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Extraction of Natural Dyes From the Floral Parts of Plants and its Applications in Fabrics

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Abstract: *Natural dyes from plant sources have been given much more interest in recent years due to the harmful effects and threat raised by synthetic dyes. The main idea of extracting dyes from plant (natural) sources is to avoid the environmental pollution. Present days with global concern over the use of eco-friendly and biodegradable materials, considerable research work is being undertaken around the world on the application of natural dyes. In this study dyes are extracted from two different flowers of plants e. Caesalpinia pulcherima, Bougainvillea glabra. These fabrics were mordanted with Alum acetate acetic acid for fastening of the imparted colours. The dyes produced from these flowers were dyed on cotton fabrics and tested for their colour fastness to washing properties. The dyad cottons fabrics were observed with different shades of colour. Moreover, the dyes obtained from the plant flowers may also be alternative sources to synthetic dyes for the dyeing of natural cotton fiber.*

Keywords: Natural dyes, Biodegradable *Caesalpinia pulcherima, Bougainvillea glabra,* Mordant

I. INTRODUCTION

India has a rich plant biodiversity which is ranked 11th as biggest biodiversity in the world. It has approximately 490,000plant species and there is no doubt that the plant kingdom is a treasure-house of diverse natural products . One such product from nature is the dye. Pigment from leaves, fruits, seed, wood and roots were used as dye stuff for textiles and as paint in art and craft. Natural dyes are environmental friendly, hygienic, user friendly and permanent than other colorant. The replacement of natural dyes could happen until the introduction of synthetic dyes due to feasible colouring property of natural dyes. Natural dyes/colorants derived from flora are believed to be safe because of its nontoxic, non-carcinogenic and biodegradable in nature. Natural dyes are now a days in demand not only in textile industry but in cosmetics, leather, food and pharmaceuticals. The rich biodiversity of our country has provided us plenty of raw materials, yet sustainable linkage must be developed between cultivation, collection and their use.

The application of natural dyes in textile industry are for various purposes, viz, dyeing of yarns, which are then woven into cloth, carpet or any other usable form; dyeing of cloths woven earlier, block printing, where the textile materials are printed with the help of printing blocks. it is an interesting and exciting prospect that one day a percentage of everyday colours could be naturally derived. The plant possesses many medicinal properties. Flowers are the most effective fermentation agent, used in Ayurvedic medicines (Kroes et al, 1990). Many investigations revealed that the use of combination of mordents in varying ratios gives different shades and different colour fastness results. The flowers, which contain much of tannin, are Flame coloured and yield red/pink/brown/flame coloured shades of dye (depending upon the fabric used) in large amounts, therefore, utilized throughout India for dying silk and fabrics on a commercial scale. India was a major exporter of herbal dyes but not so recently because of the ban on production of some of the synthetic dyes and intermediates in the developed countries due to pollution problem.

II. MATERIALS AND METHODS

The dye was extracted from the fresh floral parts of *Caesalpinia pulcherima* and *Bougainvillea glabra*, collected from Murud and some out side areasin February 2024

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Materials Required

Plant source, Cotton cloth, Bowls, Beakers, Conical flask. Mordants, Knife, Filter paper, Tripod stand, Mesh.

Plants Used

Peacock flower (Caesalpinia pulcherima), Bougainvillea (Bougainvillea glabra)

Extraction of Dyes

The collected flowers were used for extraction was the aqueous extract from fresh flowers.

In this method. Dye from flowers were extracted by preparing an aqueous solution of flowers (10 g in 100 mL. Distilled water) and the extraction process was carried out at a temperature range of 80-85°C for 1h.

This extract was then filtered and used for dyeing. Colouring materials from the flowers were extracted for dying of the fabric.

After the dye is extracted it is stored in the refrigerator for further use.

Preparation of Mordant

Mordant: The creation of a bond between the colouring matter and fibre is called mordanting. Alum0.748g of Alum and 0.187g of Washing soda were mixed in 100ml of water and was stored for further use.Vinegar50 ml of 5% ascetic acid is mixed with 100ml of water. From that 25ml of it were taken and mixed with 100ml of distilled water.

Bogenvilliapalnt

Dye Extraction

Cloth before dye

Cloth after dye

Caesalpinia pulcherima

Dye Extraction

Cloth before dye

Cloth after dye

III. RESULTS AND DISCUSSION

The dye extracted from the flowers and the colour of the dye is depended on the compounds (Phenol, Tannin, Fat&Fixed oil, Flavonoids, saponin, steroids. Quinine, Cellulose Terpenoids. Glycosides) present in the respective plant. The dye is then used in the cotton fabric for the fixation of colour. The cloth which is displayed above got fixed to the respective dye with the help of mordant. Different mordant were used for different plants. The mordant used were: Caesalpinia flower Vinegar and Bougainvillea Alum. These mordants when added to the dye gave different shades of colour and make different types of shades from one plant using the mordant. The mordants alum and cream of tartar is directly added to the dye, when treated using heat the mordant sticks into the fabric well again the colour does not fade and stay up to the limit mentioned in conclusion.

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IV. CONCLUSION

From this current study it was found that the natural dye extracted from the two different plant source extracts can be successfully applied to the cotton fabrics to obtain a wide range of colour shadings along with the application of the mordant as a fixative agent. These dyes are environmental friendly and harmless when compared to the synthetic dyes. These can easily replace the synthetic dyes, ultimately this can solve the problem caused by synthetic dye in water and land. The result of this dye fabric is that after washing and exposed to sun light for 48 hrs after this limit it will lead to shade up, so need to overcome this limit, introduce a better reagents for further study.

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