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EXTRACTION AND APPLICATION OF NATURAL DYES FROM ORANGE PEEL AND LEMON PEEL ON COTTON FABRICS

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Abstract - *Natural dyes are important substances from natural resources like plants, minerals, and insects. These dyes are non-toxic and free of health hazards like skin allergies. In this paper orange peel and lemon peel extract is used as a natural source of dyeing cotton fabric. This work aims to achieve twin objectives of effective recycling waste from food industry and extraction and application of natural dyes from frit waste and also improve the dye stuffs performance characteristics. Ethanol cold extraction method was used for dye extraction in three different ratios of which 1:1 has proved to have higher concentration of dye extract. Two organic solvents alum and sodium carbonate are used in premordanting in three different ratios, namely 10%, 20% and 30%. Of these 30% mordanted samples have shown higher dye uptake.*

Key Words: Natural dyes, non-toxic, orange and lemon peel, ethanol, cotton fabric, mordant

1. INTRODUCTION: The use of natural dyes that are non-toxic and non-allergic on textile materials has gained significant importance due to ever increasing awareness and concerns regarding environmental pollution as in the case of synthetic dyes. Increasing number of apparel sourcing companies, dyers and export houses have started looking at the possibilities of using natural dyes for dyeing and printing of textiles to overcome this problem[1]. On the other side every day large amounts of fruit waste are being produced in fruit stalls. Hence this work explores the feasibility of utilising the waste from fruit stalls for dyeing cotton fabric and at same time address the issue of pollution from dyeing industry.

2 MATERIALS AND METHOD

2.1 Material

2.1.1 Cotton Fabric - Fabric parameters are listed below

Table. 2.1 Cotton fabric parameters

Parameters	Values
Ends per cm	26
Picks per cm	23
Count	80 Ne
Fabric GSM	97 gm/m2

2.1.2 Food Extracts

Orange peel and lemon peel grinded in powder form. Ethanol is used as solvent in ratios of 1:1, 1:2 and 1:3

2.2 METHODOLOGY

Orange peel and lemon peel were dried and grounded in the form of a powder. Extraction was done using aqueous extraction method using ethanol as an organic solvent. The dried ground samples were mixed together with the solvent in the ratio 1:1, 1:2 and 1;3. The mixture was kept at room temperature under shaker for 24 hours. After 24 hours the ethanol was evaporated. The residue is filtered using filter paper and the dye is collected. The table below shows the amount of yield produced in aqueous extraction of orange and lemon peel.

3. RESULTS AND DISCUSSION

Table 3. Rubbing fastness of the dyed cotton samples

Material to Liqour Ratio (MLR)	Mordant (%)	Orange peel		Lemon peel	
		Wet Rub	Dry Rub	Wet Rub	Dry Rub
1:1	10	3	4	3	4
	20	2/3	4	3	4
	30	2/3	4/5	3/4	4/5
1:2	10	3	3/4	2/3	3
	20	2/3	3/4	3	3
	30	3	3/4	3/4	3
1:3	10	2/3	3	2/3	2/3
	20	2/3	3/4	3	3
	30	3	3/4	3	3

3.2 Fastness to washing (IS:764:79):

Mild washing was done for all the cotton fabric samples 30 minutes at 60°. The results are listed in the Table: 4.

Table 4: Change in Colour

Material to Liqour Ratio (MLR)	Mordant (%)	Orange peel	Lemon peel
1:1	10	3/4	4
	20	3/4	4
	30	4	4/5
1:2	10	3	3
	20	3/4	4
	30	3/4	4
1:3	10	3	3
	20	3	3
	30	3/4	4

4. CONCLUSION:

It can be concluded that 30% mordanting has given a superior dye uptake. The dye yield was higher for both

orange peel and lemon peel was observed to be higher with 50ml ethanol extraction and among orange peel and lemon peel orange peel has given a better dye yield when compared to lemon peel.

With 1:1 material to liquor ratio and 30% pre-mordanting the cotton fabric dyed with extracts from orange peel and lemon peel has shown better fastness to rubbing in dry and wet state. Similar trend is observed in case of fastness to washing. This work clearly indicates both extracts from orange peel and lemon peel could be used as source for natural dyes for cotton fabric and hence will result in better utilization orange and lemon waste from food processing industry as value addition. This will at the same time has potential reduce the extent of pollution in the conventional textile dyeing industry.

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