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EXPERIMENTAL STUDIES ON THE EXTRACTION AND DYEING WITH RUBIA TINCTORUM

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Abstract

This article examines the extraction and application of dyeing substances from Rubia tinctorum (dyer's madder) on different textile fibers in the context of sustainable natural dyeing. The aim is to investigate how key factors – solvent type, extraction temperature and duration, state of the dye material, dye-to-fiber ratio, as well as the use of tannin additives and metal salts (iron sulfate, copper sulfate) – influence the final color. A total of 50 experiments were conducted, combining various extraction and dyeing conditions.

The results confirm known patterns, such as the greater dye absorption in protein fibers and the predictable effects of metal salts, while also revealing discrepancies with commonly cited recommendations – for example, the stability of colors despite high-temperature extraction, or the limited enhancement of red hues following the addition of calcium carbonate. Attention is given to repeated extraction and dyeing, which demonstrates the stepwise release of various dye compounds, as well as to a comparison between Rubia tinctorum and Rubia cordifolia.

The study highlights the importance of a systematic experimental approach, applicable even outside formal laboratory settings, as a contribution to the advancement of sustainable practices in textile dyeing.

Keywords: *natural dyes, Rubia tinctorum, extraction, dyeing, anthraquinone dyes, textiles, experiment.*

PS Dear colleagues please do not delay to present your requests to participate in the conference. Specifying the average number of participants until October 8th 2025 will optimize the organization of scientific sessions.