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# Development of filter fabrics for medical applications

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## ABSTRACT

***Spun bonded polymeric and organic materials are used as base material to improve anti-fungal properties in gauze bandage in medical textiles. Development of antibiotic natural source for utilization is the main focus in designing medical textiles. The above can be achieved and enhanced by introducing suitable design concepts, materials and manufacturing process. Comparative study on natural textiles with existing will provide a way for development of new products. Novel filter material will be developed with due consideration on health care and medical applications with suitable finish including antimicrobial agents.***

**Keywords:** *Medical Textile, Filter fabrics, Medical applications.*

## 1. OBJECTIVES

- To make a filter fabric for better performance in health care product in medical Textile.
- With the several literature review and study of different journal we can give some improvement in filter fabric.
- To establish new improvement in filter fabric in medical application.

## 2. INTRODUCTION

In medical textile mainly we are using spun bonded polymeric and organic materials are used as base material to produce bandage, masks, aprons, wet tissues and gloves. In this project as per the literature guidance we use some antibiotic natural source for utilization is the main focus in designing medical health care product. The above can be achieved and enhanced by introducing suitable design concepts, materials and manufacturing process. Comparative study on natural textiles with other artificial ones will provide a way for development of new products. Novel filter material will be developed with due consideration on health care and medical applications with suitable finish including antimicrobial agents.

## 3. FILTRATION FABRIC IN MEDICAL TEXTILE

Fabric filtration is a physical separation process in which a gas or liquid containing solids passes through a porous fabric medium, which retains the solids. This process may operate in a batch or semi continuous mode, with periodic removal of the retained solids from the filter medium. Filtration systems may also be designed to operate in a continuous manner. As with other filtration techniques, an accumulating solid cake performs the bulk of the filtration. Importantly, an initial layer of filter cake must form at the beginning of the filtration operation.

Fabric filtration effectively controls environmental pollutants in gaseous or liquid streams. In air pollution control systems, it removes dry particles from gaseous emissions; in water pollution control, filtration removes suspended solids; in solid-waste disposal, filtration concentrates solids, reducing the landfill area required. Often, filtration processes simultaneously reduce air, water, and solid-waste disposal problems. An air pollution control system might, for example, remove particles and/or gases from an emission source and might consist of a scrubbing device that removes particulates by impaction and the gases by chemical absorption. The reaction products of gases and chemicals can produce a crystalline sludge. A fabric filter may also be used to remove solids from water so that the water can be recycled. As a result, effluent slurry does not present a water pollution problem. Effective use (optimization) of a fabric-filter system would minimize problems with waste disposal.

 

Although fabric filtration is suitable for removing solids from both gases and liquids, it is often important that the filter remain dry when gases are filtered, and likewise, it may be desirable to prevent the filter from drying out when liquids are filtered. In the gas system, many solids are deliquescent, and if moisture is present, these materials will have a tendency to pick up moisture and dissolve slightly, causing a bridging or blinding of the filter cloth. The result is a "mudded" filter fabric. In such cases, it is often impossible to remove this material from the cloth without washing or scraping the filter. If the cake on the cloth is allowed to dry during liquid filtration, a reduction in the porosity of the cake as well as a partial blinding of the filter could result, which could then reduce the rate of subsequent filtration.

**a) Types of Fabric Used in Medical Textile:**

Now-a-days different types of fabrics are used in medical textile. But mainly four types of fabrics are mostly used in medical textile. There are-

a) Woven
b) Non-woven
c) Braided
d) Knitted

**b) The use of textile materials for medical and healthcare products can be classified into following main areas**

- Barrier material (for infection control)
- Bandaging & pressure garment
- Wound care material
- Hygiene material
- Implantable material (sutures, art. Joints etc)
- Extra Corporal devices (like art. Kidney etc)

## 4. MEDICAL TEXTILE USING NEEM LEAF EXTRACT FOR PRODUCTION OF ANTIMICROBIAL TEXTILE FINISHES

**Selection of medicinal plant and preparation of the extract:**

Plant neem (Azadirachtaindica) was selected for present investigation. Neem leaves were acquired from Botanical garden of SRKI College in Surat. Aqueous plant extract has been synthesized from green neem leaves. 5g of Fresh leaves were collected and properly washed with distilled water. Fresh leaves were cut into fine pieces and boiled with 100 ml distilled water and filtration was done by using whatmann No.1 filter paper. The extract was used for further studies.

## 5. METHODOLOGY

By literature review we can extract the Neem pigment with some composition of chemical and it can be used with dipping process or finishing process to novel filter fabric like bandage in the medical application. It can be applied in bandage non woven material and tested as per the norms. By this materials we can use in outer layer of wound dressing and it will act as a protective filter fabric in medical textile.

## 6. MATERIAL

- The air dried leaves of Neem plants (Azadiractaindica), collected from Jeddah, KSA were washed under flowing water repeatedly to remove dust particles and soluble impurities and were allowed to dry at ambient temperature (24-25 o C) till the leaves became crisp, then were crushed into a fine powder in an electrically grinder.
- Distilled water, acetone, ethanol, sodium hydroxide and acetic acid were all of analytical grade.

**a. Pigment leaching and estimation of extraction yields**

To select the best extraction variable parameters, different amount of Neem solution from (1-5) % (w/v) were dissolved in distilled water and other co-solvents as water-acetone and water ethanol mixtures were tested at different concentrations ranged from (5-75) % (v/v), at (25-70) o C, for (15-120) min, at pH values of (3, 5, 7 and 9). This was carried out using a liquor ratio of 1:50 to determine the standardization method of extraction

**b. Spectral analysis**

The absorption spectra were recorded for the determination of absorbance on Pharmacia Biotech Ultrospec 3000 UV/Vis spectrophotometer in the wavelength range 300-800 nm. Infrared spectra of the compounds were recorded on a PerkinElmer FTIR spectrum (version 10, 03.08) in the frequency range 4000-450 cm_1.

**c. Production detail & Process of Manufacture:**

The process of manufacturing consists of various steps, as follows:
a) Fabric preparation of bandage cloth
b) Removal of chemical from the bandage cloth
c) Preparation of Neem paste
d) Dipping of fabric in various percentage of Neem solution by Padding mangle
e) Drying by cold process

 

## 7. TESTING METHODS

- Observation methods with different percentage of GPL with the filter fabric.
- Quantitative test
- Comparative study with filter fabric with improved filter fabric.

## 8. RESULT

- Filter Fabric is used for medical purpose
- Widely used for the outer surface of the dressing
- Avoid skin problem
- Flexible to use in various area

## 9. CONCLUSION

An anti-microbial finish for textiles involving skin contact will need additional safety data concerning this aspect. For manufacturers with biocides with relatively low volumes the cost of generating the necessary data may make ongoing production uneconomical. Acute toxicity data is relatively cheap to generate but sub-acute and other long-term studies are very expensive. It is therefore likely that the number of biocides being produced in the future will diminish and bringing new products to market will be even more expensive. A possible future development would be the micro-encapsulation of biocides. The potential is considerable if the correct performance and economics can be achieved. Benefits could include better durability and greater safety. The search for more cost-effective testing methods will continue.

Overall the need for anti-microbial and hygiene finishes looks set to continue for the foreseeable future. Improving performance and cost-effectiveness, while meeting environmental and toxicity requirements, will continue to challenge those working in this field.

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