A CRAM ON NATURAL DYEING BY POMEGRANATE AND EUCALYPTUS EXTRACT IN ORGANIC COTTON KIDS WEAR

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***ABSTRACT*: The awareness and idea of this project is about the healthy garment towards the babies with the environmental concerns and ill effects on health caused by synthetic dyes has made the natural dyes comeback such as Pomegranate Extract and Eucalyptus leaves extract. Many natural materials from plant and animal sources are being identified as possible colorants; one such established colorant is eucalyptus leaves. Tea is primarily consumed in large quantity as a beverage all over the world. The reused tea dust as a colorant was explored in this study and its fastness property of silk fabric under different mordanting methods and mordant's was evaluated. It was observed that the reused tea leaves contained colorants but more effort was involved in the extraction of dye to obtaining the required shade. The post mordanting method was found to have better color fastness and visual properties and alum significantly improved the fastness properties of the dyed samples. A natural dye extracted from eucalyptus leaves and Pomegranate Extract was applied to a silk and wool fabric by the use of two padding techniques, namely the pad-batch and pad-dry techniques under different conditions. Silk and wool fabrics dyed in a solution composed of eucalyptus extract from leaves showed a shade of pale yellow to brown. The exception was when the fabric was dyed with ferrous mordant, resulting in a shade of dark grayish-brown. The fastness properties ranged from good to excellent, while light fastness was fair to good.**

***Keywords*- Eucalyptus leaves extract, Pomegranate Extract, Dyeing, Organic Cotton, Single jersey fabrics, Kids apparel**

1. Introduction

1.1 Natural Dyeing Process

Normally, one technique used for dyeing with natural dye; exhaustion dyeing (conventional dyeing, solicitors dyeing and microwave dyeing). Exhaustion dyeing is using lot of water as shown in "Liquor Ratio (ratio between water and goods)". Producers immerge the goods in dye for extended periods for complete penetrate. This produces excessive waste water compared to continuous process.

1) Conventional dyeing is carried out by boiling the fabric in dye bath for 4-hours and often the dye uptake is still not completed. Enormous amount of heat is consumed in terms of heating the dye bath.
2) Sonicator dyeing: Utilization of ultrasound energy of aid wet processing of fabrics. The process of increasing dye transfer from the dye-bath to fabric using ultrasound energy is a function of the acoustic impedance characteristics of the fabric
3) Microwave dyeing takes into account only the dielectric and the thermal properties.

The dielectric property refers to the intrinsic electrical properties which affect the dyeing by dyeing by dipolar rotation of the dye and the influence of microwave field upon dipoles. The aqueous solution of dye has two components, which are polar. In the high frequency microwave field, oscillating at 2450 MHz; it influences the vibration energy in the water molecule and the dye molecules.

1.2 Objectives

- To produce kids, wear by using natural dyeing by pomegranate extract with eucalyptus combo
- To incenses the medical sense towards kid's wear
- To impact and produce kids wear with new application as behaviors of eucalyptus smell
- To study unique properties and their applications

2 Review of Literature

Jersey fabric is a types of knit textile made from cotton or a cotton and synthetic blend. Some common uses for jersey fabric include t-shirt and winter bedding. The fabric is warm, flexible, stretchy, and very insulating, making it a popular choice for the layer worn closest to the body. Jersey also tends to be soft, making it very comfortable.

2.1 Eucalyptus

Eucalyptus is a diverse genus of flowering trees and shrubs (including a distinct group with a multiple-stem mallee growth habit) in the myrtle family, myrtaceae. Members of the genus dominate the tree flora of Australia, and include the tallest known flowering plant on earth. There are more than 700 species of eucalyptus and most Australia; a very small number are found in adjacent areas of New Guinea and Indonesia. One species, eucalyptus deglupta, ranges as far north as the Philippines.Eucalyptus is one of three similar genera that are commonly referred to as "eucalypts". The others being Corymbia and Angophora. Many species, though by no means all, are known as gum trees because they exude copious Kino from any break in the bark (e.g., scribbly gum). The generic name is derived from the Greek words, referring to the operculum on the calyx that initially conceals the flower.

2.1.1 Eucalyptus dyeing process

Eucalyptus is a member of evergreen hardwood genus, endemic to Australian. There are approximately nine hundred species and sub-species. Eucalyptus has also been grown in many parts of the world, including southern Europe, Asia and the west coast of the United States (Flint, 2007). Eucalyptus is one of the most important sources of natural dye that gives yellowish-brown colourants. The colouring substance of eucalyptus has ample natural tannins and polyphenols varying from 10% to 12%. The major colouring component of eucalyptus bark is quercetin, which is also antioxidant.

2.1.2 Dye extraction from eucalyptus leaves

Fresh eucalyptus leaves (eucalyptus camaldulensis) were dried in sunlight for one month and crumbled using a blender and then were used as the raw material for dye extraction, which was achieved by the reflux technique: 70g of crumbled eucalyptus leaves was mixed with 1l of distilled water and refluxed for 1h. It was then filtered and the dye solution was separated into two parts: (a) one for evaporating under reduced pressure (rotary evaporator), and (b) one for dyeing. The rotary evaporator provided a crude dye extract of eucalyptus leaves. Then, it was crumbled with a blender and used for obtaining the standard calibration curve. The dilution of the eucalyptus leaf extract gives a relatively clear solution system with a linear dependence on the concentration absorbance, an absorption peak at 262 nm [25]. The concentration of 20 g/l was calculated from a standard curve of concentrations of the eucalyptus leaf extract dye solution versus absorbance at the wavelength mentioned.

2.2 Pomegranate

Pomegranate (Punica granatum) is a deciduous spiny shrub or small tree belonging to the family Lythraceae. This attractive shrub is hardy, drought resistant and long lived (up to 200 years). Pomegranate is cultivated in warm countries all over the world. The fruit is spherical, up to 12 cm in diameter and has a tough leathery skin. Inside there are many seeds, each surrounded by a ruby-red fleshy pulp. The flesh can be made into juice and the syrup grenadine, whilst the seeds can be ground and made into a spice called anardana. The leftover rind is not wasted but used as a dye. One tree yields about 1 kilo of dried rind a year. Dyers use the rind to produce golden yellows, greens, greys and blacks.Pomegranate is one of the oldest fruits in cultivation and its rind has been used as a dye by carpet makers for millennia. It was a symbol of love in antiquity and even feature in an ancient Egyptian love song. The common name 'pomegranate' means seeded apple in Latin. The city of Granada in Spain was named after the pomegranate fruit. In Rome it was known as Punica, as it was introduced from the Punic nation (now Tunisia) and this is why the scientific (generic) name is 'Punica'

2.2.1 Dyeing with pomegranate

This dye is high in tannin (19 to 26%), therefore it works particularly well with cotton and other plant fibers but you can also use it to dye wool and silk. You will get yellow fawn when using pomegranate without a mordant and golden yellows with a mordant. With the addition of iron, you will get mossy greens, greys and blacks. You can over-dye it with indigo to make beautiful dark greens. Pomegranate rinds are popular for contact dyeing (Eco prints).
Immature fruits give pale yellows, while ripe fruits give golden yellows. Most dyers buy dry chopped pomegranate rinds which come from ripe fruits. However, if you have access to a pomegranate tree you can use fresh fruit. If the fruits are small, use the whole fruit broken up. If you have access to large fruits from a market, eat the fleshy pulp and use the rind.

2.2.2 Yellows from pomegranate:

1. Soak the pomegranate rinds in hot water overnight. Use the same amount of dried rind as fiber (for example if your piece of cotton fabric weighs 80 grams, use 80 grams of pomegranate rind).
2. Simmer the rind for an hour the next day.
3. Let it cool down, strain the rind and save the liquid.
4. Add your wet mordant fiber to the dye pot. Gently simmer for an hour.
5. Let the fiber cool in the dye bath.

Note: If you are dyeing cotton fabric and you want a mottled effect, you don't need to strain the rind, just add the fabric after you simmered the rinds, and simmer everything for another hour. Let the fabric cool down in the pot and then take it out. Let it dry outside and then shake all the bits out.

2.2.3. Mossy greens, greys and blacks from pomegranate:

Pomegranate's high tannin content means that it reacts with iron, turning to deep moss green, and even to greys and blacks. Just remember that too much iron damages wool, silk and other protein fibers.

2.3 Organic Cotton

Organic cotton is cotton that is produced and certified to organic agricultural standards. Its production sustains the health of soils, ecosystems and people by using natural processes rather than artificial inputs. Importantly organic cotton farming does not allow the use of toxic chemicals or GMOs (genetically modified organisms). Instead, it combines tradition, innovation and science to benefit the shared environment and promote a good quality of life for all involved.

Organic cotton is generally defined as cotton that is grown organically in subtropical countries such as Turkey, China, and parts of the USA from non-genetically modified plants, and without the use of any synthetic agricultural chemicals such as fertilizers or pesticides.Its production is supposed to promote and enhance biodiversity and biological cycles. In the United States, cotton plantations must also meet the requirements enforced by the National Organic Program (NOP) from the USDA in order to be considered organic. This institution determines the allowed practices for pest control, growing, fertilizing, and handling of organic crops.

	ORGANIC COTTON
Seed preparation:	Natural, untreated GMO free seeds.
Soil preparation:	Healthy soil through crop rotation. Retains moisture in soil from increased organic matter.
Weed control:	Healthy soil creates natural balance. Beneficial insects and trap crops used.
Harvesting:	Natural defoliation from freezing temperatures or through the use of water management.
Production:	Warp fibers stabilized using double-plying or nontoxic cornstarch.
Whitening:	Safe peroxide is used.
Finishing:	Soft scour in warm water with soda ash, for a pH of 7.5 to 8.
Dyeing:	Low-impact fiber-reactive or natural dyes with low metal and sulfur content.
Printing:	Low-impact, water-based inks and/or pigments with no heavy metals.
Fair trade:	Social criteria in place to ensure safe, healthy, non-abusive, nondiscriminatory environment with living wages.
Marketing:	Positive story can be told to differentiate you from your competitors.
Price:	Initial cost more expensive. Long-term advantages: priceless.

2.3 Benefits of Organic Cotton

Organic cotton shows great benefits at various levels of the value chain.Farmers, traders, retailers and consumers all benefit from the economic, social and ecological advantages of organic cotton projects. Click on the buildings to see the benefits for each group:

2.4 Kids wear

Kids wear is defined as apparel for the kids. Kids are generally defined as children in the age group of below 15 years. Kids wear is clothing for children who have not yet grown to full height. Grandma bait is a retail industry term for expensive children's clothing. Children's clothing is often more casual than adult clothing, fit for play and rest. Hosiery is commonly used. Nowadays a lot of kids wear are very much influenced by trends in adult wear. Good quality well designed garments are a priority for a growing number of parents and children's clothing is getting prime place in top label stores and high end fashion retail outlets. Dresses are also getting separately designed for boys and girls at a very early age Function and design must meet at the right proportions in children's clothing for it to be popular and accepted. Fabric choices, openings and fastenings, fit and ease, trimmings used are all major considerations when designing children's wear. Some other factors a designer designing for children's clothing should focus on are the changing shape of the growing kid and different proportions of the different parts of the body.Leisure wear and sportswear are two very prominent design styles in children's clothing. Girls' clothing is available in a wide range and styles. Children's clothing is also sometimes worn by adult midgets, dwarves or short people. American sizes for baby clothes are usually based on the child's weight. European sizes are usually based on the child's height. These may be expressed as an estimated age of the child, e.g., size 6 months (or 3–6 months) is expected to fit a child 61 to 67 centimeters (24 to 26 in) in height and 5.7 to 7.5 kilograms (13 to 17 lb.) in weight.

3 Product Sample

Organic cotton is an imperative for us and our world. Besides the quality-of-life benefits from organic cotton, the quality of clothing produced from organic cotton is also substantially higher. Organic cotton plants produce longer-stable cotton fibers which yield stronger yarn and more durable fabrics. Pesticide –free long-stable cotton also feels softer and more breathable and luxurious against the skin. But organic cotton is not the only healthy fabric. The rate of people experiencing a wide barrage of health problems such as rashes, allergies, respiratory problems, and difficulties focusing mentally due to chemical sensitivities has been growing alarmingly. Many people diagnosed with multiple chemical sensitivities find organic clothing to be essential in reducing their exposure to the vast array of toxic chemicals that we are unknowingly exposed to every day.There is another reason why people are becoming excited about organic clothing and that is because of the fashions that are starting to come from some of the hot, new designers turning to eco-fashion. In future blogs, we will be interviewing some of trhe designers behind the cool eco-fashions.

4 Result and Discussion

4.1 Colour fastness report

Size of Test Sample : 10*4
Reagents : 5 gpl soap and 2 gpl soda ash
Colour : light Green and Light Pink
Apparatus Required : Laundrometer and grey scale
Temperature : 95+/-2oc.
Time : 30 minutes.

4.2 Result

- Rating for change in test specimen 4-5.
- Rating for staining in white fabric is 3-4.

5 Conclusion

The whole process of extraction and dyeing is ecologically safe. The obtained results have shown the dyeing potential of pomegranate as source for cotton dyeing. Good fastness exhibited by the dyed clothes is because of the mordants used. There is need for proper knowledge, documentation and assessment of dye- yielding plants as well as the dying techniques so as to increase the use of natural dyes. There is a lot of scope to use the pomegranate dye for obtaining various color shades using safe mordant under eco-friendly textile dyeing. The process of production of pomegranate dye was found to be cost-effective as compared to the cost of dyes in local market.

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