Effects of Tin Chloride on Dyeing Wool

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Effects of Tin Chloride on Dyeing Wool Fibers with Saffron Petals

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Abstract
Saffron petals can be used as natural source for dyeing wool fibers to enhance green color. Iran is a main producer of world’s saffron and a large amount of saffron petals is produced each year as by-product during saffron harvesting. Only small part of this product is used as food color or medical uses. In this research work saffron petals taken from the northeast of Iran is used for dyeing wool yarns using in hand woven carpet industry as pile yarn. The main goal of this study is to find a proper method for using saffron petals and to gain green natural color from a botanical source.

For experiments woolen yarn (7Nm) using as piles in hand woven carpet was selected and then washed with detergent at 60°C for 15 minutes for cleansing, following rinsing with tap water and squeezing. Then wool yarns pre-treated with tin chloride (SnCl₄) as a colorless mordant at 3% with different acids such as acetic acid, citric acid, lactic acid and oxalic acid. A sample is also was prepared without mordant. Then the yarn samples were dyed with 50% (owf) saffron petals in acidic condition. At the end all the samples were washed with clean water and dried at room.

The chromaticity coordinates of samples measured in CIELAB system. Color and wash fastness of the dyed samples were also measured using standard methods. According to the results green hue can be gained using saffron petals in acidic conditions. Natural mordents bind dye molecule to the active sites of the fiber and affects on final hue. The best way of dyeing wool with natural colorants is pre mordanting method that increases the dye stability. The sample treated with oxalic acid showed the best green color among samples and also sample treated with citric acid showed green color. Washing fastness of the samples varies between 4-4.5 for different acids in dyeing bath. Same result is also gained for light fastness of the samples, i.e. 4.5. According to the findings saffron petals can be considered as a natural dye for wool fibers.

Keywords: Wool, Saffron, Dyeing, Tin chloride.