Application of Antibacterial Treatment on Cotton Fabric in Nurse Uniforms

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Abstract **- Cotton is a naturally high-performance wicking fibre that is more breathable than polyester, wicking moisture and heat away from the body. The nursing uniform was established in 1910 to distinguish patients and working nurses from the hospital. Cotton fabric was chosen for the nurse uniform because it absorbs antibacterial finishes more quickly than other fabrics. Senna auriculata is used as an antibacterial agent that fights germs and microorganisms to protect nurses working in hospitals from sickness.**

Index Terms **- Cotton, Nurse uniform, Senna auriculata, Antibacterial finish.**

1.INTRODUCTION

Cotton is a natural fibre that grows in the form of a ball. It is a durable fibre that is utilised in a variety of applications and is the most widely used fibre on the planet. Cotton fibres are often spun into yarns and used to make soft, breathable textile materials. Cotton fibre is grown traditionally in India, and it is produced in an optimal manner. Cotton fibre is a valuable business in the medical area because most of the materials used, from cotton to bed linen, are composed of cotton fabrics. Cotton textiles are ideally suited for applying finishes, and we can achieve good results with them. Cotton has been used for textiles since prehistoric times. In this study, the leaf extract of Senna articulata was tested for antibacterial activity, and ethanolic extraction demonstrated the greatest antibacterial activity, thus it was applied to cotton fabric. Antibacterial activity of covered texture was superior against *staphylococcus aureus, E. coli,* and *Klebsila pneumonia.*

2. MATERIALS AND METHODS

For the current study, a woven cloth with a count of 40 was used. Senna Auriculata was used for the current investigation since it is readily available. The chosen herb was gathered in and around Coimbatore.

2.1 Herb Collection and Processing

To minimize the moisture level of the plant extract, the collected plants were shade dried at room temperature. After that, the extraction was pulverized and sieved. For the extraction, 10gms of dry powder were put into 50ml of 80% ethanol.

Procedure: For extraction, the above-mentioned formula was utilised. Five grammes of herbal powder were carefully combined with ethanol and stored in an airtight conical flask. The conical flask was incubated at room temperature for 24 hours. The supernatant was filtered through a Whatman no. 1 filter paper, and the filtrate was dried while the ethanol evaporated at room temperature. When exposed to the elements. The filtrate was collected and stored in an airtight container for future research. The same approach was employed to gather herbal powder filtrate from three different herbal samples.

2.2 Application of Antibacterial Finish on Nonwoven Fabric

The selected ethanol extract of Senna Auriculata was finished on a 40's count cotton fabric with dip-dry method.

2.3 Construction of Nurse Uniform Based on Suitable Design

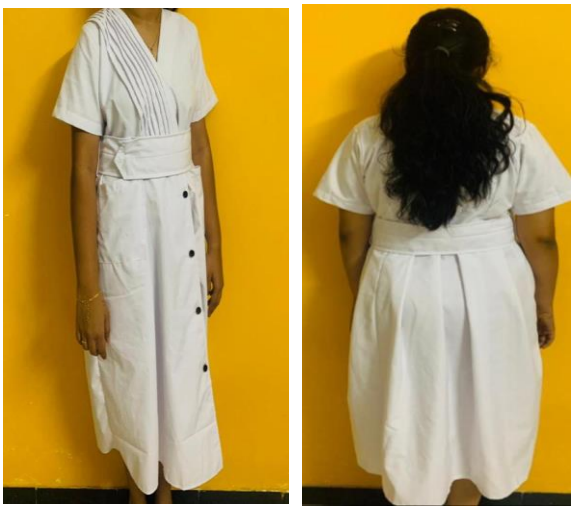
Nurse uniform is designed and constructed according to the selected design.

Measurements:

Full length = 36"
Arm hole = 15"
Waist = 34"
Shoulder = 14"
Chest = 38"
Shoulder to waist = 14"

Procedure

- Take 2 ½ metres of fabric and cut it with a pattern. Finish the neck area with a bias piece.
- Finish the front open with a straight piece.
- Make pleats on one side of the front.
- Join the two front parts to the back piece.
- Finish the edges with an over lock end by double folding.
- Attach Velcro and buttons to the front opening.
- Make a belt out of straight fabric that fits around your waist.



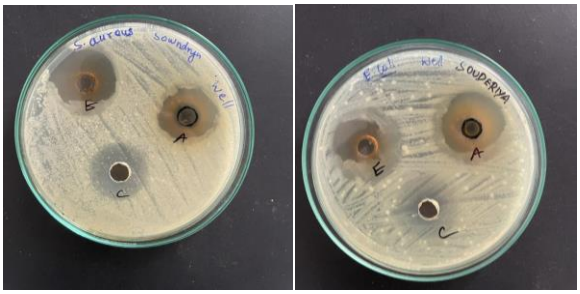
Photos of Nurse Uniform with Antibacterial Finish

3. RESULTS AND DISCUSSION

3.1 Evaluation of Antibacterial Finish on Herb Extraction

S. no	Volume of extract	Zone of incubation in (mm)		
		E. coli	*Klebsila pneumonia*	*S.aereus*
1	Ethanol	11	12.5	12.5
2	Aqueous	14	14	12

Antibacterial Finish on Herb Extraction



S.areus *e.coli*

Klebsila pnemonia

Herb extraction with an antibacterial finish has a high inhibitory zone of 11mm in ethanol extraction, which is extremely efficient against bacteria, and 14mm in water extraction, which is effective against *E. coli*. And the *staphylococcus aureus* has 12mm in the aqueous technique and 12.5mm in the ethanol extraction method has a high effective against bacteria in *Klebsila pneumonia* is 12.5mm zone in the aqueous method and 14 mm zone inhibition in the ethanol method.

3.2 Evaluation of Antibacterial Finish on Fabric

S .n o	Volume of extract	Zone of incubation in (mm)		
		E. coli	*Klebsila pneumonia*	*S.aereus*
1	Ethanol	12	17	17
2	Aqueous	15	12	16

Antibacterial finish on fabric

S.areus *e.coli*

Klebsila pneumonia

Fabric with an antibacterial finish has a high inhibition zone of 12mm in ethanol extraction, which is highly efficient against bacteria, and 15mm in water extraction, which is effective against *E.coli*. In addition, the *staphylococcus aureus* has a 16mm zone

in the aqueous approach and a 17mm zone in the ethanol extraction method that is highly effective against bacteria. The inhibitory zone in *pseudomonas aeruginosa* is 15mm in the aqueous approach and 12mm in the ethanol method.

4. CONCLUSION

From the study, it was concluded that the herbs utilised in this study have high antibacterial activity, it may promote greater germ protection when herbs lessen the risk of bacterial illness. For my research, I gathered a variety of medicinal plants with antibacterial properties that are easily accessible. In its natural state, this plant contains medicinal herbs. It is used for the nurse uniform, and the design for the nurse uniform was analysed and created based on the needs. Cotton cloth is used to make it. Cotton is a fabric that is both cool and pleasant. Although cotton is a cellulosic fibre, an antibacterial treatment is applied to the cloth using *Senna auriculata*. The untreated control fabric and finished fabrics are tested. I have designed the nurse wear with the comfortable and the herb shows better antibacterial activity. Then the garment is constructed according to the design that has the best comfort for the nurses.

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