# Studying the effect of using zinc chloride on dyeing cotton fabrics with licorice extract

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**Abstract**

Natural dyes have been known to be used to color foodstuffs, and leather in addition to natural fibers such as wool, silk, and cotton as significant fields of application since prehistoric times.

Natural dyes produce an unusual, calm, and subtle shade compared to synthetic dyes. Awareness of the environment has recently increased and the debate has been raised about the dangers of synthetic dyes, which has led to the reuse of natural dyes known in the past and the search for new sources of dyes, especially dyes with locally available sources such as licorice.

In this paper, licorice extract, prepared by ultrasound assistance at room temperature, was used for dyeing pretreatment and bleached cotton samples. The natural dyeing process was carried out by the simultaneous mordanting method using both zinc chloride and alum as mordants. The color constants of the dyed samples were determined using the scanner and the program (ImageJ). The fastness of the dyed fabrics was tested towards both washing and rubbing, as the dyed sample with licorice extract showed excellent stability. The stability decreased slightly when using mordants. A tear test was conducted to determine the effect of dyeing with licorice extract on the mechanical properties of the studied samples. It was found that dyeing with licorice led to a decrease in the tear strength of the dyed samples, but an increase in the concentration of each of the mordant led to an increase in the resistance of the dyed samples to tearing, as it became stronger than the undyed reference sample.

**Keyword:** Natural dyes, Glycyrrhiza, mordant, zinc chloride, alum.