



ECO FRIENDLY DYEING OF FABRICS USING DISCARDED FLOWERS OF CHRYSANTHEUMS AND ORIGANUM MAJORANA

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Abstract

"Growing environmental awareness has sparked increased interest in natural dyes within the textile industry, as consumers recognize the harmful effects of synthetic dyes on both health and the environment. While natural dyes are eco-friendlier, their overall performance typically falls short compared to synthetic alternatives."

The present study deals with the extraction of natural dye collected from the discarded flowers of temples, Pooja flowers in houses and the flower shops at the local market. The selected flowers for the study are Yellow Chrysanthemum, Purple Chrysanthemums, Origanum majorana, and lotus flowers. The conventional method of dye extraction process was done for the selected natural sources and evaluated to determine the best colour strength. Three different types of knitted fabrics were used in the experiment to observe the colour fastness of dye. The sample dyed from Yellow Chrysanthemum shows best colour fastness report than the other dyed samples.

Key words Discarded flower, Yellow Chrysanthemum, Conventional Dyeing, Knitted structures

INTRODUCTION

Due to growing global environmental awareness, the use of natural colors on natural fibers has recently seen a resurgence. These materials are considered eco-friendly because they are both renewable and biodegradable [1,2]. In contrast, the textile industry is a major consumer of various chemicals, auxiliaries, and colorants (including dyes and pigments), many of which have mutagenic and carcinogenic properties. Dyes are one of the most important uses of the plants[9-10]. Recently, interest in the use of natural dyes has been growing rapidly due to the result of stringent environmental standards imposed by many countries in response to toxic and allergic reactions associated with synthetic dyes[3]. Nature has gifted us more than 500 dye-yielding plant species[8]. "Furthermore, the release of microfibers (i.e., microplastics or fiber fragments) from textile materials

presents a range of issues, particularly because the presence of synthetic dyes and chemicals hinders the biodegradation of both natural and man-made cellulosic fibers."[7].

2. Materials and methods

2.1. Materials

Three different structures single jersey ,interlock and pique of modal and cotton blended knitted materials were purchased from Raja Ganapathy Mills, Tirupur. The selected materials are treated with bio wash process followed by dyeing .The knitting composed samples were chosen for sustainable colouring in order to introduce to the sports clothing .It is necessary for comfort in terms of ease of body movement , colouring with discarded flowers extraction adds better skin friendly clothing for the wearer.

2.2. Extraction of dyes

In the extraction process, initially, collected discarded flowers are separated according to its colour and type to get different natural colour extraction. The selected chrysanthemum purple, yellow, Lotus and Origanum majorana flowers are kept in a room temperature and make them more resistant to decay. For dye extraction, conventional boiling technique was followed to extract the colour in a quick method. The dye was extracted by boiling flowers in distilled water at material-liquor ratio (MLR) 1:2.7, at 100 °C for 1 h. After the first extraction process, the dye solution was filtered and evaporated water was adjusted with distilled water to a volume of 3 L. Extraction process was repeated twice by using residual flowers after the first extraction.

2.3 Selection of Mordant

A mordant is necessary to fix the dye to the fabric. Mordants are also mineral salts, used to increase the affinity of the material. Alum and Banana stem residue was used as a mordant to fix the dye to the material.

2.4 Dyeing procedure

Prior to the dyeing process, selected fabric samples were carried bio-polishing pre-treatment for dyeing process. The obtained filtrate was diluted with water at a ratio of 1:10. Simultaneous mordanting was carried out using alum, where 20 grams of alum were blended into a solution containing the diluted slurry of the extract. Three different knitting structures such as single jersey, interlock and pique cotton samples were dyed with three different dyeing extracts namely chrysanthemum yellow and chrysanthemum purple, Origanum majorana in a separate conventional boiling vessel maintaining 30 to 80°C for 1 hour.

After this period, the dyed fabrics were removed and pressed to eliminate excess dye. The dyed materials were then immersed in a saturated brine solution for 15 minutes, serving as a dye fixative, followed by thorough rinsing in tap water. Finally, the dyed fabrics were left to air dry.

FIGURE-1

COLLECTED DISCRDED FLOWERS



FIGURE-2 ORIGANUM MAJORANA



FIGURE-3 YELLOW CHRYSANTHEUM



FIGURE-4 PURPLE CHRYSANTHEUM



NOMENCLATURE OF SAMPLES

FIGURE-5



FIGURE-6



YC-S-Yellow Chrysanthemum Single Jersey

YC-P- Yellow Chrysanthemum Pique

YC-I –Yellow Chrysanthemum Interlock

PC-S-Purple Chrysanthemum Single Jersey

PC-P-Purple Chrysanthemum Pique

PC-I-Purple Chrysanthemum Interlock

OM-S- **Origanum Majorana** - Single Jersey

OM-I- **Origanum Majorana** - Interlock

OM-P- **Origanum Majorana** -Pique

3. Results and Discussion ORIGANUM MAJORANA

The analysis of Colour Fastness Tests to rubbing, washing, sunlight and pressing was done for all the dyed fabrics. The results of the colour fastness tests are given in Table-1 and Figure-6

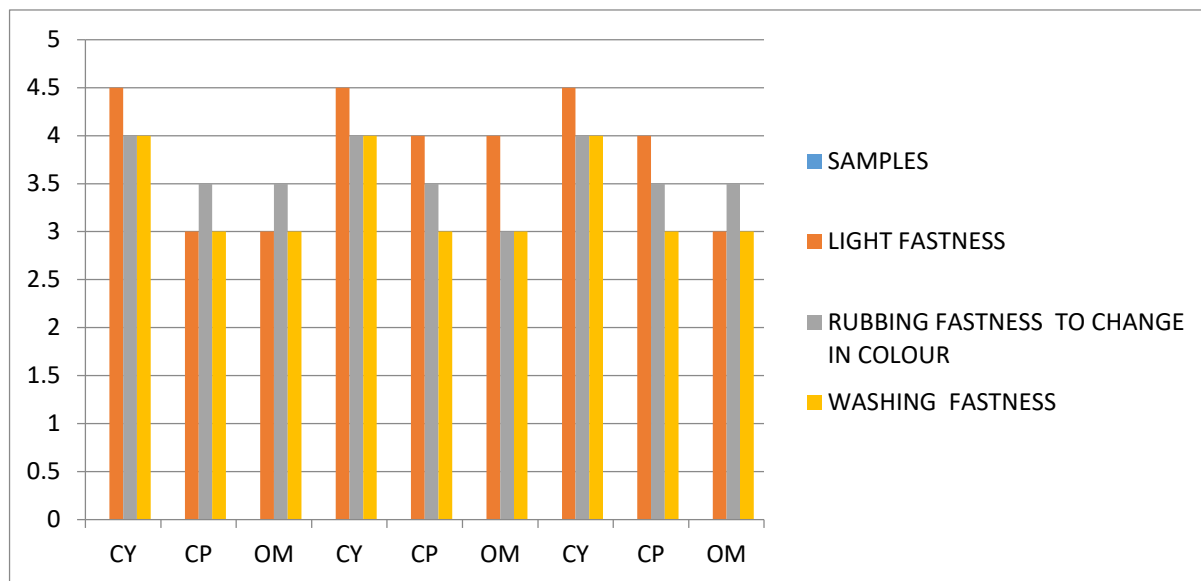
Fastness Properties of Samples

The fastness properties of samples in terms of washing, rubbing, and light are indicated in Table - Washing and rubbing fastness results were examined with a gray scale varying between 1 and 5 (1 presents bad and 5 represents excellent results). In addition, light fastness values are measured with a blue scale. On the blue scale, “1” gives a bad result and “8” gives an excellent result.

S.NO	DYES	SAMPLES	LIGHT FASTNESS	RUBBING	WASHING FASTNESS
				FASTNESS TO CHANGE IN COLOUR	
1.	CY	SJ	4.5	4	4
2.	CP	SJ	3	3.5	3
3.	OM	SJ	3	3.5	3
4.	CY	I	4.5	4	4
5.	CP	I	4	3.5	3
6.	OM	I	4	3	3
7.	CY	P	4.5	4	4
8.	CP	P	4	3.5	3
9.	OM	P	3	3.5	3

FIGURE-7

FASTNESS PROPERTIES OF TESTED SAMPLES



From Table 1, it was observed that the fabric samples showed YC –S sample shows highly better fastness than the other selected samples. CP-S,CP-P shows intermediate fastness results and OM-S,OM-I,OM-P shows average rating in all tested samples.

4. CONCLUSION

As green consumerism and environmental friendliness are on an increase, the use of natural dyes is the latest trend. Researchers are exploring natural substances and testing them for their potential as dyes. Eco and Organic fabrics once considered an alternative to manmade synthetic fibres and are now entering into the mainstream. Consumers are becoming increasingly very much conscious to environmentally friendly consumer goods and much concerned about green processing. Natural dyes exhibit several important properties that provide them a significant edge over synthetic dyes. Fabrics dyed with natural dyes are also free from carcinogenic compounds.

The present study deals with the natural dyeing of eco-friendly fabrics using discarded flower of Yellow Chrysanthemum, Purple Chrysanthemum two variants that gives two different colours orange and yellow. Bio washed cotton and modal fabrics were selected for the study. Dyeing was carried out using simultaneous mordanting with Banana stem extracted juice as mordant. It was noted from the results that both cotton and modal fabrics showed good affinity to both the dyes. From the fastness properties the fabrics CP-S,CP-I,CP-P shows fair to average results. The dyed samples of colour fastness tests, of which the results were found to be satisfactory..

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