

Herbal Antimicrobial Finish for Cotton Fabric

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ABSTRACT

Textiles are developing into interdisciplinary high tech products with interesting changes. It has become an integral part of everyone's life as it is associated with us round the clock. These are used to envelop human body, thus protecting it from dust, sunlight, wind and other foreign matter present in the environment. In the past textiles were considered primarily for economical and functional point of view. But now some end users in particular demands on the safety of textiles for the health. The odour development resulting from biological growth on textiles exposed to perspiration had not been considered a real need until relatively recently. To overcome this problem nowadays antiperspirants are used. But antiperspirant shrink sweat glands and block pores causing toxins that are normally eliminated by perspiring. Therefore to control sweating and also to avoid the use of antiperspirants, herbal antimicrobial finishes were applied onto cotton fabric. The herbal antimicrobial finished cotton fabric was converted into arm pads as these are mainly used as sweat absorbents. Absorption of sweat by the arm pad alone does not give freshness instead it provides medium for the growth of microbes. It is important to resist the growth of microbes. The use of herbal antimicrobial agents on the cotton fabric has reduced the growth of bacteria and body odour to some extent. The herbal sources selected were neem, aloe vera, tulsi, pomegranate rind, and coffee senna. The results obtained were satisfactory with respect to subjective and objective evaluation.

Introduction

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- Explore the natural herbal sources for antibacterial finish and optimization
- Carry out antibacterial test.
- Evaluate the treated fabrics for their performance qualities, colour fastness, wettability and absorbency.

With the above objectives in mind, the investigator conducted a survey among the adolescents. A questionnaire was prepared to elicit information from the

respondents. The questionnaire was administered among hundred respondents and information such as odour formation and discoloration due to sweating, remedies followed to overcome the problem were collected. Based on the survey, samples were chosen for the study. Variety of plant sources were chosen from the wide range of the plant kingdom. The sources were charted and classified based on their chemical compositions, from these active antibacterial components were identified.

Neem leaf, aloe vera gel and leaf, coffee senna, pomegranate rind and ocimum sanctum leaf were the selected natural sources. These natural sources do not adhere to the fabric directly and require a binder. Hence, citric acid was selected as the best suited cross linking agent. Owing to properties like absorbency, biodegradability, high wet strength, non allergic, softness and water retaining capacity, cotton fabric was selected. Desizing was carried out as the preparatory step prior to finishing on cotton. Extraction of herbal solution was done by aqueous method, since the selected sources are soluble in water. Centrifuging was done to get clear extract of the herbal solution. Based on Antibacterial activity, various concentrations were selected. The evaluation was carried out for mechanical properties, colourfastness, wettability and absorbency and antibacterial tests.

Concentration of binder and herbal solution were standardized. Later the cotton fabric was treated with herbal antibacterial solution using pad mangle. Then the treated fabric was constructed into armpads. The armpads were subjected to wear study. They were worn by the adolescents for about seven hours a day. This was followed for seven days by using fresh armpads.

The original untreated samples were evaluated subjectively by collecting the opinion of wearer's and carrying out bottle incubation method. Objective evaluation was carried out by conducting laboratory tests like tensile strength and elongation, abrasion resistance, besides tests for colour fastness, antibacterial tests, wettability and absorbency.

The users of armpad were very happy with the product, since the armpads were finished with herbs. The wearers expressed that herbs gave pleasant odour and fresh feeling. There were no complaints of skin irritation.

The tensile strength of the sample in the warp direction has reduced after antimicrobial finish while there was percentage gain in the weft direction. An increased elongation was shown by the sample (16.77%) in warp direction.

Abrasion resistance of the treated samples was higher when compared to the original untreated sample. Sample exhibited very good fastness to dry crocking, good fastness to wet crocking and artificial perspiration.

The samples had got excellent wettability and absorbency as the time taken for dropping, sinking and capillary rise was less when compared to the original sample.

The bacterial reduction of sample varied from 75 to 85 percent with respect to staphylococcus epidermitis, varidans, streptococcus sp, Bacillus sp, Nocardia sp, Actinomyces sp, Enterococcus sp. The sample had got excellent antibacterial activity.

Conclusion

The antibacterial finish on the cotton fabric reduced the bacterial count adversely. The natural herbs with antibacterial activity could be used as an alternate source since they reduced the bad odour besides controlling the growth of microorganisms. The treated samples had good absorbency, good resistance to abrasion, and excellent antimicrobial effect. The colour fastness of the samples was satisfactory. Hence it may be concluded that the armpads thus prepared could be used as thin disposable tissues. These antimicrobial treated arm pads would be a suitable alternate to antiperspirants and can be used by artists who work under heavy lightings..