

Comparative Study on Antibacterial Finishes by Herbal and Conventional Methods on the Woven Fabrics

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Abstract

Cotton is the natural vegetable fiber of great economic importance as a raw material for cloth. 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 Antibacterial effect on cotton and organic cotton fabrics. The Antibacterial property of fabrics is considered to be more important and inevitable finish for garments, which are in direct contact with human body. In this paper the investigators have compared the effect of Antibacterial finish applied by conventional and herbal based methods and the best result among the two processes were analyzed and discussed.

Keywords: Antibacterial; Eco friendly; Herbal methods; Conventional method

Introduction

The microorganism's growth is one of the factors that have resulted in the development of Antibacterial finishes [1]. Microorganisms cause problems with textile materials and while processing using chemicals. The study is a small step in developing an eco-friendly natural Antibacterial finish from plant extracts for application. Some selective species of plants were identified and screened for their Antibacterial activities and applied on cotton and organic cotton fabrics.

Materials and Methods

In this study, 50's combed organic cotton and cotton yarn was used for the study. The wet processing techniques used here were scouring, bleaching and dyeing in the yarn stage. Then the yarn was dyed in package from using reactive dye [2]. The dyed yarn was woven using Dobby loom along with plain weave structure. Then Antibacterial finish is applied on the fabric by conventional and herbal process [3].

Application of the Antibacterial Finish by Conventional Method on the Fabric

Application of padding and exhaust method

Commercial agent, Triclosan was finished with the cotton/organic cotton fabric using padding mangle method. Exhaust the fabric for 20 minutes below 40°C. After exhausting, fabrics were dried and cured.

Properties

Triclosan: 10% of fabric weight

Appearance: Straw colour transparent liquid

pH: 7

Solubility: Soluble in cold water in all proportions

Temperature stability: Stable at boiling temperature.

Procedure

The fabric was padded with Triclosan at room temperature for 20 minutes and tested for the antibacterial.

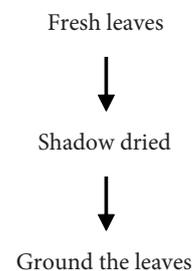
Selection of the Medicinal Valuable Herbs

The herbal plants were identified and collected from the natural resources in a pure form. The following plant was chosen for the study *Michelia×Alba*. The procedure begins with the selection of natural herb [4], which was screened and identified. The extract was tested for its antibacterial activity which was done by *gar diffusion method*.

Assessment of the highest antibacterial effect of herbal extract

Procedure

Extraction from the Herb:



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 [5].

Filteration of the herb: 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 of the herbal extract: After filtering

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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 [6].

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 (Figure 1).

Result and Discussion

The Antibacterial test for Qualitative method was applied on both conventional and herbal based method (Table 1). The properties for Antibacterial were tested by *Staphylococcus*, and *Escherichia coli*. Here the investigators that among the cotton and organic cotton blended material which were finished by Antibacterial finishes by herbal methods was found to be higher than that of conventionally finished Antibacterial fabric (Figure 2).

Conclusion

This research work has given a new idea in finishing of cotton and organic cotton with herbs for Antibacterial activity (*Michelia x Alba*).

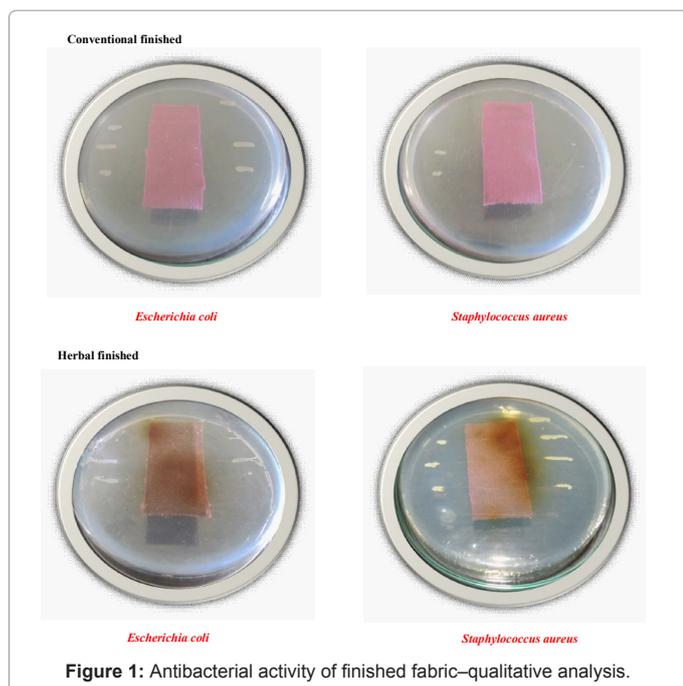


Figure 1: Antibacterial activity of finished fabric—qualitative analysis.

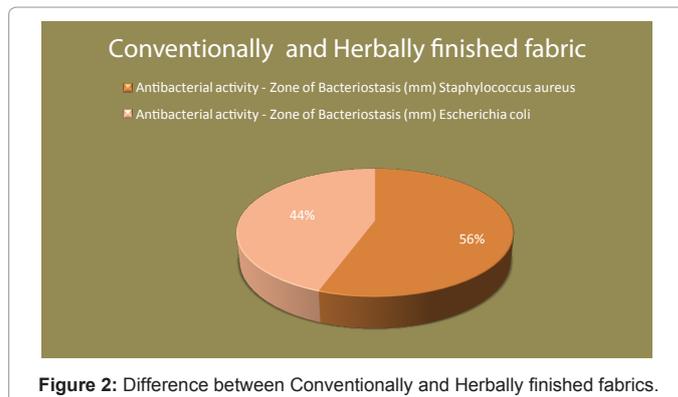


Figure 2: Difference between Conventionally and Herbally finished fabrics.

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

Table 1: Antibacterial Activity of the Fabric (AATCC 147).

The treated fabrics were found to be very hygienic with less bacteria when compared to conventionally Antibacterial finished fabrics.

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