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Development Of Discharging Agent Formulation for Discharge Printing on Pre-Dyed Cotton with Kenchana Ungu Extract

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Structured Abstract

Background: This study explores the development of a suitable discharging agent formulation for discharge printing on cotton fabric pre-dyed with Kenchana Ungu (*Ruellia Simplex*) extract. The textile industry's heavy reliance on synthetic dyes and chemical discharge agents has raised serious environmental and health concerns, creating demand for more sustainable alternatives. Kenchana Ungu was selected due to its availability and anthocyanin content which shows potential for eco-friendly textile coloration. An experimental laboratory-based approach was employed involving natural dye extraction, cotton dyeing, discharge paste formulation and screen-printing application. The effectiveness of the discharge process was evaluated through visual assessment, spectrophotometric color measurement and standard color fastness tests. Results demonstrate effective dye removal without compromising fabric quality, supporting the potential of sustainable natural dye-based discharge printing.

Methods: This study employed an experimental research design conducted in a textile laboratory environment. The methodology was structured to develop and evaluate a discharge agent formulation suitable for discharge printing on cotton fabrics pre-dyed with Kenchana Ungu (*Ruellia simplex*) extract.

Results: The discharge printing process successfully produced visible and well-defined patterns on cotton fabrics pre-dyed with Kenchana Ungu extract. Variations in discharge effectiveness were observed depending on mordant type and formulation conditions. Spectrophotometric analysis revealed a reduction in color strength and an increase in ΔE values, indicating effective dye removal in the discharged areas. Color fastness results demonstrated that the discharged fabrics retained satisfactory resistance to washing, rubbing, light, and perspiration, suggesting that the discharge treatment did not adversely affect fabric quality. The findings indicate that a balance between discharge efficiency and fabric integrity can be achieved using appropriately formulated discharge agents.

Conclusion: This study successfully developed a discharge agent formulation suitable for discharge printing on cotton fabrics pre-dyed with Kenchana Ungu (*Ruellia simplex*) extract. The formulated system demonstrated effective dye removal while maintaining acceptable fabric quality and color fastness properties. The results highlight the potential of using natural dye-based discharge printing as a sustainable alternative to conventional chemical-intensive processes.

Keywords: Natural Dyes, Tamarindus Indica Seeds, Mordants, Exhaustion Dyeing Natural dye; Ruellia simplex; Discharge printing; Sustainable textiles; Cotton fabric

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