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A Comprehensive Study on Natural Dye From Red Onion Skin

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Abstract: Red Onion Skin Synthetic dyes and chemicals create an enormous impact on environmental pollution both in textile manufacturing and after the product's lifetime. Biobased plant-derived colorants and mordants have great potential for the development of more sustainable textile dyeing processes. Colorants isolated from biomass residues are renewable, biodegradable, and usually less harmful than their synthetic counterparts. Interestingly, they may also bring additional functions to the materials. However, the extraction and purification of the biocolorants from biomass as well as their dyeing efficiency and color fastness properties require a more thorough examination. Here, we extracted Red onion skin (Allium Cepa L) skins to obtain polyphenolic flavonoids and anthocyanins as biocolorants, characterized the chemical composition of the mixture, and used a quartz crystal microbalance and thin films of cellulose nanofibrils to study the adsorption kinetics of dyes onto cellulose substrates in situ. The effect of different mordants on the adsorption behavior was also investigated. Comparison of these results with conventional dyeing experiments of textiles enabled us to determine the interaction mechanism of the dyes with substrates and mordants. Chitosan showed high potential as a biobased mordant based both on its ability to facilitate fast adsorption of polyphenols to cellulose and its ability to retain the purple color of the red onion dye (ROD) in comparison to the metal mordants FeSO4 and alum. The ROD also showed excellent UVshielding efficiency at low concentrations, suggesting that biocolorants, due to their more complex composition compared to synthetic ones, can have multiple actions in addition to providing aesthetics..

Keywords: Red Onion skin, Synthetic Dye, Quercetin, Natural Dyeing, Textile, Biocolorants



