

Title: Eco-friendly dyeing of cotton with natural colorants using natural mordants obtained from aloe vera

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Abstract: Due to sustainable and green processing requirements from buyers, the researchers are working on natural dyes to dye textile materials. In this study, cotton fabric was successfully dyed with a natural colorant which was extracted from black tea, and [aloe vera](#) was used as a natural mordant to enhance the fixation of natural dyes. The aqueous extraction method was used to extract colorant from black tea powder in a water bath at the temperature of 85–95 °C for 60 min. Three mordanting techniques were applied for cotton dyeing by changing parameters such as dye concentration (2, 4, 8 % o.w.f) and mordant concentration (20, 40, and 60 g/L). Pretreated cotton fabric was dyed on a high-temperature (HT) dyeing machine at 80 °C for 40 min at pH 5.5. The dyed cotton samples were analyzed for color [strength](#) (K/S), colorfastness, and antibacterial assessment (qualitative) using standard test protocols. The results showed that the maximum color [strength](#) value was achieved with 8 % dye and 60 g/L mordant using pre mordanting method. The dyed fabrics revealed excellent colorfastness to washing, whereas the color fastness to light, perspiration, and crocking was satisfactory. The [antibacterial property](#) of the dyed fabric was also satisfactory which is confirmed by no colonial growth on or below the samples. In a nutshell, this study presented an ecofriendly approach using black tea leaves and [aloe vera](#) contributing to green and sustainable production.

Keywords: Natural dyes Black tea extract Aloe vera mordant Cotton dyeing Ecofriendly processing Colorfastness Antibacterial assessment

<https://doi.org/10.1016/j.jics.2024.101182>

<https://www.sciencedirect.com/science/article/abs/pii/S0019452224000621>