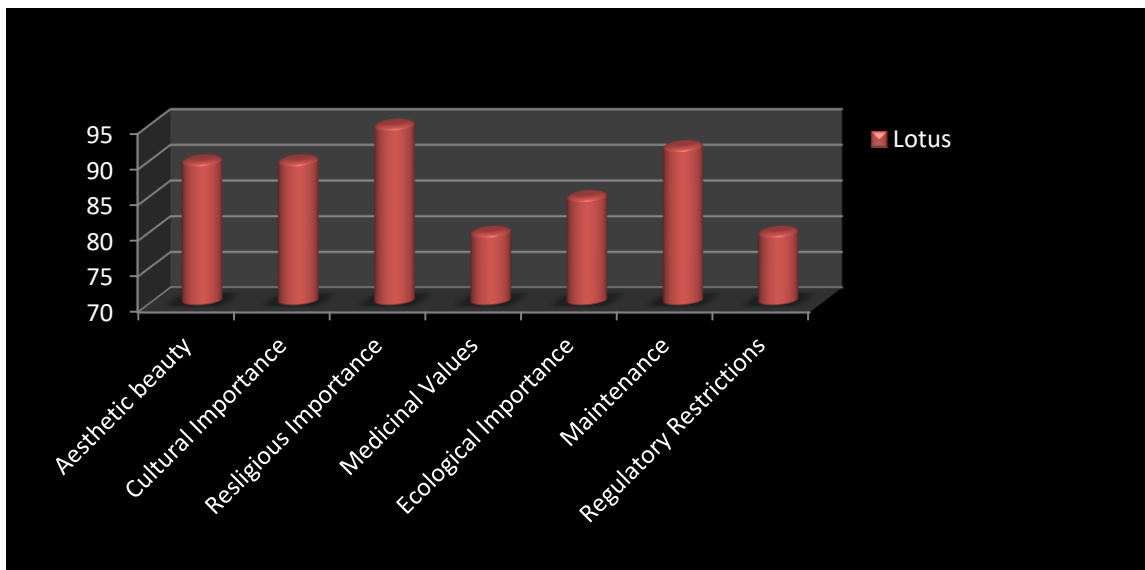


Figure 11: Merits and Demerits of Cultivation of Lotus Plants

Based on the data collected from a broad literature survey, it is clear that the aesthetic beauty of lotus flowers is 90%. It has 90% cultural importance and 95% religious importance in various nations. Each part is useful for medicine, so it possesses 80% medicinal value. Ecologically, it gains its own place and scores 85% ecologically. But the only drawback is that it needs more space to cultivate, and its maintenance is a little more, so it scores 92% maintenance-wise. and so the prohibition is there in many nations, so 80% of regulatory restrictions are there.

5.4. Lotus fabric:

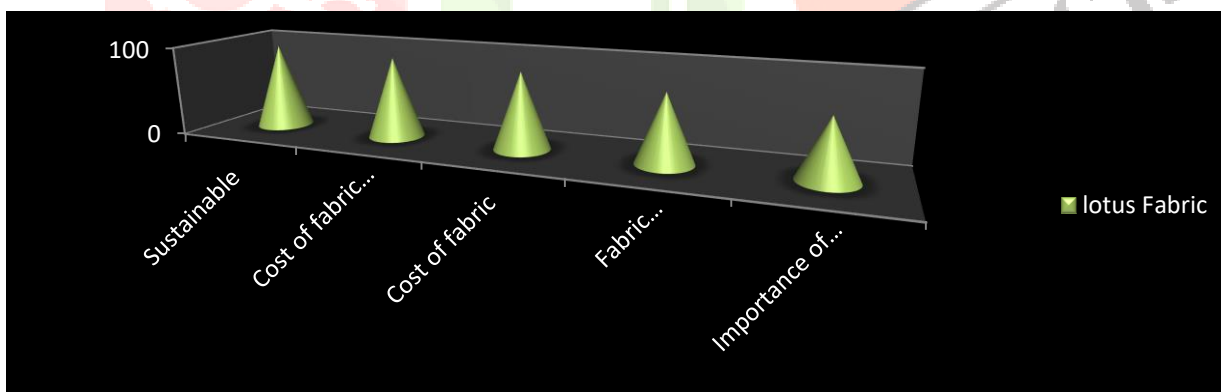


Figure 12: Production and of Importance of Lotus Fabric

Based on the data collected from a broad literature survey, it is clear that lotus fabric production follows a sustainable and eco-friendly process. The fibre, which is 2-3 metres in length, can be extracted by splitting open the stems. The cleaning and spinning will take place, followed by the weaving of the fabric with traditional weaving machinery.

Lotus fabric is sustainable and biodegradable, and it enjoys 95% in this regard. The cost of fabric production will be high, and it is scored at 90% because of the dependency on labour. And so the cost of fabric is higher, and it gained 85% obviously, and it faces scarcity of fabric as there are restrictions on the cultivation of lotus

and as it is seasonal. Fabric appearance will resemble silk in texture and lustrousness, and it will score 75% for its appearance. It has its own religious and cultural importance, so it enjoys 65% likewise.

5.5. Muga Silk Fabric

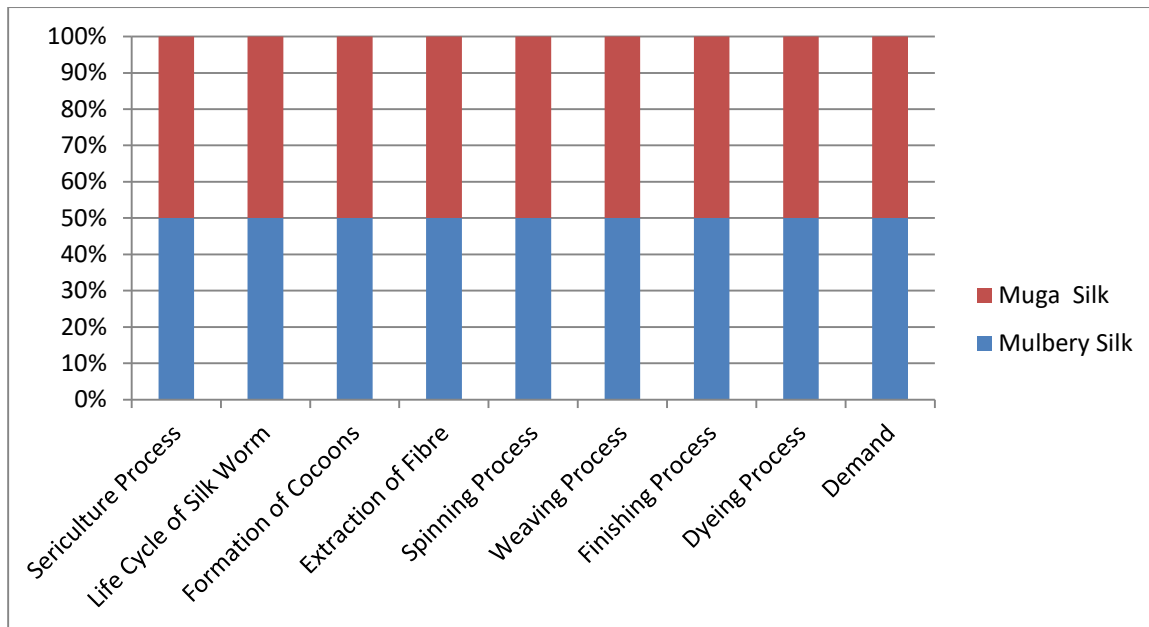


Figure 13: Similarities and Dissimilarities between Production Process of Mulberry Silk and Muga Silk Fabric.

Data collected about sericulture confirms that the harvesting processes for mulberry silk and wild silk are different, despite the similar production processes for each fabric. Silk reeling is the process of forming continuous threads by softening cocoons, and then the spinning of yarn takes place, followed by other processes of weaving, finishing, etc. Collected data about sericulture shows that the sericulture of both mulberry silk and wild silk scores 50%. The life cycle of the silkworm in mulberry silk is 50%, and the life cycle of the silkworm in muga silk is 50%. The formation of cocoons of mulberry silk is 50%, and the formation of cocoons of muga silk is 50%. Extraction of fibre from both silks is scored at 60%, and spinning of yarn from both silks is 80%. The weaving process of both silks is 90% similar. In the case of the finishing process of fabric, both types of silk are similar and score 90% each. Also, in the case of the dyeing process of fabric, both types of silk are similar and score 90% each. Mulberry silk is in demand irrespective of region and has scored 65%, but muga silk enjoys more demand than the mulberry silk in the Assam surrounding it, and it also enjoys 65%.

Conclusion: Natural and sustainable textiles are advocated as they are environmentally compatible. People are adapting to natural and sustainable textiles because of their environmental, social, and economic benefits, and so the market for such products is increasing. and the textiles are not only used for adornment but also for different applications. With different textures, these textiles can be used for still more unique applications.

References:

1. Kathleen Delate et al. Organic cotton production may alleviate the environmental impacts of intensive conventional cotton production. *Renewable Agriculture and Food Systems*, Renewable Agriculture and Food Systems. November 2020.
2. A G Harshitha et al. A Review on Organic Cotton: Various Challenges, Issues and Application for Smart Agriculture. *IEEE*. 2021.
3. Jessica Shade et al. Organic Cotton: One of the most important choices you can make for the environment. *The Organic Center Organic Cotton*
4. S. Aishwariya et al. Sustainable Textiles From Lotus. *Asian Textile Journal*, October 2019.
5. Zhongyuan Lin et al. The Latest Studies on Lotus (*Nelumbo nucifera*)-an Emerging Horticultural Model Plant. *International Journal of Molecular science*. July 2019.
6. Madhu Sharan et al. Lotus (*Nelumbo nucifera*) - An Exploration of Hygro waste for Textile Applications. *Acta Scientific AGRICULTURE*. 2021.
7. Cheng Cheng et al. Extraction of lotus fibres from lotus stems under microwave irradiation. *Royal Society of Open Science*. 2017.
8. Brojeswari Das et al. Preparation And Processing Of Muga Silk, *Tekstilna Industrija* · September 2010
9. Md Nakib Ul Hasan et al. Organic cotton clothing purchase behavior: A comparative study of consumers in the United states and Bangladesh. *Textiles*. 2021.
10. Sangita Tomar et al. Lotus Fiber: A Eco Friendly Textile Fiber. *International Archive of Applied Sciences and Technology*. 2019.
11. Dr. Neerja Gupta. The Spiritual Power of Lotus Fabric. *IOSR Journal of Humanities And Social Science (IOSR-JHSS)*. 2020.
12. Dr. (Mrs.) Kavita Patil. Lotus Fiber: A new facet in textile and fashion. *International Journal of Humanities and Social Science Invention (IJHSSI)*. 2018.
13. Shilpa Saikia et al. Recent Advances and Innovations in Muga Silk Industry. *Just Agriculture*. 2022.
14. Brojeswari Das et al. Preparation and Processing of Muga Silk. *Tekstilna industrija*. 2010.
15. Dr. Raju Phukan . Muga Silk Industry of Assam in Historical Perspectives. *Global Journal of Human Social Science History & Anthropology*. 2012.
16. Amalendu Tikader et al. Muga silkworm, *Antheraea assamensis* (Lepidoptera: Saturniidae) – an overview of distribution, biology and breeding. *European Journal of Entomology*. 2013.
17. Minti Gogoi et al. Exotic Muga Silk: Pride of Assam. *International Journal of Applied Home Science*. 2017.
18. Bharat Bonia. Muga Silk Rearers: A Field Study Of Lakhimpur District Of Assam. *International Journal Of Scientific & Technology Research*. 2020.
19. Amrit Paul et al. Sustainable Livelihoodthrough Muga Silk Cultivation By Muga Farmers of Upper Assam-A Study of Problems or Constraints. *Journal of Advance Management Research*. 2017.