



APPLICATION OF NATURAL DYE AND ANTIBACTERIAL ACTIVITY ON COTTON KNITTED FABRIC USING *TECOMASTANS FLOWERS*

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ABSTRACT

As today's fashion environment, the most scientific and advanced level of dyeing are used in various ways. Upon, many processes are used to do coloration. In this manner, dyeing is a process which is applying directly on the fiber, yarn or fabric without any additives. Based on these, the proposed method is developed for coloration/ dyeing in fabric using natural resource. In this proposed work, the natural dyes are extracted from Tecomastans flower with the help of alum mordant and then the extracted natural dyes are applied into the fabric which is 100% pure cotton knitted. After dyeing process, the proposed work can be helped to analyze the properties of the dyeing. The main motive of the work is done an antibacterial activity of natural dyes using Staphylococcus Aureus (*S.aureus*) and Escherichia Coli (*E.coli*). In the antibacterial test of the natural dyes, the *S.aureus* is produced good results than *E.coli*.

KEYWORDS : *Tecoma Stans* Flower, Alum Mordant, Staphylococcus Aureus, Escherichia Coli, Antibacterial Test

INTRODUCTION

Now a day textile dyeing industry at uses an excessive amount of synthetic dyes to meet the required coloration of global consumption of textiles due to cheaper prices, wider ranges of bright colour and shades. Then considerably improved fastness properties in comparison to natural dyes (El-Nagar et al. 2005; Iqbal et al. 2008). The synthetic dyes are produced either chemically source these dyes contain carcinogenic amines or from a plant. Moreover, many countries already imposed stringent environment standards over these dyes. The natural dyes are beautiful natural colour ranging from yellow to black exist in the above source. These natural dyes are developing in greener textile dyeing process and such interest is reflected the increasing number of recent publications. The plant leaves are potential source which is easily collected from abundant nature.

Cotton is comfortable fabric. It is the fiber most referred for many furnishings and for warm weather clothing. (Kadolph 2009). Single jersey fabric is a type of knit textile made from cotton and synthetic blend. The single jersey fabric t-shirts and winter bedding this a command used. The fabric is warm, flexible, stretchy, and very insulating, making it a popular choice for the layer worn closest to the body.). There is scope to extract colour from *Tecoma Stans* for the use in dyeing of cotton fabric in order to get different fashion hues.

The aim of the research was to evaluate the performance of dyes extracted from *TecomaStans flower* in cotton knitted dyeing. Finishing has a wide variety of functions all of which are in intended to make the fabric more suitable for its intended use. Antimicrobial textile helps to avoid the loss of performance properties as a result of microbial fiber degradation and significantly limits the incidence of bacteria (R. malathy 2016).

The antibacterial activity can either act having a direct bacterial effect or hindering growth without killing the bacteria, or they act passively by impeding bacteria to colorize the textile fibers, e.g., by obstructing bacterial adhesion (Höfer D 2006).

TABLE-1 TECOMASTANSFLOWER IMAGE

Scientific Classification *TecomaStans Flower*

Kingdom: Plantae
Clade: Angiosperms
Clade: Endicots
Clade: Asterids
Order: Lamiales
Family: Bignoniaceae
Genus: *Tecoma*
Species: *T- Stans*



Tecoma stans flower is a Central and South American tree that grows to 25 feet. It has been bright yellow flowers and dense, lushly green foliage that is evergreen tropical climates, but deciduous in chiller places. *Tecomastans* are traditional folk medicinal plants are herbal remedies this plant extract on biologically and chemical to treat many diseases and conditions. Roots are used as a diuretic, vermifuge (G. Anburaj2016). The present investigation deals with the extraction of natural dye from the flower of *Tecoms Stans*

MATERIALS AND METHODS

Flower of *TecomsStans* Used for the extraction purpose was collected from Roads & Highways surroundings R.S Puram, Coimbatore.as shown in Fig. 1.100% Cotton knitted single jersey fabrics were purchased from A to Z Fabric Mills; Tirupur was used for this study.

MORDANTING TECHNIQUE

Alum is the natural mordant chosen for the study as they are abundant in their availability. Depending upon the mordant used, the colours obtained on textiles from the dye extracts may give different shades. The simultaneous-mordanting technique used in the present study.

DYEING OF COTTON KNITTED FABRIC USING TECOMA STANS

The dyeing was carried out by hot dyeing method in the home by manually. According to the material to liquor ratio 1:20, the crushed flower was taken into the vessel and adding the required amount of water and alum to the weight of the fabric. Wash the fabric and immerse into the vessel at the temperature of 100°C for 60 minutes. After completion of dyeing, samples were taken out washed, squeezed, dried in shade for 24 hours. And the curing process was carried at 180°C for 2 minutes.

**Figure 1: Dyed Sample Using Alum Morden ANTIBACTERIALACTIVITY TESTING**

Test specimens (Flower extract with alum mordant used natural dyed fabric) were cut into 25mm x 50mm pieces. A 50mm length of permits to the specimen lay to across 5 parallel inoculums streaks each of diminishing width from both 8mm to 4mm wide. Sterile AATCC bacteriostasis agar plates were prepared. Using sterile 4mm

inoculating loop, one loop full of culture (*Escherichia coli* ATCC 25922 and *Staphylococcus aureus* ATCC 6538) was loaded and transferred to the surface of the agar plate by making five parallel inoculum streaks spaced 10mm covering the central area of the Petrid is without refilling the loop.

The test specimen was generally pressed transversely and across the five inoculums of streaks to ensure intimate contact with the agar surface. Then the plates were incubated at 37°C for 18-24 hours. The inoculated plates were examined for the interruption of growth and along with the streaks of inoculum beneath the fabric and for a clear zone of inhibition beyond the fabric edge. The average width of the zone of inhibition around the test specimen was calculated in mm.

Table-2 Assessment Of Qualitative Antibacterial Activity Of Finished Fabric

S. No.	Test Bacterium	Zone of inhibition (mm)
1	<i>Escherichia coli</i> ATCC 25922	35.4
2	<i>Staphylococcus aureus</i> ATCC 6538	36.0

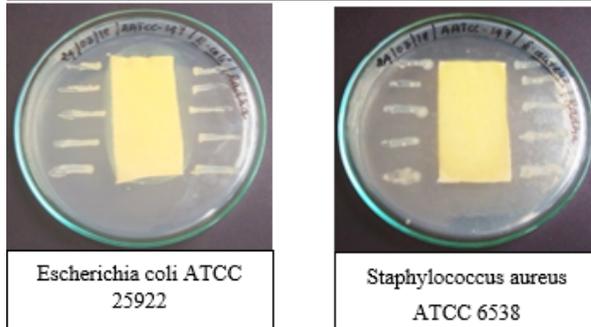


Figure 2: Antibacterial Activity of Finished Fabric (AATCC 147 Test Method)

RESULTS AND DISCUSSION
COLOUR FASTNESS TEST

To colour fastness test, this work is used cotton knitted fabric which is dyed by natural dyeing; collected from TecomaStans flower with the help of Alum mordant. The colour fastness test will be done using following processes such as sunlight process, washing process, crocking process, and perspiration. The values are shown in below table 3.

Table-3 Colour Fastness Test

S. No.	Sample	Sun light	Wash-ing	Crock-ing	Perspi -ration
1	Alum	5	4	4	5

Ratings of the colour fastness tests are given below:

- 5- Excellent
- 4- Good
- 3- Moderate
- 2- Poor
- 1-Very Poor

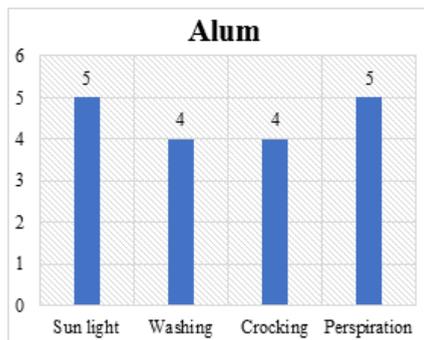


Figure 3: Colour Fastness Test

The above figure 3, shows that Alum sample which displays the excellent colour fastness of sunlight, washing, crocking and perspiration processes.

ANTIBACTERIALACTIVITY FINISHING TEST

The antibacterial activity of naturally dyed fabric.

Table- 4 Antibacterial Activity Of Tecoma Stans Flower Extract On Finished Fabric

S. No.	Sample	Zone of inhibition in mm	
		<i>E. coli</i>	<i>S. aureus</i>
1.	Finished fabric	35.4	36.0

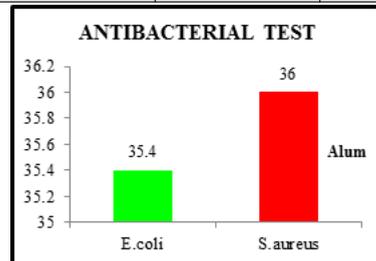


Figure 4: Antibacterial Activity of Tecomastans Flower Extract on Finished Fabric

The above figure 4 shows the antibacterial test. The activity of the antibacterial test of the *S.aureus* is produced the good result than *E.coli*.

CONCLUSION

As demanding the eco-friendly product, the proposed work is needed to satisfy the customer in the aspect of producing an eco-friendly product. To bring an eco-friendly product, the proposed work uses *TecomaStans flower* extract with the help of alum mordant. The natural extracts or dyes applied in the cotton knitted fabric. Based on these, the proposed work produced the elegant colour naturally. After that, the antibacterial test was done. The main aim of the proposed work is created to produce the eco-friendly product and it is used to protect the people from communicable diseases using antibacterial test.

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