Title: Sustainable Assessment of Bio-Colorant from Bakain Bark (*Melia azedarach* L.) for Dyeing of Cellulosic and Proteinous Fabric.

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Abstract: The current study proceeded to reduce the environmental hazards spreading worldwide due to synthetic dyes. To overcome these problems, eco-friendly natural dyes are introduced as alternative sources of synthetic dyes. The present study was focused on exploring the bio-colorant of the aqueous and acidic extract of the bark of *Melia azedarach* L. for the dyeing of both silk and cotton samples. The results of the extraction medium specified that the aqueous extract gave maximum colorant solubility and upon fabric dyeing produced higher color strength in contrast to the acidic medium. The optimization experimentation data showed that excellent color strength of silk fabric was found at 45 min dyeing time duration, in 35:1 mL dye extract, and using 2% salt (NaCl) as an exhausting agent, whereas cotton fabric showed the maximum K/S value at 60 min dyeing time, in a 45:1 mL liquor ratio, and with the use of 2% salt. Bio-mordants produce different shades on both fabrics. Bio-mordanting experiments on silk revealed that pre-mordanting with 2% turmeric and 3% pomegranate, and post-mordanting using 3% turmeric and 2% pomegranate produced a darker shade. In the case of cotton, the pre-mordanted samples with 2% turmeric and 3% pomegranate and the post-mordanted samples with 4% turmeric and 4% pomegranate gave the highest color strengths. All the mordanted samples gave excellent fastness ratings. Overall, it has been found that Bakain bark proved to be an excellent source of tannin. The result of this study showed that it could be a cost-effective and eco-friendly dye source for textile progress.

Keyword: Tannin, Bio-Mordant, Bakain Bar, Cotton, Silk.

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