

To Analyse the Antibacterial Activity of *Tectona Grandis*

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ABSTRACT

The Textile Sector in India ranks next to Agriculture. Maintaining sustained growth for improving quality of life. A bamboo fiber has a good reputation for the benefit to both human and earth in the clothing industry. Bamboo leaves have antioxidant properties, menstrual irregularities or disorders can find benefit through the intake of bamboo shoots that help to regulate the cycle. Natural dyes are dyes or colorants derived from plants, invertebrates, or minerals. In Ayurveda the teak leaf is considered a laxative, a sedative for the uterus, good for piles, dysentery and leucoderma. Recent studies shows that teak leaf has antibacterial properties. In this research it was shown that teak leaf has both dyeing and medical properties.

Keywords : Teak leaf, Finishing, Antifungal, Antibacterial.

I. INTRODUCTION

The Textile Sector in India ranks next to Agriculture. Textile is one of India's oldest industries and has a formidable presence in the national economy in as much as it contributes to about 14 per cent of manufacturing value-addition, accounts for around one-third of our gross export earnings and provides gainful employment to millions of people. The textile industry occupies a unique place in our country. The source of Natural fibers are from plants, animals and mineral. Since these are available naturally, it is called as natural fibers. Plant fibers are composed of cellulose and therefore are classified as natural cellulosic fibers. The important raw material to produce fabrics are fibers especially cotton and silk. Fibres are of two types: natural fibre, which consists of animal and plant fibres, and man-made fibre, which consists of synthetic fibres and regenerated fibres.

1.1 Health benefits of Teak leaf

Teak is an excellent source of flavonoids, carbohydrate, alkaloids, saponins, tannins and proteins. Furthermore, studies reveal that the teak plant contains anti-inflammatory, antipyretic, antidiabetic, anti-ulcerogenic, antibacterial, analgesic, antioxidant, anti-diuretic, hypoglycemic, antiasthmatic, antifungal, antitumor, antimicrobial and anti-inflammatory properties. Dyes are produced from the root bark and young leaves and this is used for paper products, matting and cloth. The dyes may be yellow-brown or red-brown. Dye from the leaves alone is used for dyeing cloth especially wool and cotton. In Java, Indonesia, the sawdust is burnt as incense.

II. METHODS AND MATERIAL

2.1. Selection of 100% Bamboo Knitted Fabric

The bamboo Knitted fabric was environmentally friendly. The 100%bamboo knitted fabric was purchased in Tiruppur, KOTHARI FABRS. I KG of fabric was bought it of about 6 meters.

Plate - 1



BAMBOO FABRIC

2.2.Desizing

Desizing is the process of removing the starch from the fabric. here the 100%bamboo knitted fabric was processed to remove the starch as follows.

2.2.1.Procedure

2.2.1.1Materials Required

Fabric	: 680gm(4 meters)
Water	: 5 liters
Detergent	: 25gm
Temperature	: 60°C

First the 25gm of detergent was mixed with 5 liter of water. then the 100% of bamboo knitted fabric was immersed in the prepared solution for 30 mins with the temperature 60°C.After the 30 mins the fabric was removed from the solution and it washed the tap water. then fabric was squeezed and dried.

Plate 2



DESIZING

2.3. Selection of Mordant

Myrobalan is a great dye to modify colours on Bamboo fabric. On its own it produces butter yellows. Myrobalan (*Terminalia chebula*) is a deciduous tree that grows in Asia, mainly in the foothills of the Himalayas. The dye comes from the dried fruits, which are ground into a powder. Myrobalan is rich in tannin and can be used both as a mordant and a dye for cotton and bamboo fabric. Mordant is nothing but an agent used to fixing the dye in the fabric. In this process myrobalan was used as a fixing agent.

2.3.1. Materials Required

Fabric weight	: 680gm (4 mtr)
Myrobalan mordant	: 102 gm
Water	: 6 liters
Temperature	: 60°C
Time duration	: 1 hr

The myrobalan powder was extracted of weighted according to the fabric weight. the amount of myrobalan powder is measured according to the weight of the fabric. For 1 gm of 100% bamboo knitted fabric 0.15gm myrobalan powder was adding for the preparation of the solution. There are 680gm 100%bamboo knitted fabric 102gm myrobalan powder was added.

2.3.2.Procedure

First the 102 gm of myrobalan powder was mixed with 6 liter of cold water. The 100%knitted bamboo fabric was immersed in to the prepared solution. The fabric was immersed in 30 mins with 60°C temperature. Then the fabric was squeezed and dried.

Plate - 3



MYROBALAN POWDER

2.4. Selection of Herbs For Dyeing

For the dyeing process *Tectona grandis* was selected. The leaf of *Tectona grandis* was collected from the trees. And it was grown in tropical areas. Only young leaf was chosen for the extraction of dyes. Only in young leaf the dyeing property was found greater. where as no dyeing property was found in matured leaf.

2.4.1. Drying of Herbs

Provided they are dried appropriately, herbs are able to preserve a significant quantity of their unique hue, aroma as well as healing properties. In fact, it is not all difficult to dry herbs property nevertheless, it requires you to be cautious while drying them as well as be aware of the particular attributes of each plant. Initially, you need to remove the plants away from direct sunlight immediately after you have completed collecting or harvesting them. You always need to following a common rule of thumb while drying herbs. As per this rule, you should always dry up all warming herbs in sunlight, while the cooling herbs should always be desiccated in the shade.

Plate - 4



Dry Herbs

It was ensure that are removed all the soil from the leaf herbs you have cultivated soon after harvesting the plants.

2.4.2. Grinded

Dry grinded powder of the selected herbal portion was done in grinded mixers. After that, the powder was sieved with seiver to remove the dirt and unkind particles. The fine powder obtained was used for extractions.

2.5. The Extraction of Dye Solution From The Selected Herbs Was Done In Three Different Methods

1. Aqueous dye extraction method
2. Ethanol dye extraction method
3. Methanol dye extraction method

2.5.1. Aqueous Dye Extraction Method Material required

Dye powder	: 25gm
Water	: 500ml
Time	: 35 - 45
Temperature	: 60 – 70°C
Ph value	: 6

Plate -5



The dry grained powder 25gm was taken and mixed with 500ml of deionized water and about 30 mins at the temperature of 60 - 70°C. After 30 mins the extraction was filtering using the filter sheet.

2.5.2 Ultrasonic machine

Ultrasonic cleaner stainless steel (6 liters)(LMUC – 6) the ultrasonic energy is produced by converting electrical energy in to mechanical vibrations by using

generator and piezo electric transducers. Due to mechanical vibrations in cleaning liquid this phenomenon is called cavitations. In a very short time it removes all dirt and foreign bodies from components which are immersed in the cleaning liquid features continuous self tuning circuitry for any change in workload, liquid level and bath temp. uniform cavitations through out the tank with special transducers separate oscillator eliminates damages to generator in case of failure of transducers using 40Khz frequency for effective cleaning with low noise designed for completed cleaning of small and large components without dismantling inner tank and outer body made of stainless steel model.

Plate - 6



Ultrasonic machine

2.5.3 DYEING PROCESS

The 100% bamboo knitted fabric was dyed using padding mangle method. The fabric was dyed separately in Aqueous, Methanol and Ethanol.

2.5.4 PADDING MANGLES

Material required

Solution : 200ml

Time : 20-30mins

The padding mangle and two-bowl padding mangle. The cloth is passed in full width the liquor in the through and the excess solution is removed by passing it through the squeezing bowls thus the mangle effects impregnation of the liquor and squeezes out excess liquor. The padding mangle is continuous

process of the fabric in concerned liquor, such as pretreatment dyeing or finishing.

Plate -7



Padding Mangle

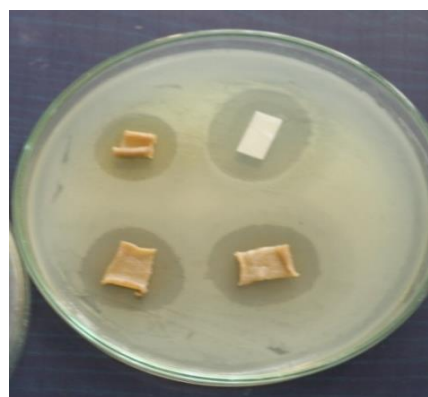
2.6 Analysis of Antibacterial activity

The slant culture of Pathogenic bacteria such as E. coli, and Staphylococcus spp., were procured from Bharathiar University, Coimbatore. These cultures were subjected to sub-culture with nutrient broth in a shaking incubator at 37 °C overnight. For antibacterial activity nutrient agar medium was prepared and poured into petri plate and allow for 10 min for solidify purpose. Then these culture were swabbed (Sterile cotton swabs) with E. coli, and Staphylococcus spp., then Sample were cut into small pieces and placed over swabbed plate. Then the plates were incubated for 24 hrs at 37°C. After the incubation the diameters of the inhibition zone of each sample was measured.

2.7 PLATES :

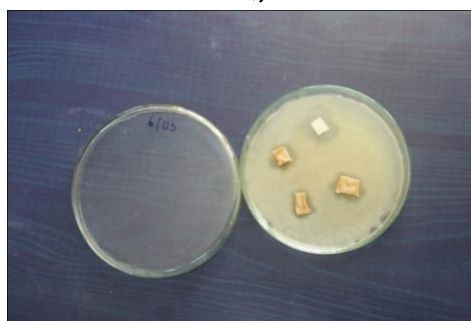
2.7.1 ANTIBACTERIAL ACTIVITY TEST : (E .COLI)

Plate - 8



AQUEOUS

2.7.3 ANTIBACTERIAL ACTIVITY TEST - (STAPHYLOCOCCUS SPP.)



AQUEOUS

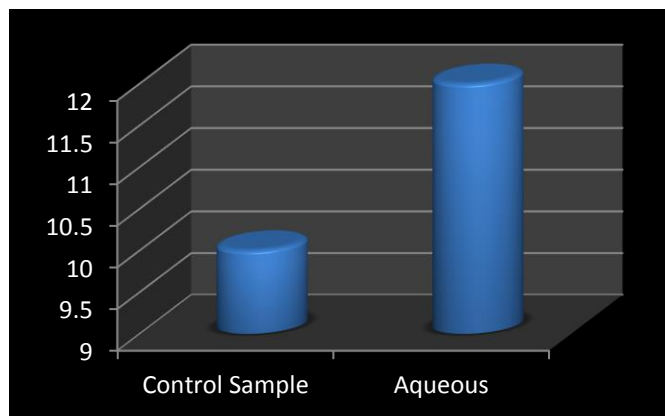


Figure -2

ANTIBACTERIAL ACTIVITY TEST : (E .COLI)

TABLE - 1

S.No	Control Sample	Aqueous
1	12	14

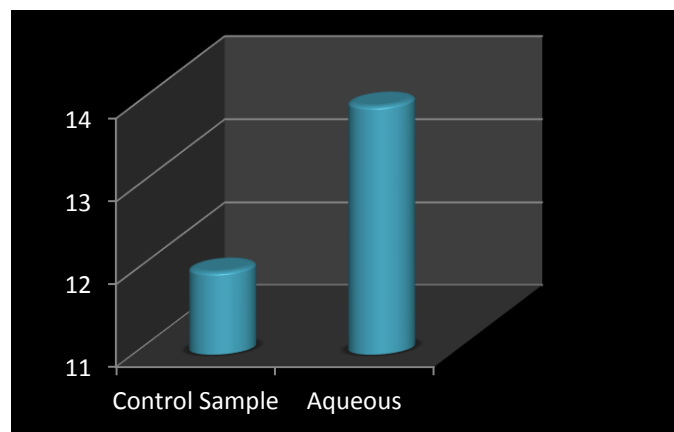


Figure -1

From the above Table -1 and Figure -1, it was found that antibacterial activity was found greater in control sample 100% bamboo knitted fabric than aqueous100% bamboo knitted fabric.

3.1 ANTIBACTERIAL ACTIVITY TEST - (STAPHYLOCOCCUS SPP.)

TABLE - 2

S.No	Control Sample	Aqueous
1	10	12

From the above Table -2 and Figure -2, it was found that antibacterial activity was found greater in control sample 100% bamboo knitted fabric than aqueous100% bamboo.

III.CONCLUSION

The bamboo fabric was Soft and comfortable ,Eco friendly, Anti-bacterial ,Anti-fungal, Ultraviolet protection factor is very good. Bamboo juice is particularly helpful for ulcers. Tectona grandis, is a plant that is useful to our lives. Teak leaf tea has a major ability to increase fat metabolism in the body. This teak leaf was making the natural slimming that can help you lose weight. Not only lose weight, as a healthy beverage teak leaf tea also contains antioxidants that can help prevent diabetes, high blood pressure, heart disease and other diseases. The teak leaf will be having naturally antibacterial and anti fungal activity. From the above study it was found that aqueous extracted solution treaded result than control sample.

IV. REFERENCES

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