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## Natural Dying Application Used of Pomegranate peels

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**Abstract:** Use of natural dyes has increased several folds in the past few years due to the ecofriendly approach of the people. This paper concerns with the purification of natural dyestuff extracted from an abundantly occurring plant 'Punica granatum'. The main coloring agent in the pomegranate peel is granatonine which is present in the alkaloid form N-methyl granatonine. This paper explains the Dyeing of the Cotton fabric and silk fabrics using Natural Dye stuff extracted from the Pomegranate peel "Punica granatum". There are several processes involved in the dyeing of Fabric using Natural Dye. First, the Dye extraction using from pomegranate using Aqueous Extraction method. The Mordants used were ferrous sulphate, Copper sulphate and Oxalic acid. Dyeing with Mordants was carried out with Pre Mordanting. Study of Fastness of Dyed fabrics are undergone. The pomegranate peel dye was used for dyeing of scoured cotton cloth using two mordants-copper sulphate and ferrous sulphate. Dyeing along with mordanting techniques which included premordanting.

**Keywords;** Dyes, Mordents, Colouring

### I.INTRODUCTION

Natural dyes derived from naturally occurring sources such as plant, insect, and mineral extracts are believed to be safe because of their nontoxic, noncarcinogenic, and biodegradable nature. Natural dyes do not cause pollution or wastewater problems (Ali et al. 2009). Moreover, many of the plants traditionally used for dyeing are credited with medicinal properties (Gupta et al. 2004), and some of these have recently been shown to possess remarkable antimicrobial activity (Singh et al. 2005; Ibrahim et al. 2010). Fibers, especially natural ones such as cotton, provide conditions that bacteria need to grow (Ursache et al. 2011). Today, antimicrobial finishing of textiles has become extremely important in the production of protective, decorative, and technical textile products (Simoncic and Tomsic 2010). Therefore, in this study, use of thyme and pomegranate peel as natural dye sources for cotton dyeing was investigated in terms of dyeing performance and antimicrobial effect.

The synthetic dyes are mainly used since 1856 to dye the fiber and fabric materials, due to its superior properties than the naturally extracted substances. The synthetic dyes are economical price and their excellent colour fastness properties. As these dyes are the by-products of the crude oil they are highly toxic and can cause inhibition of benthic photosynthesis and are highly carcinogenic. But the natural dyes are anti- allergic, nontoxic and easily biodegradable and also possess deodorizing properties. And these dyes are bio compatible and have a green approach and ecofriendly in nature so they do not affect the environment. These natural dyes are used for colouring the fabric material and other substances since the Bronze Age. In recent years their uses are extended to antimicrobial finishing of textiles, UV protective clothing, food colorations and pharmaceuticals etc. As they do not require any strong acids and alkalis for their application and production their demand is continuously increasing. The term "Natural dye" includes all the dyes which are derived from natural sources like plants, minerals and animals. But the dye content and colour yield of natural dye is comparatively lower than synthetic dyes. Natural dyes also have various disadvantages in their properties. As already mentioned they do have colour fastness problems such as colour yield, reproducibility results, dyeing procedures are different and difficult and fastness properties. So the dyeing industries use mordants with natural dyes to make their affinity to textile materials and to produce different dye shades with various levels of colour fastness. Mordants are metallic or mineral salts when added to the natural dye bath either it intensifies the dye or changes the colour. They also play a large role in making the resultant shade to have prominent light and wash fastness. The dyes do not directly interact with the materials they are intended to colour. They are substantive and require a mordant to fix with the fabric. A mordant is an element which aids the chemical reaction that takes place between the dye and fibre, so that the dye is absorbed. The containers used for dyeing should be non-reactive, materials like stainless steel, enamel etc. can be used. Brass, iron materials should not be used as they do their own Mordanting.

## II. MATERIALS AND METHOD

### 2.1 Sample Collection



Fig. 1. Pomegranate peels



Fig.2. Pomegranate peels powder

The Pomegranate were collected from local fruit market. The pomegranate peels are removed from the fruit and are dried under shade in sunlight for about 3-4 days until moisture gets dry. Once the peels are dried they are converted into powdered form by grinding it and the finely powdered peel is filtered before processing

Fabric Silk and cotton were purchased from local market and washed with a detergent and rinsed thoroughly with hot water to remove any traces of detergent and starch.

### 2.2 Extraction of dye:

The dye extraction was performed by mixing the pomegranate peels powder and purified water with the resource-liquid ratio 1:10 and then boiling the solution for approximately 60 minutes.

50 gm pomegranate peel powder were added to 500 ml of water and boiled for 60 minutes. The resultant colored water was to be used as dye bath. The pomegranate peels powder were removed by straining the mixture using a fine muslin cloth.

### 2.3 Mordating Technique:

Various mordant were used in present investigation like Copper sulphate, ferrous sulphate, alum. Pre-mordant method is used for dyeing. Silk and cotton fabrics were each cut into 6cm ×6cm of four cotton and four silk fabrics pieces put into the different mordants such as copper sulphate, alum, iron / ferrous sulphate solution (one cotton and silk put into two different container of copper sulphate solution, one cotton and silk put into two different container of alum solution and one cotton and silk fabrics put into two different container of iron sulphate solution) each fabrics are deep into mordant container for 12 hrs. The two different fabric samples of one yard each (cotton, and silk fabrics) were purchased for Based on the dyeing procedures adjusted from those used in previous research (11), these fabrics were dyed with a fixed dye bath ratio of 1:50 at 80°C for approximately 30 minutes. A pre-mordanting stage was then performed at room temperature for approximately 24 hrs with 5 wt.%, on the weight of fabric, of each mordant (alum, copper, and iron) and non-mordant (control) in each dyeing bath, according to a certain mordant concentration (18); therefore, a total of four different dyeing baths were used in this study. The dyed fabrics in each bath were soaped and rinsed in tap water and then allowed to air dry thoroughly for 24 hours.

### 2.4 Dyeing of fabrics:

The fabrics were added in the prepared dye bath after removing the fabric from mordants. The fabric were dipped in the dye bath for 12 hours. The dyed fabrics were washed with water to see the fastness

property of the dye to fabric.

### III Result & Discussion

The different colour shades were obtained from various extracts of pomegranate peels. The extracts show variation in colour and which mainly depends upon the extraction solvents. Various shades obtained with pomegranate dye is shown in below table.

#### 3.1 Various shades obtained with pomegranate dye



Treated with  $\text{CuSO}_4$  on Cotton



Treated with  $\text{FeSO}_4$  On Cotton

### IV Conclusion

Thus results obtained from present work revealed that, the pomegranate peels has the dyeing potential as a source of cotton, silk, and wools dyeing. Dye obtained from pomegranate peels can be used as cost effective and economically for various industries such as textiles, cosmetics, leather, food and pharmaceuticals.

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