Special finishes on fabrics

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Abstract

Textiles have always played a central role in the evolution of human culture by being at the forefront of both technological and artistic developments. An eco friendly natural antibacterial finish has been prepared from the plant extract for the textile application. Herbal extracts have been applied to cotton and organic cotton fabric by pad, dry cure method. This paper consists of a detailed discussion of the herbal finish with antimicrobial effect on cotton and organic cotton fabrics .The antimicrobial property of fabrics is considered to be more important and inevitable finish for garments, which are in direct contact with human body. The fabrics which are in contact with the human body provide an ideal environment for the microbial growth. In this paper the investigators have compared the effect of Antimicrobial finish applied by conventional and herbal based methods and the best result among the two processes were analyzed and discussed.

Introduction

Cotton is the natural vegetable fiber of great economic importance as a raw material for cloth. Cotton's strength, absorbency, and capacity to be washed and dyed also make it adaptable to a considerable variety of textile products. Organic Cotton is grown using methods and materials that have low impact on the environment. Organic cotton fabric is softer, hypoallergenic, comfortable, breathable, and warming or cooling to the human body. Textile finishing usually includes treatments such as scouring, bleaching and dyeing.

Medicinal plants are the gift of nature to cure limitless number of diseases among human beings. The abundance of plants on the earth surface has led to an increasing interest in the investigation of different extracts obtained from the traditional medicinal plants as potential sources of new antimicrobial agents. Thus the study is a small step in developing an eco-friendly natural antimicrobial finish from plant extracts for application. Some selective species of plants were identified and screened for their antimicrobial activities and applied on cotton and organic cotton fabrics. As the fabric are subjected to washing, the wash durability of microbial and odor finishes are evaluated.

The microorganism's growth is one of the factors that have resulted in the development of antimicrobial finishes. Microorganisms cause problems with textile materials and while processing using chemicals.

Materials and methods

In this study, 50's combed cotton and organic cotton yarn was used for the study. The wet processing techniques used here were scouring, bleaching and dyeing .Then the

yarn was dyed in package from using reactive dye. The dyed yarn was woven using Dobby loom along with plain weave structure. Then Antimicrobial finish is applied on the fabric by conventional and herbal process.

Selection of the Medicinal Valuable Herbs

The herbal plants were identified and collected from the natural resources in a pure form. The following plant were chosen for the study *michelia* × *alba*. The procedure begins with the selection of natural herb, which was screened and identified. The extract was tested for its antibacterial activity which was done by agar diffusion method and Antifungal activity was done by *Aspergillus niger*.

Assessment of the highest antimicrobial effect of herbal extracts

Procedure

Extraction from the Herb

Fresh leaves
↓
Shadow dried
↓
Ground the leaves

The selected sources were cleanly and safely collected from both living area and the forest area that were grown under optimal environmental condition that is free from disease and contamination.

Filtration

Required amount of dry powder is mixed with methanol; the container was closed and kept overnight. After overnight incubation, the extract was filtered through filter paper.

Evaporation / condensation

After filtering the herb extract, methanolic solvents were evaporated and the herb extract were condensed.

Application of Selected Herbal Extracts on the Fabric by Herbal Methods

The extract was finished on the cotton/organic cotton fabric using padding mangle. Herbs were padded on the fabric with the three roll padding machine for five minutes. After padding, fabrics were dried and cured.

Antifungal Testing

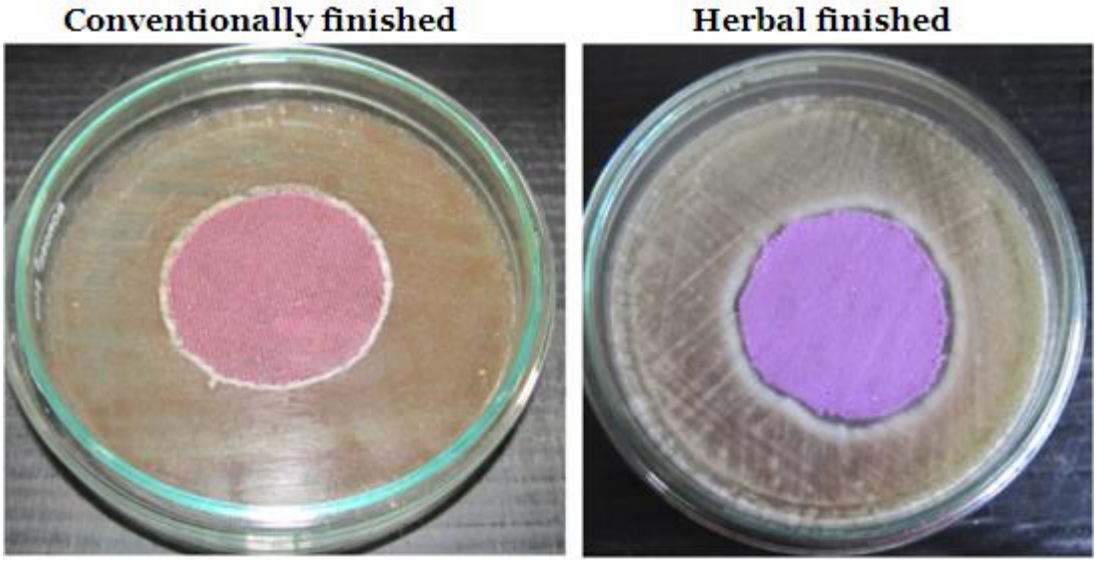
Step: 1 Extraction of Herbal powders and finishing:

Required amount of dry powder with methanol were taken. The extract was used to finish on the fabric by dip dry method and tested for its Antifungal activity.

Step: 2 Analysis of Antifungal Activity by Qualitative Method

After testing the two samples by qualitative method and the result for *Aspergillus niger zone* was analyzed. The herbal extract finished fabric was higher than that of conventionally finished fabric.

Antifungal activity of finished fabric– qualitative analysis



Antibacterial Testing By AATCC 147 Test Method

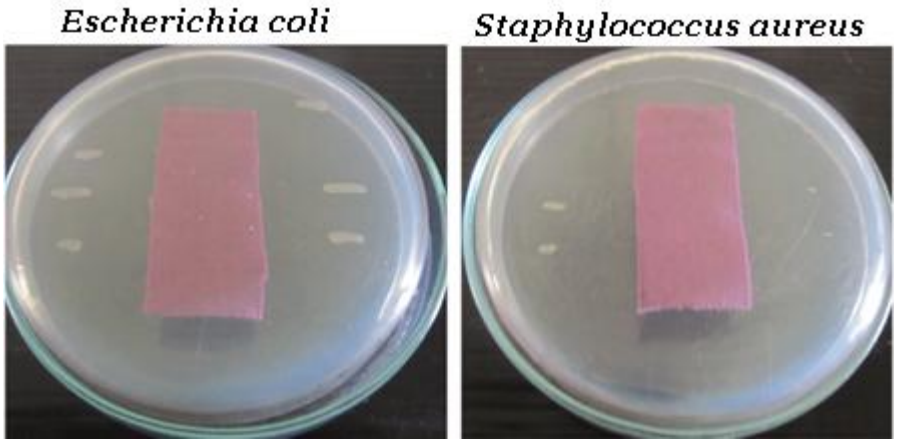
The fabric sample was cut into rectangular shape and was taken for the analysis. Using sterile inoculation loop, the test organisms (*Escherichia coli & Staphylococcus aureus*) after incubation, the plates were examined for the zone of bacterial inhibition around the fabric sample. The size of the clear zone was used to evaluate the inhibitory effect of the sample.

Antibacterial Activity of the Fabric

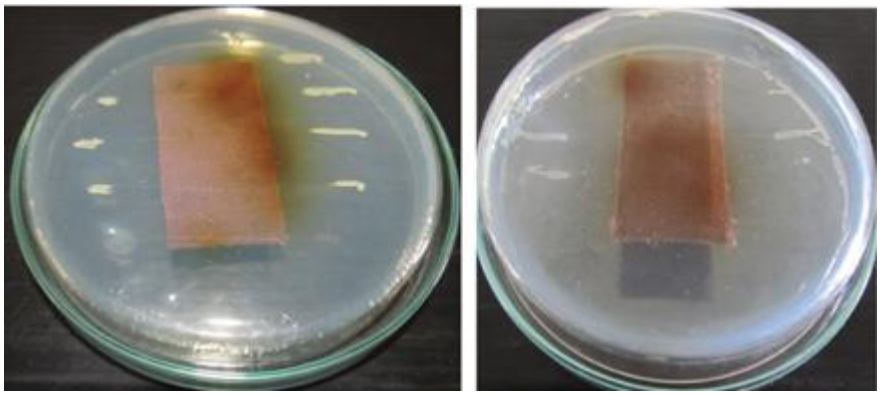
After testing the two samples with *staphylococcus aureus* and *Escherichia coli, the* result for the herbal extract finished fabric was higher than that of conventionally finished fabric.

Antibacterial activity of finished fabric– qualitative analysis

Conventional finished



Herbal finished

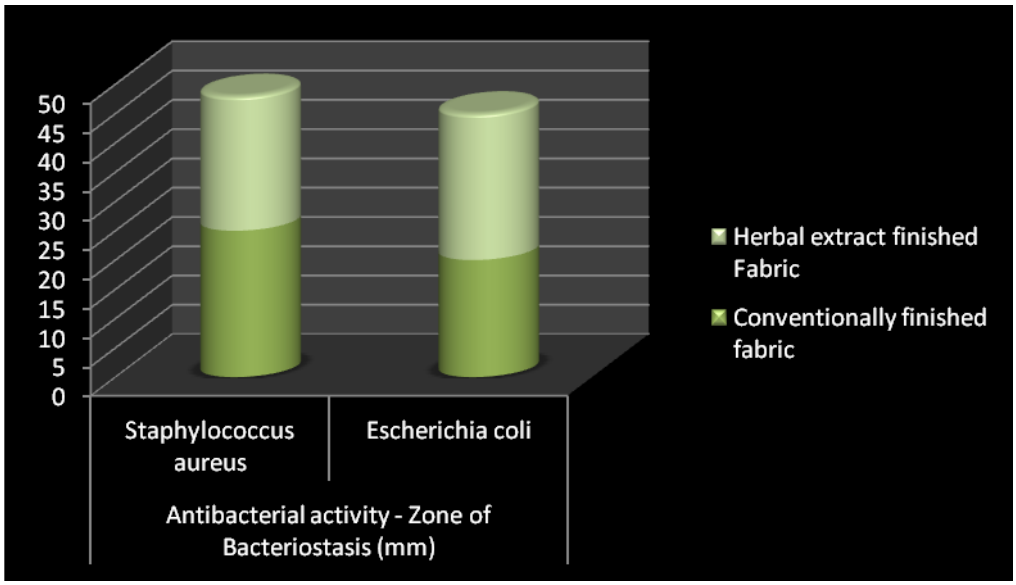


Result and Discussion

The Antimicrobial test for Qualitative method was applied on both conventional and herbal based method. The properties for Antibacterial and Antifungal were tested by Staphylococcus, *Escherichia coli and Aspergillus niger*. Here the investigators that among the cotton and organic cotton material which were finished by antimicrobial finishes by herbal methods was found to be higher than that of conventionally finished antimicrobial fabric.

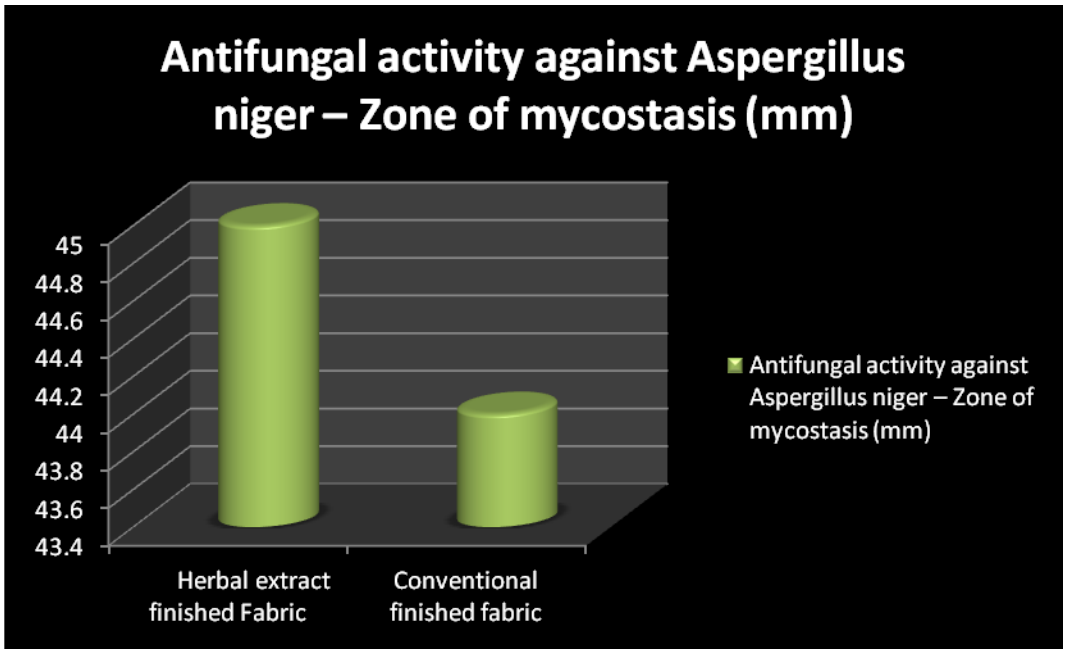
Antibacterial Activity of the Fabric (AATCC 147)

S. No.	Fabric sample	Antibacterial activity - Zone of Bacteriostasis (mm)	
		Staphylococcus aureus	***Escherichia coli***
1.	Conventionally finished fabric	25	20
2.	Herbal extract finished Fabric	23	25



Antifungal activity of cotton fabric finished with herbal extract against *Aspergillus niger* (AATCC 30 test method)

S. No.	Fabric sample	Antifungal activity against *Aspergillus niger* – Zone of mycostasis (mm)
1	Herbal extract finished Fabric	45
2	Conventionally finished fabric	44



Conclusion

This research work has given a new idea in finishing of cotton and organic cotton with herbs for antimicrobial activity (*michelia* × *alba*).The treated fabrics were found to be very hygienic with less fungi and bacteria when compared to conventionally antimicrobial finished fabrics.

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