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Aloe Vera Finish On Cotton and Organic Cotton Fabrics

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ABSTRACT

Textiles enhance the quality of human life through protection against various hazards. Aloe Vera plant is considered to be a miracle for health due to numerous benefits. Aloe Vera plant is a non-toxin succulent plant. This study investigated the antibacterial assessment of cotton and organic cotton fabrics coated with Aloe Vera gel extract as value added textile product. This study work has given a new idea in finishing Aloe Vera herbal extract on cotton and organic cotton for antimicrobial activity. There is a vast resource of natural antimicrobial agent, which can be used for imparting useful antimicrobial property to textile substrates.

KEYWORDS: Aloe Vera Finish, Cotton, Organic Fabrics, Anti microbial

1. INTRODUCTION

The consumers are now increasingly aware of the hygienic life style and there is a necessity and expectation for a wide range of textile products finished with antimicrobial properties.

The aloe gel is applied on cotton and organic cotton fabric in dip dry method. An extensive study was conducted to assess the antimicrobial activity on herbal finished fabric by employing standard test methods.

2. MATERIALS AND METHODS

2.1 Selection of Herb

Plant materials remain an important resource to combat serious diseases in the world. The traditional medicinal methods, especially the use of medicinal plants, still play a vital role to cover the basic health needs in the developing countries.

The Aloe vera plant is selected for the study and has been known used for centuries back.

The name Aloe vera derives from the Arabic word "Alloeh" meaning "shining bitter substance," while "vera" means "true." Aloe vera has been used for medicinal purposes. (Plate 2.1)

An inner clear gel that contains 99% water and rest is made of glucomannans, amino acids, lipids, sterols and vitamins. Aloe vera contains 75 potentially active components vitamins, enzymes, minerals, sugars, lignin, saponins, salicylic acids and amino acids.

Aloe has the ability to penetrate the deepest body tissues 7 layers deep. It has 6 antiseptic agents, which kill bacteria, viruses and fungus. This Aloe gel has as many as 75 nutrients, which augur good health.

PLATE :2.1 ALOE VERA PLANT



2.2 Selection of Fabric

The commercial available cotton knitted fabric is selected for this study. The details of the fabric is given below table 2.1

S.no	FABRIC	Yarn Count	GSM
1	COTTON KNITTED FINE JERSEY FABRIC	60's	160
2	ORGANIC COTTON KNITTED FINE JERSEY FABRIC	60's	160

Table 2.1: Particulars of the Fabric

2.3 Extraction of Gel

Aloe is processed using the hand filtered or whole leaf procedure. The leaf is cut from the plant and washed with fresh water. The top and bottom layer of the leaf is removed, and the inner gel was stored in bowl (Plate 2.3). The gel must be cool processed with in 4 hours of harvesting. The gel was smashed and converted in to solvent form.

PLATE 2.3: EXTRACTION OF GEL



(a) ALOE VERA INNER PART



(b) EXTRACTED GEL

3. Finish Application

Recipe:
Temperature - 50°C
pH - 5
Time - 30 min
M: L Ratio - 1:20
Aloe Vera Gel

The Aloe vera gel was taken and mixed with water and Terminalia Chebula (powder). Then the container was closed and kept for over night. The processed liquor gel was finished on to the fabric with the above recipe by dip dry method.

The fabric will be dip in to the solution for two hours. Then the fabric was dried at shade to remove the moisture. Finally, the fabric samples were tested for antimicrobial activity as per the standard test methods.

4.STANDARD QUANTITATIVE TEST METHODS

AATCC 147 is a Qualitative test used to detect bacteriostatic activity on textile materials. The test Method determines antibacterial activity of diffusible antimicrobial agents on treated textile materials.

4.1 ANTI-BACTERIAL ASSESSMENT OF THE FINISHED FABRIC BY (AATCC 147)

The finished fabric samples with the diameter of 2cm ± 0.1cm were taken for the analysis. Both the sides of samples were presterilized under ultra violet radiation for 15minutes. Sterile bacteriostasis agar was dispensed in sterile petridishes. Broth cultures (24 hours) of the test organisms were used as inoculum.

Using sterile cotton swab the test organisms (**Escherichia coli & Staphylococcus aureus**) were swabbed over the surface of the agar plate. Presterilized samples were placed over the pre-swabbed agar surface by using sterile spatula.

After placing the samples all the plates were incubated at 37°C for 18 to 24 hours. 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 extract.

5. RESULTS

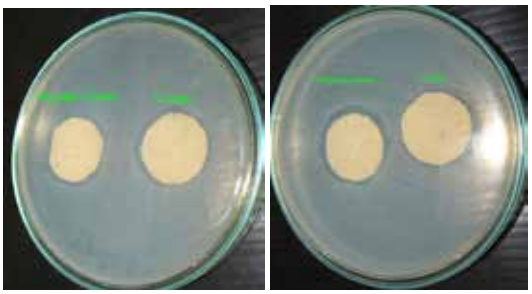
The finished fabric samples were tested for Anti-bacterial assessment by AATCC standards. The results shown in the table no 5.1 and plate 5.1 .

Table No 5.1 Antibacterial activity of the aloe vera herbal extract finished cotton fabric (AATCC 147)

S. No.	Fabric sample finished with Aloe vera extract	Antibacterial activity - Zone of Bacteriostasis (mm)	
		Staphylococcus aureus	Escherichia coli
1.	Cotton	18	20
2.	Organic cotton	29	27

While comparing cotton and organic cotton, The anti bacterial activity in organic cotton fabric sample is rated to be excellent and good in protection with less fungi and bacteria.

PLATE 5.1 ANTIBACTERIAL ACTIVITY OF ALOE VERA HERBAL EXTRACT FINISHED FABRIC (AATCC 147)



(a) Tested with Escherichia coli (b) Tested with Staphylococcus aureus

Plates 5.1(a) and (b) shows that both organic cotton and cotton fabrics were tested with Escherichia coli and Staphylococcus aureus for anti bacterial activity respectively from which organic cotton zone of 27mm and 29mm which is high when compared to cotton sample.

6. CONCLUSION

This study work has given a new idea in finishing Aloe Vera herbal extract on cotton and organic cotton for antimicrobial activity. There is a vast resource of natural antimicrobial agent, which can be used for imparting useful antimicrobial property to textile substrates. So the consumers are now aware of the hygienic life style and expecting for a wide range of textile products.

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