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Avocado seed and skin - based dyes for treatment of linen fabrics

E. H. K. Ranawaka[1*], K.G.R. Samarawickrama[2], M.H. Medagedara[2] and C.N. Herath[1]

[1] Department of Textile and Apparel Technology, Faculty of Engineering Technology, The Open University, Sri Lanka
[2] Department of Textile and Apparel Engineering, Faculty of Engineering, University of Moratuwa, Sri Lanka
hasiniranawaka91@gmail.com*

This research paper investigates the feasibility and sustainability of using avocado waste as a natural dye for cellulose-based fabrics, specifically focusing on linen materials. Avocado seeds and skins were utilized to develop a cost-effective dyeing technique. Avocado, a globally recognized fruit with substantial presence in Sri Lanka, offers an easily accessible and eco-friendly source of raw materials for dye production. Both dried and fresh avocados can be employed for this purpose. In light of the environmental and health concerns associated with synthetic dyes, exploring eco-friendly alternatives derived from food waste has gained significance. This study delves into the chemical composition of the natural dye, assessing its advantages and distinguishing characteristics between avocado pit and skin extracts. Avocado seeds are rich in the natural mordent "Tannin," facilitating effective fabric dyeing. To achieve our research objectives, various color extraction techniques were examined, along with appropriate mordents, to optimize the dyeing process following established literature procedures. Hydro extraction emerged as the most eco-friendly and cost-effective method for dye extraction. Natural and less harmful mordents such as Soy Milk and Alum were employed to ensure color fastness, while iron mordant was used for color modification. Subsequently, these hydro extraction and encapsulation methods were applied to prepare the dye for linen fabric dyeing. The paper underscores the importance of evaluating the fastness properties of avocado dye on linen materials, as their durability directly affects usability and value. Through hydro extraction and encapsulation techniques, efforts were made to enhance fastness properties. The study's findings indicate a significant improvement in fastness properties after encapsulation, contributing to sustainable fabric dyeing practices. This highlights the potential of food waste as a valuable resource for the textile industry. By substituting harmful synthetic dyes with eco-friendly alternatives derived from avocado waste, this research aims to mitigate the environmental impact of textile production, particularly in regions heavily reliant on the textile industry. Emphasizing the significance of adopting environmentally responsible dyeing practices, this study paves the way for a greener and more sustainable future in fabric dyeing.

Keywords: Sustainability, Smart Material, Natural Dyes, Avocado Dyes

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