

# **Development of eco-friendly surgical gown fabric with improved comfort properties**



*Submitted by*

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(Signed)

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**Date:**

June 16, 2017

## DECLARATION

I hereby declare that all the information in this project entitled “Development of eco-friendly surgical gown fabric with improved comfort properties” is the result of my collaborative efforts and my original work. In this research work, the information and data given is authentic to the best of my knowledge. This project report is not submitted to another university or institute for the reward of any degree, diploma or fellowship or published before.

Name of Student: \_\_\_\_\_

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Date: June 16, 2017

## Statement of submission

The title of my research project ‘‘development of eco-friendly surgical gown fabric’’ is being submitted for the completion of the degree of BS Textiles from School of Textile and Design, University of Management and Technology, Lahore Pakistan.

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## ABSTRACT

Bacteria's and other hazardous substances are produced onto the surgical gowns during various surgical operations. These undesirable substances cause problems for the medical staff and the patients as well. For avoiding the production of bacteria's and avoid the absorption of liquid contaminations, the surgical gown fabric is given both the antibacterial and fluid repellent treatment. Pure cotton fabric is being used due to its properties of high absorbency, high tensile strength, comfort-ability and durability. Three finishes are applied by pad dry-cure method in different concentrations onto the pure cotton fabric which are; antibacterial RUCO-BAC (MED), fluid repellent RUCO-GUARD AFR and Chitosan for achieving the properties of antibacterial, fluid repellency, high strength, comfort-ability and durability. The antimicrobial activity, fluid repellency, air permeability, tensile strength and MVTR (moisture vapor transmission rate) of the treated cotton fabric have been evaluated. The finished fabric shows the adequate tensile strength, fluid repellency, air permeability and antibacterial activity.

**Keywords:** surgical gown, chitosan, cotton, RUCO-BAC MED, RUCO-GUARD AFR, pad dry-cure method, antibacterial, fluid repellent

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## **Chapter 1**

### **INTRODUCTION**

## 1.1. Background

Medical textile comprises of the development of surgical gowns, drapes, bandages, caps, masks, gloves, artificial livers, artificial hearts and many others [1]. Surgical gowns are the protective wear which imparts great properties during various surgical operations. For the development of surgical gowns different types of fabric are being used, mostly cotton or its blends with synthetic like PC (polyester cotton blend). Cotton is the most preferable material used for making surgical gowns due to its durability, non-allergic nature, good strength, breathability, low thermal conductivity and elasticity, good wear-ability and comfort ability [2]. A wide range of surgical gowns are also made of nonwoven polypropylene fibers as it exhibit good strength, easy to handle and impermeable to fluids [3]. The major characteristics which should be essential in development of advantageous surgical gowns are; comfort-ability, absorbency, fluid repellence, antimicrobial, good tensile strength, durability and breathability. All these properties of surgical gowns can be achieved by the application of various antimicrobial and fluid repellent finishing materials. These finishes are natural or synthetic, however the preferred finishes are natural because they are eco-friendly and not give any harm to life [4]. Mostly natural antimicrobial finishes of chitosan, chitin and silver are used while a wide range of synthetics antimicrobial materials are being used such as; triclosan, Zinc oxide nanoparticles. Dichlorophenol, nitro compounds, amines, organometallics and formaldehyde derivatives [5].