Original Research Paper

Volume - 10 | Issue - 11 | November - 2020 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

Home Science

ANTIBACTERIAL FINISH OF METHANOL EXTRACTED SEAWEED ON POLYESTER FABRICS BY USING ALUM MORDANT

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ABSTRACT Natural dyes have been considered as a promising alternative to chemical dyes, since they have more harmful effects on humans and the environment. Micrococcus Luteus is a bacterium that is Gram-positive. In the ulvaceae family, it is an edible green algae. Seaweed is rich in bioactive compounds, antioxidant and antimicrobial properties, and is not biodegradable and biocompatible with the skin. Using ulvans and oligo ulvans, natural dyes are extracted from the green seaweed and serve as color producing pigments. The dyes are extracted from sea weed. One mordant (Alum) finished the methanol extracted seaweed in color to the polyester fabrics. Methanol extracted sows excellent antibacterial activity. Fabrics made from alum showed excellent color on fabric. Color pigment was extracted from seaweed which shows promising color for fabrics. The natural dye-finished fabrics thus have a wide range of applications in various fields, such as Medical textiles, Home Textiles, Sportswear fabrics, Performance fabrics, etc.

KEYWORDS : Methanol extraction, antibacterial activity, alum mordant finishing, polyester fabric

I.INTRODUCTION

Natural dyes are extracted from the green seaweed using ulvans and oligoulvans and serve as pigments that produce colour. Polyester is a synthetic fibre that is generally petroleum derived. This fabric is one of the most popularly used textiles in the world, which is used by thousands of various consumer, industrial and commercial. Textile fabric finishing is done to improve the desirability and versatility of the fabrics. Different finishing techniques are available to achieve various results, which increases the textile materials value. Natural dyes are the colorants and pigments derived from nature's renewable resources, while natural dyes are also produced from earth's minerals. Natural dyes are derived from plants, animals, and micro-organisms; their environmentally friendly nature is one of the reasons for their growing significance worldwide. Nowadays antimicrobial material that can create comfortable living environment has attracted more and more attention. The increasing demand for comfortable, aesthetic, durable, functional and safe textile products dictates the development of new and contemporary techniques of processing and designing textiles..

II.MATERIALS AND METHODS

2.1. Extraction Of Dye From Seaweed

Fig: 1 Seaweed (soxhlet Extraction)

The Seaweed is collected and washed with distilled water. They've been drying shadow for 3 weeks and grinding into fine powders. The fine powders are collected and stored in sterile containers. The bioactive compounds are extracted using soxhlet instruments. For 20gm of powder, about 100ml of solvent ethanol was used. Extraction of Soxhlet was performed for 30 minutes. Collecting and storing the extracts..

2.2. Mordanting

In the present analysis, alum mordant was used to classify the mordant used to dye the fabrics. Mordants at 2 per cent of fabric weight (o.w.f.) were used for fabric dyeing. The fabric is treated with these mordants which act as cross linking agents to bind fibre and dye efficiently. Mordant and distilled water are blended together to attain a content liquor ratio (MLR) of 1:40. At room temperature, fabric was soaked in mordant and steadily lifted to 90 ° C, and allowed to stand for 30 minutes. The mordant solution was then allowed to cool and in laboratory conditions, the sample was left to air dry.

2.3. Dyeing Of Fabric

Dyeing of fabrics was conducted for 1-hour in an open dye beaker bath containing dyes and mordants at a temperature of 90 ° C. The dyed samples were allowed to cool at 40-50 ° C, and the excess dye was removed by running water wash, which also helps remove un reacted mordants and extra deposits on the surface. Drying of fabric was conducted at 80 ° C for 2min and curing at 150 ° C followed. In soaping for 10 minutes non-ionic detergent (NID) was used to extract the residual dye and other chemical substances. The samples were then dried in air under laboratory conditions, at room temperature.

III. RESULT AND DISCUSSION

3.1. Antibacterial Properties of Methanol Extracted Seaweed

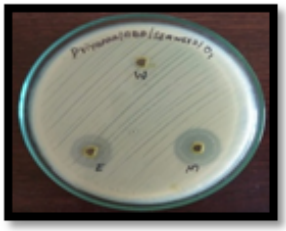

Fig:6Sea weed – *E. coli* **Fig:7 Sea weed – *S. aureus***

Table-1: Antibacterial Properties Of The Extracted Natural Dyes.

S. No	Sample	Solvent	Inhibitory zones(mm)	
			Staphylococcus aureus	Escherichia coli
1	Seaweed	Water	0	0
		Methanol	20	19

Aqueous extracts of seaweed showed no inhibitory zones, Ethanol extracts showed 20 mm of inhibitory zones against *S. aureus* and 19 mm against *E. coli*; Water extracts showed no inhibitory zones whereas methanol extracts showed higher zones of inhibition then other one solvent. Table-1 shows the Antibacterial properties of the extracted Natural dyes.

IV.CONCLUSION

The color derived from seaweed gives the polyester fabrics a very good color. There are many types of seaweed available, the main advantage of getting colors from seaweed. Every single seaweed gives colors. This methanol extracted seaweed has unique properties such as antibacterial activity. Even in polyester fabrics the color extracted from seaweed give a very good colour. Properties of the dyeing are examined. The measurement of colour speed yields a very good result. More experiments can be carried out by changing the mordents to give various shades and colours.

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