

# Publications

**Research Publications:**

1. Ahmed, Minhaz, and Jyoti Prasad Saikia. "A Novel Activated Charcoal Based Wash to Make Muga Silk Shiny." *Journal of Natural Fibers* 20.1 (2023): 2145407.
2. Ahmed, Minhaz, and Jyoti Prasad Saikia. "Traditional Washing Formulations Outstand Commercial Ones for Washing *Antheraea assamensis* (Muga) Silk Cloth." (2022): 455-462.

**List of presentations in conference/workshop:**

Ahmed, Minhaz, and Jyoti Prasad Saikia. "Enhancement of Dyeing and Antioxidant Properties of Ahimsa Silk Eri". National Seminar (Biology is Fascinating) 1st March 2022, Tezpur University

TRADITIONAL WASHING FORMULATIONS OUTSTAND  
COMMERCIAL ONES FOR WASHING *Antheraea assamensis* (MUGA)  
SILK CLOTH

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**ABSTRACT**

Safe silk washing is an issue faced by its users for long because silk is prone to get damaged during conventional washing. The current study focused on the possible *Antheraea assamensis*(Muga) silk washing formulation which was a rare event until people realized the importance of cleaning and hygiene with the onset of covid-19 pandemic. *Kolakhar*, lemon (citrus) juice, and some commercially available washing products were studied for bond changes by FTIR, surface changes by SEM and colour deviations from control samples. The study showed that there was formation of new bands in all treated samples (except water wash) between 1513-1518  $\text{cm}^{-1}$  that is attributed to  $\beta$ -sheets; and 1698-1703  $\text{cm}^{-1}$  linked with  $\beta$ -turn conformation in all the treatments. The morphological observation illustrated fibrillation and peeling off fibers in the commercial washed fabrics. Colour change ( $\delta E$ ) was least in fabric conditioner (0.85) < citrus wash (1.06) < *kolakhar* wash (1.13) and maximum for fabric whitener (5.46). Overall, the traditional agents proved excellent washing factor and has the potential in opening a window for optimized formulation that can be employed for Muga washing.

**Keywords:** Commercial washing agents, Muga, traditional agents, silk

**INTRODUCTION**

Silk fabrics are tagged as “the queen of fibers” because of their softness, comfort, good hygroscopicity, mechanical strength, environmental stability, etc. (He *et al.*, 2017). Muga silk produced by *Antheraea assamensis* is exclusive to Assam, India which has got the Geographical tag (Devi *et al.*, 2011). The prime identity of Muga silk is its golden luster appearance that makes it one of the costliest silks (₹. 16000-18000 $\text{kg}^{-1}$  yarn) (Goswami *et al.*, 2016; Gogoi *et al.*, 2017). One major characteristic of Muga silk is its longevity which gets threatened due to washing (Devi *et al.*, 2011). Muga silk washing is an infamous activity due to the non-availability of silk-specific commercial washing products; and dry cleaning is uneconomical. With the on-set of covid-19 pandemic, washing of clothes has become a mandatory task that is also extended to Muga silks which are more commonly worn in occasions that involve mass gatherings.

Assessing and analyzing the washing parameter of silk fabrics has been a matter of concern for researchers for quite a long (Talukdar *et al.*, 2011). It has been reported that chemical treatments causes modifications in the polypeptide chains and side chains of amino acids which

## A Novel Activated Charcoal Based Wash to Make Muga Silk Shiny

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### ABSTRACT

Lustrous golden muga silk is endemic to the northeast part of India. Being pricey, the washing method plays a vital role in retaining the shininess of silk without compromising the fiber's quality. *Kolakhar* has been used traditionally for washing muga silk. The present study targets maintaining the overall quality of muga silk washed with different agents. From the FTIR results, it was evident that all the agents had a similar effect with respect to bonds. Activated charcoal showed better results in the shining properties (glossiness 0.029, 1.471 and 0.400 at 20, 60 and 80 degree angle respectively) of muga justifying being the best washing agent compared to other agents (glossiness for detergent 0.000, 0.1257 and 0.514 at 20, 60 and 80 degree angle respectively) without any damage to the fiber. The hue (angle 24.37), saturation (37.41%), and luminosity (68.52%) of activated charcoal wash fabrics reveal the visual change of the fabrics suggesting the formulation an excellent washing agent contributing to the increased shine in muga silk.

### 摘要

鲜艳的金黄色木加丝绸是印度东北部特有的。由于价格昂贵，洗涤方法在保持丝绸光泽而不影响纤维质量方面起着至关重要的作用。*Kolakhar*传统上用于洗涤木加丝绸。本研究的目标是保持用不同试剂洗涤的木加丝的整体质量。从FTIR结果来看，很明显，所有试剂对键具有相似的效果。活性炭在木加的光泽性能（20、60和80度角的光泽度分别为0.029、1.471和0.400）方面显示出更好的结果，证明木加是最好的洗涤剂，而其他洗涤剂（20、80和60度角的洗涤剂光泽度为0.000、0.1257和0.514）对纤维没有任何损害。活性炭洗涤织物的色调（角度24.37）、饱和度（37.41%）和亮度（68.52%）揭示了织物的视觉变化，表明该配方是一种优秀的洗涤剂，有助于提高木加丝绸的光泽。

### KEYWORDS


Activated charcoal;  
luminosity; muga; silk;  
washing; RGB

### 关键词

活性炭; 光度; 穆加; 丝; 洗涤; RGB

## Introduction

The rich heritage of Assamese culture holds muga in an exclusive position in the socio-economic life of Assam (Gangopadhyay 2008; Goswami, Nath, and Saharia 2015). This golden yellow silk thread is derived from semi-domesticated silkworm *Antheraea assamensis* and is rare with its texture, luster, and durability (Choudhury, Ramakrishnan, and Devi 2021; Gangopadhyay 2008; Tikader, Vijayan, and Saratchandra 2013). Muga silk is traditionally associated with north-eastern parts of India (mainly Assam). It is vastly accepted because of its amazing forbearance and shiny golden appearance (Choudhury, Ramakrishnan, and Devi 2021). One remarkable property of the muga silk fiber is lustre, which is correlated to the reflection of light. The fibers are running filaments composed of fibroin dipped with gum protein named sericin (Katpadi Mohammed and Naik 2021). Sericin is not present in the outer layer, but toward the inner-side binding the fiber layers in the cocoons which eventually gets degummed (Manjunath and Khatkar 2020). Rigid and harsh nature of silk indicates presence of excess sericin which also conceals the natural lustre of silks (Vyasa and Shukla 2016). The brilliance of silk fabric is effected

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**Chapter I**  
**Introduction**

# PHYSICO-CHEMICAL, ANTIBACTERIAL, ANTIOXIDANT, BIO-COMPATIBILITY, AND BIODEGRADATION STUDIES OF WASHED AND DYED ERI, MUGA, AND PAT SILK FABRIC

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