Strengthening Natural Dyeing: A Comparative Study of Mordants for Sustainable Textile Coloration

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The fashion industry heavily relies on synthetic dyes, causing 20% of industrial water pollution and health risks due to toxic chemicals like lead and arsenic. Most factories, mainly in developing nations, lack regulation, leading to untreated water release, devastating ecosystems. This research examines the environmental impact of fast fashion dyeing practices, favoring cost-effective synthetic dyes over eco-friendly natural alternatives. It aims to assess if natural mordants can match synthetic dyes in fabric coloration, potentially reducing water contamination in third-world countries.Variables include mordant type (independent) and water quality, pH, heavy metals, turbidity, and color retention (dependent). The hypothesis suggests that exploring eco-friendly mordants could yield sustainable options with vibrant, long-lasting colors, mitigating environmental harm. Materials involve dyeing substances, testing tools, safety gear, and emergency provisions. Procedures outline lead chromate processes, dyeing methods, and data collection. Results show lowered lead concentration in dye runoff, varied pH levels between natural and synthetic dyes, and differing turbidity in water samples. This study reveals the potential for eco-friendly mordants in natural dyes to offer sustainable alternatives, potentially transforming fast fashion dyeing practices.

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