



STUDY OF ANTIALLERGY AND ANTIBACTERIAL PROPERTIES OF KNITTED FABRICS DYED WITH CANNON BALL FRUIT EXTRACT

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ABSTRACT

Natural dyes are derived from naturally occurring colouring sources such as plants, insects, animals and minerals. *Couroupita guianensis* fruit pulp is a good source of indigo dye. The present paper discusses on antiallergic and antibacterial properties of knitted fabrics dyed with Cannon Ball Fruit Extract. There are extensive studies which shows the use of *Indigofera tinctoria* for curing many ailments like epilepsy, depression etc. It is also said to possess antiseptic, astringent, anti allergy and purgative qualities. The present study focuses on anti allergy and antibacterial properties of knitted fabrics dyed with cannon ball fruit extract.

Index Terms : *Couroupita Guianensis* , Indigo, Antiallergy, Antibacterial

INTRODUCTION:

Natural dyes are those which are obtained from nature without chemical processing. Natural dyes are considered eco-friendly and are renewable and biodegradable. Natural dyes are skin friendly and may also provide health benefits to the wearer. There has been a renewed interest in natural dyes in view of the fact that they are free from toxicity which is present in synthetic dyes. Of the natural dyes indigo deserves special mention as it is obtained from plants. Indigo has a long history and is well known for its application to denim fabrics.

Natural dyes are of great demand from consumers not only because of biological concern but also because of the various antimicrobial, antifungal , antibacterial, analgesic properties that they possess.

REVIEW OF LITERATURE :

Ramalakshmi C et. al, (2013), stated that *Couroupita guianensis* is a plant with lot of medicinal properties. It belongs to the family Lecythidaceae and commonly known as Cannon ball tree, locally known as “Kailashpati” is found throughout India in plains. It is widely cultivated for its large pink flowers with very pleasant odour and reddish brown woody capsular fruits up to 20 cm in diameter.

It is also grown in gardens in Indian as an ornamental tree. It is native to South India and Malaysia and commonly known as Nagalinga pushpam in Tamil and Nagalinga Pushpa Tree in Kannada. The flower extracts of the *Couroupita guianensis* was studied for in-vitro antimicrobial activity and of phytochemical components.



CANNON BALL TREE

ANTIALLERGY PROPERTY

According to Kate Wells (2013), many of the dye yielding plants can be classified as medicinal plants as they possess anti-microbial, anti-allergy, anti-viral, anti-fungal properties. Indigo (*Indigofera tinctoria*) is a blue colour dye yielding plant. Worldwide indigo blue was and in some areas still is considered a 'cool' and 'magical' colour. There are extensive studies which shows the use of *Indigofera tinctoria* for curing many ailments like epilepsy, depression etc. It is also said to possess antiseptic, astringent, anti allergy and purgative qualities.

ANTIBACTERIAL PROPERTY

According to Deepti Gupta(2007), the last few years have recorded a double digit growth in the field of antimicrobial textiles. The increasing demand by consumers for fresh, clean and hygienic clothing has led to this growth. Extensive research is going on in the field of antimicrobial activity and antimicrobial finishing of textiles.

According to Raja Sundararajan (2014), *couroupita guianensis* is a medicinal plant with diverse ethnomedical and pharmacological spectrum. The study on antibacterial activity of *couroupita guianensis* was conducted and the findings revealed that *couroupita guianensis* fruit possessed excellent antibacterial properties. The study also disclosed the presence of phytoconstituents such as tannins, sugar and polyphenols.

MATERIALS AND METHODS

The present paper discusses on the determination of anti allergy and antibacterial properties of knitted fabrics dyed with cannon ball fruit extract.

ANTIALLERGY TEST (IN HOUSE METHOD)

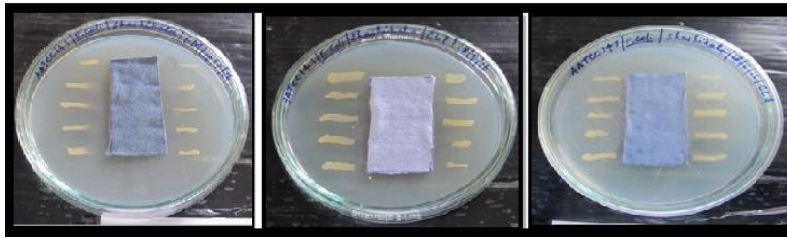
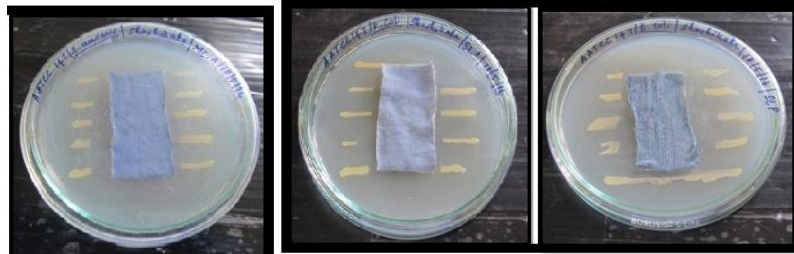
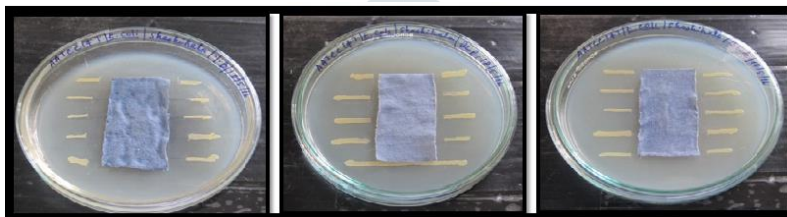
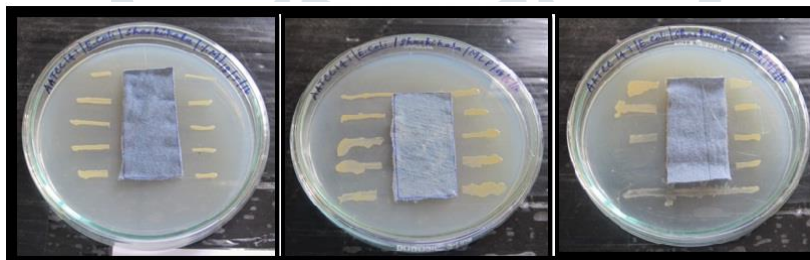
The dyed fabrics patched on the normal skin is observed for the specified period of time for the development of the symptoms related to contact dermatitis allergy. Non hairy part of the skin of the subjects is selected. The surface of the skin is cleaned with moistened sterile cotton swabs. The patches of the dyed fabrics sample are made and plastered on the surface of the cleaned skin. The site of patching is observed for any immediate allergic response. Observations are made up to 23 hours for the symptoms such as Skin rashes, redness and irritations (Erythema & Edema). The time of observation is also extended for another 23 hours to confirm the effect.

OBSERVATIONS

After the contact time, the fabric patches are removed and observed for the following reactions - (NIR)- No irritant reaction , (IR) - Irritant reaction

ANTIBACTERIAL ACTIVITY TEST (AATCC 137)

The bacteriostatic activity of dyed fabrics was determined by antibacterial assessment test by AATCC 137. The AATCC plates are prepared by pouring 15ml of AATCC media into sterile Petri plates. The plates were allowed to solidify for 5min and the bacterial culture is inoculated as single line followed by the four lines without refilling the inoculation loop. The fabric sample was cut into 5 X 2.5 size air dried in at room temperature. The fabrics sample with the diameter of 2.5 cm is placed on over the inoculated bacterial species. And the plates are kept for incubation at 37°C for 23 hours. At the end of incubation, zone of incubation formed around the fabric is measured in millimetre and recorded.

Escherichia coli – Cotton*Escherichia coli – Silk**Escherichia coli – Bamboo**Escherichia coli – Modal*

ANTIBACTERIAL ASSESSMENT KNITTED FABRICS (E-COLI)

RESULTS AND DISCUSSIONS:

The anti allergy and antibacterial properties of cotton, silk, modal and bamboo knitted fabrics mordanted(alum and pomegranate) and dyed with cannon ball fruit extract was determined using in house method and AATCC (137) tests.

DETERMINATION OF ANTIALLERGY ACTIVITY

The selected knitted fabrics namely alum and pomegranate mordanted Cotton, Silk, Bamboo, Modal (both 100% and lycra combinations) were evaluated for antiallergy activity and the observations were made upto 24 hours for any allergic reactions.

It was evident from the table that there is no irritant reaction for dyed fabrics except for one subject in case of modal.

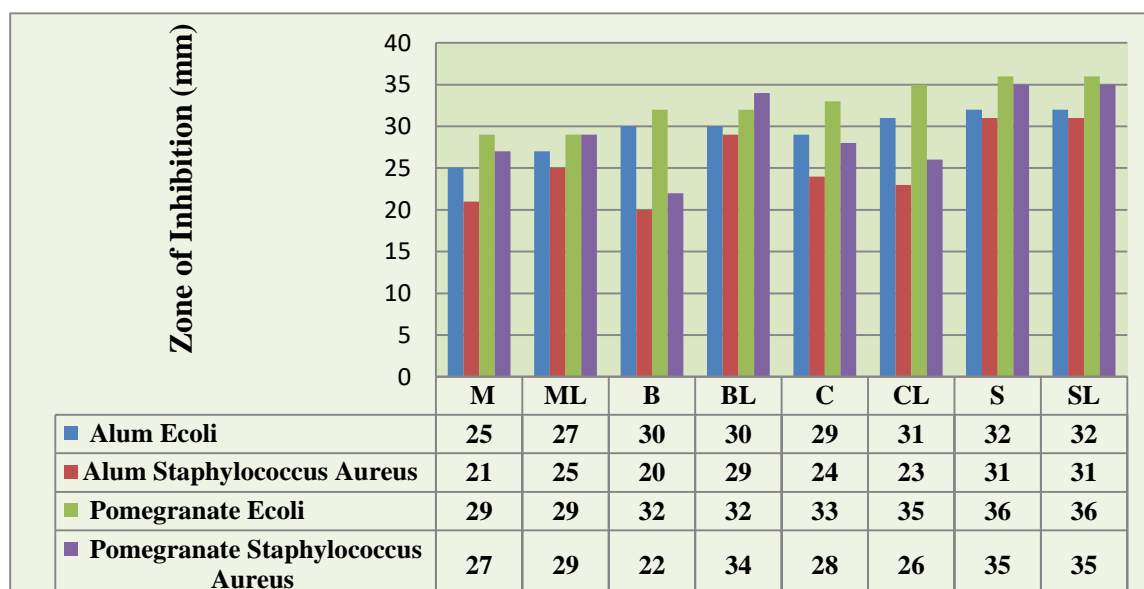
EVALUATION OF THE ANTIALLERGY ACTIVITY

| Sl.No | Sample | Alum | | | | Pomegranate | | | |
|-------|--------------|------|------|------|------|-------------|------|-------|------|
| | | Sub1 | Sub2 | Sub3 | Sub4 | Sub1 | Sub2 | Sub 3 | Sub4 |
| 1 | 100% Cotton | NIR | NIR | NIR | NIR | NIR | NIR | NIR | NIR |
| 2 | 100%Silk | NIR | IR | NIR | NIR | NIR | NIR | NIR | NIR |
| 3 | 100% Bamboo | NIR | NIR | NIR | NIR | NIR | NIR | NIR | NIR |
| 4 | 100 % Modal | NIR | NIR | NIR | NIR | NIR | NIR | IR | NIR |
| 4 | Cotton lycra | NIR | NIR | NIR | NIR | NIR | NIR | NIR | NIR |
| 6 | Silk lycra | NIR | IR | NIR | NIR | NIR | NIR | NIR | NIR |
| 7 | Bamboo lycra | NIR | NIR | NIR | NIR | NIR | NIR | NIR | NIR |
| 8 | Modal lycra | NIR | NIR | NIR | NIR | NIR | NIR | IR | NIR |

Note : (NIR) - No irritant reaction, (IR) - Irritant reaction

DETERMINATION OF ANTIBACTERIAL ACTIVITY

The antibacterial activities of the dyed fabrics were assessed against E.coli and Staphylococcus aureus. The zone of inhibition of dyed fabrics after incubation was observed and presented in figure below. It apparent from the figure that silk with and without lycra (both alum and pomegranate mordanted dyed samples) showed higher antibacterial activities when compared to other fabrics. It was also observed that the antibacterial activity was found to be higher in alum mordanted dyed fabrics. Modal showed a lower antibacterial activity interms of zone of inhibition. The antibacterial activity of Escherichia coli bacteria showed an increase in all cases in comparison with Staphylococcus aureus.



ANTIBACTERIAL
ACTIVITY OF DYED
FABRICS

SUMMARY AND
CONCLUSION:

Eco-friendly
fabrics have good

antibacterial activity and there is great demand in the present day context. Cannon ball fruit dye extracted with chloroform showed good antimicrobial activities and the zone of inhibition ranged between 0-26 mm (Al-Dhabi et.al, 2012)

- It was observed that fabrics like cotton, silk, bamboo and modal dyed with Cannon ball fruit extract did not develop any symptoms of erythema and edema hence the dyed fabrics are safe to be worn next to the skin.
- It was observed that the Cannon ball fruit pulp possessed good antibacterial activity. This is in agreement with the research results carried out by Shah et.al,(2012) on antibacterial activity of Cannon ball fruit pulp extract which is attributed because of the presence of polyphenols.

Hence it can be inferred that the fabrics dyed with Cannon ball fruit pulp extract possessed good anti allergy and antibacterial property which makes the selected fabrics suitable for active wear.

