



# Herbal Finishes-

## Natural Anti-Bacterial Finishes

By: Ayodhya Kavitha, N.Dheeraj Kumar, Shreyas, J.Soundarya

## **Herbal Finishes- Natural Anti-Bacterial Finishes**

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Garments are in direct contact with the body so the development of antimicrobial textile finish is highly indispensable and relevant. The inherent properties of the textile fibres provide room for the growth of micro-organisms. The structure of the substrates and chemical processes may induce the growth of microbes. Therefore, textile finishes with added value particularly for medical cloths are greatly appreciated. The consumers are aware of hygienic life style and there is a necessity of textile product with antimicrobial properties. Antibacterial fibres and chemicals available in international market are mostly from synthetic base and are not environment friendly.

Herbs are abundantly available in nature, non-toxic and are cheap. Extracts from plant parts such as roots, leaves, flowers and seeds exhibit antibacterial properties. Due to their eco-friendly nature herbal finishes are gaining significant momentum. These antibacterial extracts can be used as textile finishing agents in solvent form or micro-encapsules to enhance the durability and controlled release of the extracts. This finish is applied in such a way that appearance and feel of the fabric is not changed and no chemical odour remains. These are applied to textile materials for two purposes as to protect the wearer and the cotton fabric itself.

The finish extracts from different parts of plants like flowers, leaves etc . exhibits anti-bacterial properties. Herbs like neem leaves, tulsi leaves,turmeric, pomegranate rind were taken and the finish is extracted from them by using methanol solution. It is applied on to the substrate by using micro-encapsulation and pad-dry-cure method. After the application the assessment of anti-bacterial activity is done by using agar diffusion and suspension method.

### **Necessity of Antimicrobial finishes:**

Antimicrobial treatment is necessary for textile materials :

- To avoid cross infection by pathogenic micro organisms.
- To control the infestation by microbes.
- To arrest metabolism in microbes to reduce the formation of odour.
- To safeguard the textile products from staining, discolouration and quality deterioration.

## MATERIALS AND METHODS:

The leaves of neem (*Azadiracta indica*) and tulasi, fruit rind of pomegranate (*Punica granatum*) and rhizome of turmeric (*Curcuma longa*) are selected for extracting natural finish to fabrics. The air dried leaves of neem and tulasi plants are made into fine powder by grinding and mixed with methanol at room temperature in the ratio of 1:5 in a beaker. The beaker is left closed for 3 days and the methanol takes in the active components of the leaves. After 3 days, the methanol is allowed to evaporate, to get the residue at the bottom. the pomegranate rind is collected, washed with water and dried at 50° C. The dried rind is finally powdered and the finish is extracted from it using methanol. The extract is filtered and concentrated by evaporating the solvent. the dried turmeric powder is also filtered, and extracted with methanol.



Tulasi



Pomegranate rind

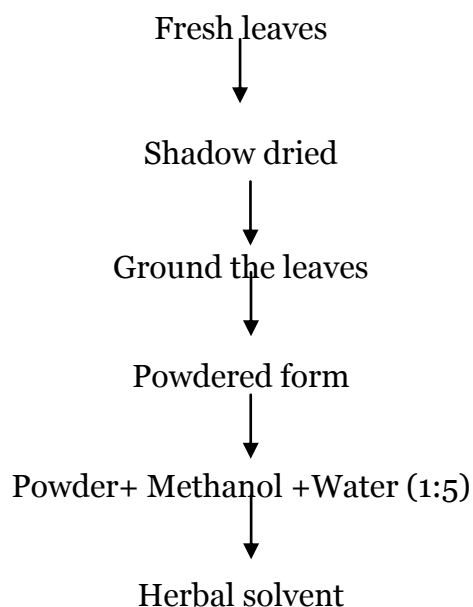


Neem



Turmeric

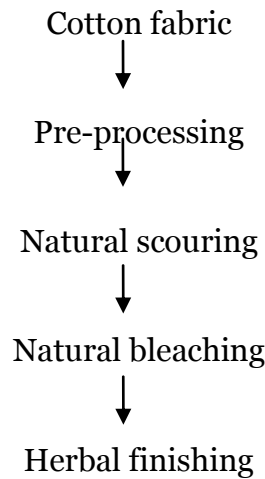
## Extraction from the Herbs:



### Pre-processing of cotton fabric:

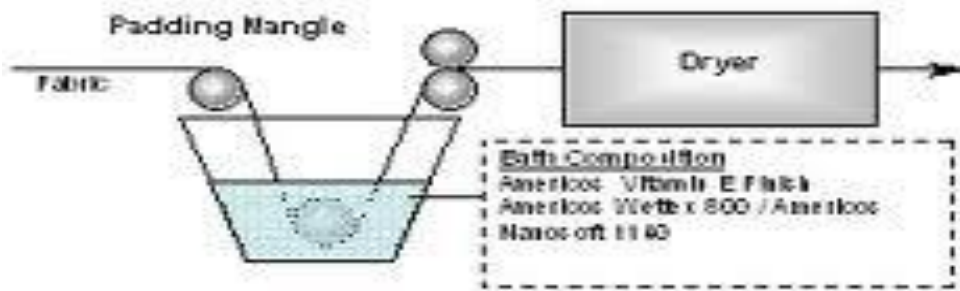
The cotton fabric is first wetted in the cold water solution containing a natural mild detergent and left in the bath for 24 hours. Scouring process is carried out in the solution containing natural scouring agent at the boiling temperature for an hour and washed till the material is brought to neutral PH. The scoured cotton fabrics are exposed to direct sunlight with use of a natural grass base and animal manure, which carries out the natural bleaching process. No chemicals are used in the process.

### Methodology



### Application of finish:

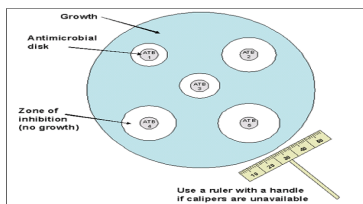
The padding bath is set with required amount of water and the herbal extract solution is poured into it and the required temperature is maintained. The fabric is treated in the padding bath and the process parameters varies according to the herbals used. the variables used are m:l ratio, concentration, temperature, time.



## ANTIBACTERIAL TESTING:

- **Qualitative (AATCC- 147) test method:**

In qualitative test, disc diffusion method is followed. The cotton fabric is cut into rectangular shape and the plant extract is dissolved in sterile water. The solution is slowly impregnated drop wise on sterile Whatmann paper disc and cotton fabric. The treated samples are placed in



intimate contact with agar, which was previously inoculated with *E. coli*. and *s. aureus* for overnight. The plates are kept for incubation and examined for the zone of bacterial inhibition around the fabric. The size of the clearzone is used to evaluate the inhibitory effect of the fabric.

- **Quantitative test (AATCC -100):**

The fabrics are tested by standard test method AATCC -100. The cotton fabric is treated in pomegranate, neem, tulasi and turmeric extract. The fresh culture of *E.coli* and *s. aureus* are inoculated to sterilized broth and the fabric samples are transferred in it and are incubated for 24 hrs in shaker. The absorbency is checked with sterilized LB medium as blank. The fabrics are analyzed for their antibacterial durability after repeated wash with standard soap. Sample is placed in soap solution in a beaker with continuous stirring maintained. The samples are washed with distilled water and dried and are again tested for antibacterial assessment. The same procedure is followed for 5 washes.



## ADVANTAGES OF HERBAL GARMENTS:

- Herbal garments are anti-allergic, anti-microbial and have anti-septic properties.
- Dyes used are eco-friendly.
- Provides manure to the soil & plants because the waste generated by herbal dyes would serve the same purpose.
- Benefit children and the future generations by stopping Air, Water and Soil pollution.



## APPLICATIONS:

The brands making herbal clothes are Aura, Cognis, Pantaloons, quiospheres etc. These brands have a range of clothing's viz. bandee, vest, camisole, men and women's tee, coirs etc.



Face



Baby t-shirt



Herbal top



Herbal shawls



Herbal socks

## EFFECTS ON BODY:

An herb acts as a revitalizing tonic and helps in keeping the body fresh and healthy. The uses of proper herbs in the textiles have proven to cure diseases like arthritis and Hay fever. It can improve the skin's natural ability to block and resist harmful chemicals and toxins from entering the body will be beneficial to health.

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## Image Courtesy:

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