

# Anti Microbial Finish for Herbal Dyed Fabric by Using Bio-Enzyme

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**Abstract-** *The eco friendly anti microbial finish given to the cotton fabric by extract of tulsi, lemon grass, aloe vera to the bio enzyme treated fabric. Textiles with improved anti microbial functionality with variety of garments worn close to the skin and also in other medical application for the infection control. The herbal plants was chosen as it constituents the luteol in which was found to be effective in the prevention of harmful diseases. The test applied to the antimicrobial finished effective material will be (AATCCTM100).*

## I. INTRODUCTION

### GENERAL INSTRUCTION

This chapter deals about the eco-friendly product to the nature without affecting the environment. The antimicrobial finish has been given to the fabric to prevent against the harmful diseases spread to the human body. The natural method of process will reduce the water purification process.

An antimicrobial is an agent kills microorganisms or inhibits their growth. Large surface area and ability to retain moisture enable micro organisms growth in textile products. The growth of microorganisms reduces the product mechanical strength, stains the fabric and lets other more pernicious microbes grow. This is one of the reasons apparel are packed in airtight bundles.

The antimicrobial diseases can be caused by bacteria and fungi with the help of giving particular finish to the fabric which can prevent the human beings from the diseases, and also to reduce the odor smell in the fabric for the longtime usage.

Antimicrobial textiles are used where moisture and microbes meet. The materials are use in a variety of applications including healthcare, hygiene, medical

devices, sportswear, food packing, storage.

In the pretreatment process instead of using chemicals we are using enzyme to make the process to reduce the water pollution caused to the environment and it can be prevent from the water-borne diseases. By using the enzyme the processing time can be reduced and the usage of temperature also reduced.

At the moment we try to discover our product as a natural way of processing and dyeing of 100% cotton fabric.

### ANTIMICROBIAL FINISHES IN TEXTILE

The chemical which is used as an antimicrobial activity, it can be applied to the textile material by exhaust, pad-dry-cure, coating, spray and foam techniques. All antimicrobials does not exhibit the same nature. The vast majority of antimicrobials work by leaching or moving surface from which they are applied. This is the mechanism used by leaching antimicrobials to poison a micro organisms. Such chemicals have been used for decades in agricultural applications with mixed results. Besides affecting durability and useful life, leaching technologies have the potential to cause a variety of other problems when used in garments. These include their negative effects because, they can contact the skin and potentially effect the normal skin bacteria, cross the skin barrier, or have the potential to cause rashes and other irritations.

A more serious problem with leaching technologies has to do with their following for the adaptation of microorganisms. An antimicrobial with a completely different mode of action than the leaching technologies is a molecularly bonded un conventional technology. The bound unconventional antimicrobial technology, an organo functional silane, has a mode

of action that relies on the technology remaining affixed to the substrate killing micro organisms as they contact the surface to which it is applied. Effective levels of this technology do not leach or diminish over time. When applied, the technology actually polymerizes with the substrate making the surface antimicrobial. This type of antimicrobial is used in textiles that are likely to have human contact or where durability is of value.

Garments are supposed to go through the more wear and tears during the chemical processing and its service time. The following facts fulfilled for the satisfactory performance of the finish:

- Durability to wash, dry clean and hot press process.
- It should not be hazardous to the producer, final user and the environmental conditions.
- To avoid the disinfection

**NATURAL EXTRACTS**

Natural plants having the antimicrobial activity can be used for the medical purposes. From this the natural extract are taken and further process were done and coated on textile material. The following were used for the antimicrobial activity here:

- Tulsi leaf
- Aloevera
- Lemon grass
- Orange peel
- Pomegranate peel

**MATERIAL USED**

Sourced and bleached 100% cotton fabric was used for the antimicrobial finish. Leaves of tulsi (*Ocimum tenuiflorum*), Leaves of aloe vera (*Aloe barbadensis*), lemongrass (*Cymbopogon*), peel of orange (*Citrus Aurantium Dulcis*), peel of pomegranate (*L. Punicagranatum*) extractions are used for finishing.

**ENZYME USED**

- Bioscouring (ScourzymeTXP)
- Biodesizing (Alpha-amylaseenzyme)

- Wetting agent (Prep LF)
- Biobleaching (Lemon juice)

**Fabric Details**

S. No	Fabric Particulars	Data
1.	Type of fabric	Woven
2.	Structure of fabric	Shirt
3.	Yarn count	30's
4.	Ends per inch	68
5.	Picks per inch	54
6.	GSM	90

**II. METHODOLOGY**

The collected herbs were shade dried for 30 days at room temperature. This is done to remove the moisture content of herbs. Since most of the herbs have 60-80% of moisture and cannot be processed without drying. After drying grinding was carried out to convert the raw materials into powder form.

- Fabric preparation

The fabric used for the study was unbleached cotton fabric, its mandatory to undergo the preparatory process. They are

- Desizing
- Scouring
- Bleaching

**DESIZING**

The desizing is done in the fabric to remove the size paste present in the warp yarn. Warp yarn are coated with sizing agents prior to weaving in order to reduce the frictional properties, decrease yarn breakage in the loom and improve weaving productivity by increasing weft insertion speeds. The sizing material present on the warp yarns can act as a resist towards dyes and chemicals in wet processing processing.

**ALPHA-AMYLASE ENZYME**

It is a unique blend of thermal stable alpha-amylase and lubricant to remove most of the size materials. This unique combination prevents the formation of

unwanted creases, streaks, lines during desizing process.

#### RECIPE

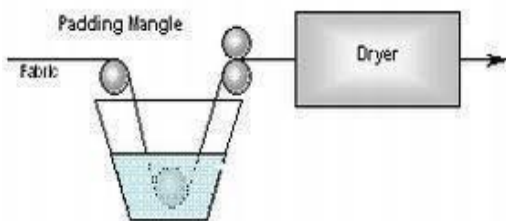
Alpha- amylase Enzyme –  
 2% Wetting agent (Prep LF) –  
 0.5% Temperature-60°C  
 pH-6.5-7.0  
 MLR-1:30  
 Time-45minutes

#### TYPES OF COATING

- Pad-Dry-Cure

#### PADDING

Padding mangle consists of main frames that are usually fabricated construction, to with stand vibrations and heavy workloads. While the cloth passes on the padding mangle machine no slackness should occur in fabric either in weft or warp directions and the weft thread of the cloth should remain parallel to the nip at the squeezing point. The nip rollers (often called bowls) are the key to successful pad dyeing. In general, two-bowl nips are preferred for lightweight or standard fabrics running at moderate speeds, whereas three-bowl arrangements are intended for heavier or more densely woven qualities that may be more difficult to wet out and thus require a double-clip and double-nip treatment.



- Padding mangle

The padding operation itself consists of two essential steps: through impregnation by immersion of the absorbent fabric in a natural extract containing a wetting agent, followed by squeezing the wet fabric

between rollers to expel air and replace it with dye liquor, as well as expressing surplus liquor back down the sloping fabric surface to the pad through.

The fabric to be padded should be pretreated, free from loose fly, waste, oily matter, flat, crease free and with opened-out selvages.

To obtain evenness in antimicrobial coating it is most important that the fabric running speed and the length of immersion of fabric in the extraction remain constant through the padding run.

#### CONCLUSION

From the detailed investigations, we found that, the fabric treated with natural extracts show high antimicrobial property. Since, this type of finish has having durability to washing, it can be applied for long bed ridden patient dress, Bed covers, surgical coats etc.,. The combination of Aloe vera & Pomegranate shows better antimicrobial activity than the other combinations. However, we used some natural extracts as mordant for long lasting the antimicrobial activity to the treated fabric. From, our study we found that, the combination of aloe vera & pomegranate yields high anti- microbial property when using the natural mordant. Hence, this natural extract anti-microbial finish will be more benefitable for the society by preventing the bacterial infection with a greener environment.

#### REFERENCES

- [1] Dr. Banupriya. J, Dr. V. Maheshwari (2019), "Antibacterial Coating Of Herbal Biopolymer Nanocomposite On Bamboo Cotton Fabric For Textile Applications", International Journal Of Scientific & Technology Research Volume-8, Issue-8,ISSN(2277-8616),pp(463-466).
- [2] Eun Kyung Choe, Juhea Kim & Sung Dong Kim (2017), "Cold-Pad-Batch Bio-Pretreatment of Cotton Woven Fabrics", Current Trends Fashion Technol Textile Eng, Volume-1,Issue-5,ISSN(2577-2929),pp(97-102).
- [3] Mangesh D. Teli and Tesfaye Tolessa Adere (2016) "Process optimization for bioscouring of 100% cotton textiles using Box-Behnken design",

- Advances in Applied Science Research, ISSN (0976-8610), pp(209-221).
- [4] S. M. Azizul Hoque, Abu Yousuf Mohamamd Anwarul Azim (2016), "Using Enzymes as an Aid of Better and Eco-Friendly Scouring Processing", American Journal of Engineering Research, Volume-5, Issue-6, e-ISSN(2320-0847), p-ISSN(2320-0936), pp(167-182).
- [5] A. R. Ramadan (2008), "Characterization of Biobleaching of Cotton/Linen Fabrics", Journal of Textile and Apparel Technology and Management, Volume 6, Issue 1, pp (1-12).
- [6] Dr. B. Senthilkumar, V. Karthi (2019), "To Study the Antimicrobial Effect on Cotton Fabric of Natural Dye Extract of Tulsi with Myrobalan Mordanting Method, International Journal of Science and Research, Volume-8, Issue-8, ISSN(2319-7064), pp (2138-2139).
- [7] Gomathinayagam Subramanian, Brij B. Tewari, Rekha Gomathinayagam (2014), "Studies of Antimicrobial Properties of Different Leaf Extract of Tulsi (*Ocimum tenuiflorum*) against Human Pathogens", American International Journal of Contemporary Research, Volume-4, No-8, pp(149-157).
- [8] Nan Thazin Hein, Dr. Swe Swe Hnin, Daw Htay Htay (2013), "A Study on the Effect of Antimicrobial Agent from Aloe Vera Gel on Bleached Cotton Fabric", International Journal of Emerging Technology and Advanced Engineering, Volume-4, Issue-2, ISSN (2250-2459), pp (7-11).
- [9] Ibrahim W, Sarwar Z, Abid S, Munir U and Azeem A (2017), "Aloe Vera Leaf Gel Extract for Antibacterial and Softness Properties of Cotton" Journal of Textile Science & Engineering, Volume-7, Issue-3, ISSN(2165-8064), pp(1-16).
- [10] Balachandar Balakrishnan, Sadayan Paramasivam, Abimanan Arulkumar (2014), "Evaluation of the lemongrass plant (*Cymbopogon citratus*) extracted in different solvents for antioxidant and antibacterial activity against human pathogens", Asian Pacific Journal of Tropical Disease, pp(134-139).
- [11] C. S. Senthil Kumar, M. Dhinakaran (2017), "Extraction and Application of Natural Dyes from Orange Peel and Lemon Peel on Cotton Fabric", Volume-04 Issue-05, e-ISSN(2395-0056), p-ISSN(2395-0072), pp(237-238).
- [12] Kulkarni S.S, Gokhale A.V, Bodake U.M, Pathade G.R. (2011), "Cotton Dyeing with Natural Dye Extracted from Pomegranate (*Punicagranatum*) Peel" Universal Journal of Environmental Research and Technology, Volume-1, Issue-2, eISSN (22490256), pp (135-139).
- [13] Faisal Rehman, Tayyab Naveed, Wajeeh Ullah, Reza Assefi Pour, Wang Wei (2016), "Extraction and Dyeing Behavior of Pomegranate Dye on Tencel Fabric", Universal Journal of Environmental Research and Technology, Volume-6, Issue-4, eISSN (2249 0256), pp(152-159).