

P-3072



# HERBAL WOUND DRESSING



## A PROJECT REPORT

*Submitted by*

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*In partial fulfillment for the award of the degree*

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*In*

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**KUMARAGURU COLLEGE OF TECHNOLOGY**

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**APRIL 2010**

D.S. M...  
CLINIC,  
PUDUR

## CERTIFICATE

This is to Certify that following final year B.Tech Textile Technology students (R.Govarthanan, M.Vijayakumar, K. Karthikeyan, M. Karthikeyan) worked on project Title Herbal wound dressing (Neem: Curcumin) with the following Concentration sample

Sample -1 (4.13: 4.13)

Sample- 2 (2.79: 1.19)

Sample- 3 (1.19: 2.79)

From the above sample tested with rabbit and the conclusions are made as

----- *Sample 1* ----- give better result.

*[Signature]*  
Authorised Signatory

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**BONAFIDE CERTIFICATE**

Certified that this project report “**HERBAL WOUND DRESSING**” is the bonafide work of “ **M.KARTHIKEYAN, R.GOVARTHANAN, M.VIJAYA KUMAR, K. KARTHIKEYAN** ” who carried out the project work under my supervision.



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**[INTERNAL EXAMINAR]**  
**[EXTERNAL EXAMINAR]**

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## ABSTRACT

Nowadays we use more synthetic bandaid in our regular life. which gives high manufacture cost and curing days is more. so we are decide to produce natural bandaid with low manufacture cost(fully Non-Woven material) which gives effective curing power.

The Polypropylene non-woven as a primary layer its produce by spunbond -meltblown –spunbond (SMS) and Polyester viscose is the wound contact layer its produce by spunlace, and then the wound contact layer is treated with Neem and Curcumin (high antibacterial at activity) with different concentration using Padding mangle method for applying the natural material.

The wound contact layer (spun lace non woven) is cut into required size and fix the contact layer into primary layer by using super bond Adhesive and protected the wound dressing with releasable label. Finally the sample is tested with Rabbit skin and study the healing of wound with help of doctor.

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# **INTRODUCTION**

# 1. INTRODUCTION

## 1.1 PROJECT AIM

To design and develop a herbal wound dressing for wounds

## 1.2 OBJECTIVES

- To devise an wound dressing with herbal medium particularly with neem and curcumin extracts
- To evaluate the product for their physical performance
- To propose a dressing-strip intended for superficial wound care treatment

## 1.3 TYPE OF WOUND

A wound is an injury causing damage to tissue, which may or may not result in loss of skin integrity. Generally wounds are classified as;

- Acute wounds
- Chronic wounds
- Post-operative wounds

**Acute wounds:** These traumatic wounds respond quickly to the treatment and generally heal without any complication, e.g. Abrasions, cuts, burns, lacerations.

**Chronic wounds:** Wounds associated with longer healing period with severe recurrence rate are called chronic wounds. Generally patients with chronic wounds have multiple factors that may delay the healing process, e.g. leg ulcers, pressure sores, malignant wounds.

**Post-operative wounds:** Wounds healing by first intention, where edges of wound are held in approximation by sutures, clips or staples. They are also called intentional acute wounds. Occasionally these wounds are also left to heal by second intention for discharging foreign matter, e.g. donor sites.

**FIG.1 Shows the Acute Wound**



**FIG.2 Shows the Chronic wounds**



**FIG.3 Shows the Post-operative wounds**



Wounds are also defined and differentiated on the basis of tissue damage, such as superficial wounds, partial thickness wounds and full thickness wounds

- **Superficial wounds:** Wounds with epidermis (upper layer of skin) damage.
- **Partial Thickness wounds:** Epidermis and part of dermis damage.
- **Full Thickness wounds:** Deeper layers of tissue are damaged such as muscle or bone and involve longer period of healing

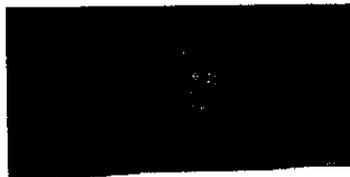
**FIG.4 Shows the Superficial wounds**



**FIG.5 Shows the Partial Thickness wounds**



**FIG.6 Shows the Full Thickness wounds**



### 1.3 TYPES OF DRESSING

Wound dressings are categorised into two broad divisions as,

- Passive dressing
- Interactive dressing

**Passive Dressing:** A dressing, which protects the wound surface by covering, is called passive dressing. These are traditional dressings such as paraffin gauze and other low adherent pads. They are used on surgical wounds or on low exudate superficial wounds. The limitation of this dressing includes quick saturation by exudates, dries and sticks to the wound added with increased trauma while removal.

**Interactive dressing:** A dressing, which actively interacts with the wound surface promoting a conducive environment that in turn, accelerates the healing potential of the wound. These dressings are occlusive in some cases, where a dressing totally seals the wound from external environment, which is either semi-permeable or impermeable to moisture.

The interactive dressing support the philosophy of moist wound healing. All modern wound dressings are made from wide range of materials are interactive dressings, for instance alginate is an interactive dressing that turns into gel on contact with the exudate whereas hydrocolloid is an occlusive dressing, since it seals the wound. In this project a passive wound dressing is proposed which is intended for acute or superficial wound care.

# **LITERATURE REVIEW**

## 2 LITERATURE SURVEY

### 2.1 NEEM:

#### 2.1.1 General introduction:

R.L. Bhardwaj said [1], Neem, or margosa, belongs to the family, Meliaceae. It has a botanical name: *Azadirachta indica*. It grows in tropical and semi-tropical regions and is widely found in Burma, India, and Pakistan.

As a fast growing, evergreen tree, which can reach the height of 15-20 metres, neem is known for its innumerable medicinal properties. It is used as a main ingredient in many home remedies. Commending the medicinal properties of neem, numerous Sanskrit names have been coined by ayurveda acharyas. A few of them are mentioned below.

- Nimba, as it boosts health
- Pichumarda, as it destroys skin infections/diseases
- Arishta, as it can ward off "evil powers" that harm our body.

#### 2.1.2 Chemical composition

- The neem tree has numerous medicinal properties by virtue of its chemical compounds. Seeds of the neem tree contain the highest concentration of azadirachtin, a chemical [an effective natural insecticide]. Neem also has salannin, gedunin, azadirone, nimbin, nimbidine, nimbicidine, nimbinol, etc., which are important liminoids [steroid-like substances].

### **2.1.3 USES OF NEEM:**

#### **General uses**

Neem has been the most traditionally used plant in India, Pakistan and Africa. It's used to protect grains and cereals from pests.

Fresh neem leaves are mixed with grains and cereals before storage. A paste of fresh neem leaves is also rubbed against the wall of large mud bins, or gunny bags, in which the grains and cereals are stored. Sometimes, a thick layer of dry neem leaves are spread over grains. Neem oil, extracted from seeds, acts as an effective and safe bio-pesticide. Jute bags treated with neem oil, or extracts of neem, are also used to store food grains. Neem oil is a very cheap and effective household pesticide. It protects grains and legumes. Neem is used to protect stored roots and tubers from potato moth too.

Azadirachtin is available in high concentration in neem seeds. It is used as a “botanical pesticide,” and is environmentally-friendly. It prevents insects from feeding on plants and regulates the growth of insects.

Neem extracts, however, do not harm insects like bees and butterflies, which help in pollination.

#### **Medicinal uses**

Neem has many medicinal uses. The chemical compounds present in neem have anti-inflammatory, anti-arthritis, anti-fever, sugar/glucose regulation, antifungal, spermicidal, anti-malarial, antibacterial and diuretic properties. The flower, leaves, bark and seeds of neem are used in many home remedies and in preparation of medicines. The bark of neem helps reduce fever. The flowers are used in intestinal disorders. The juice from fresh leaves is very helpful in treating skin diseases, wounds, and also weight problems [obesity].

Oil from neem seeds is used in arthritis, skin diseases, and muscular sprains. Neem is very effective in treating gum diseases too.

Neem is known to be beneficial in treating skin disorders, as already cited, thanks to its antibiotic, antifungal and blood purifying properties. According to ayurveda disturbed pitta and kapha cause skin diseases. Neem pacifies "harmed" kapha and pitta, and helps cure skin ailments. It promotes wound healing as it is packed with anti-bacterial and astringent properties. In psoriasis, it reduces itching, irritation, roughness of skin and also psoriatic patches. In the same way, it heals eczema too. It also reduces infection and inflammation of acne [Also read, Beauty Salon in this issue]. Neem helps to maintain the health of scalp skin and prevents dandruff.

Due to its detoxifying properties, neem also helps to keep organs/systems healthy - especially our circulatory, digestive, respiratory and urinary systems.

Scientific studies have revealed that neem reduces blood sugar level. Hence, its usage supports diabetic patients to keep their blood sugar levels under control. Diabetes impairs blood circulation and can cause gangrene in lower extremities. Numerous scientific studies have highlighted the role of neem in keeping the circulatory system healthy, thus reducing the chances of gangrene. New studies have shown that neem also reduces blood cholesterol levels and helps to keep the heart healthy.

## **Other uses**

Neem flower pachidi, prepared from roasted neem flower, is a famous dish in South India. It is prepared during Ugadi [New Year]. Neem flower rasam, another tangy recipe, improves digestion and is very popular in Andhra Pradesh and Tamil Nadu.

Extracts of skin-friendly neem are being used in bathing soaps, hair gels, body lotions etc.

### **2.1.4 THE EFFECTS OF NEEM ON WOUND HEALING:**

Wound on our skin heal in a multi stage process. In the earliest stage of the wound healing process a provisional matrix or ground substance is laid down which is made up of glycosaminoglycan. This is followed by the formation of granulation tissue and finally the synthesis of elastic and collagen. Neem oil contains active ingredient that directly deal with the wound healing process, because of this neem directly affects the wound healing process and helps the skin to retain its suppleness as the wound heals. Neem oil has a high content of essential fatty acids which plays an important role in adding moisture and a soft texture to the skin during the healing process. In addition to the neem trees ability to affect the re-structuring of the skin during the wound healing process neem leaf extract and seed oil have proven antimicrobial effect this keeps an wound or lesion free from infection by bacteria, viruses, parasites and fungi. Clinical studies show that neem plays another important role in wound healing by inhibiting inflammation as effectively as cortisone acetate.

### **2.1.5 “The antimicrobial effects of extracts of *Azadirachta indica* (Neem)”**

**Almas K.Department of Preventive Dental Sciences, College of Dentistry, Riyadh, Kingdom of Saudi Arabia. Kalmas@su.edu.sa said [5],**

*Azadirachta indica* (Neem) are commonly used as oral hygiene tools in different parts of the world, Several studies have demonstrated the anti-plaque anticariogenic and antibacterial effect of these sticks. The aim of this study was to compare the effectiveness of antimicrobial activity of Neem and Arak chewing stick's aqueous extracts at various concentrations. The microbial inhibition was measured using blood agar and ditch plate method up to 48 hours. The pH of Neem extract was 6.1 and of Arak was 4.9 Data suggested that both chewing stick extracts are effective at 50% concentration on streptococci and *Streptococcus faecalis*. Arak extract was more effective at lower concentrations for *Streptococcus faecalis*. The effect may be due to the difference of their chemical composition and variability in their PH. Further research is needed to extrapolate other plants used for oral hygiene. Chewing sticks are recommended as oral hygiene tools for health promotion in developing countries.

### **2.1.6 “Fungitoxic Activity of Extracts from *Azadirachta indica* and *Xylocarpus aethiopicus* on *Colletotrichum lindemuthianum* in Cowpea” . Amadioha;V. I. Obi**

**<sup>a</sup>Department of Crop Protection, College of Crop and Soil Sciences, Federal University of Agriculture, Umudike, Umuahia, Abia State, Nigeria [6]**

**College of Sciences, Imo State University, Owerri, Imo State, Nigeria**

Hot water and oil extracts of *Azadirachta indica* (neem) and *Xylocarpus aethiopicus* significantly reduced spore germination and growth of *Colletotrichum lindemuthianum* in vitro. Tests with cowpea (*Vigna unguiculata*) indicated the extracts applied before or after infection of the plants with *Colletotrichum lindemuthianum* were also effective in reducing the size of pathogen induced lesions. The fungitoxicity of the extracts from *Azadirachta indica* and *Xylocarpus aethiopicus* was greater than that of benomyl.

## **2.2 CURCUMIN**

### **2.2.1 General Introduction**

In online journal (Health promoting properties of Turmeric) deals [6.2], Turmeric contains a powerful active chemical compound called curcumin. This compound is not only responsible for its vibrant yellow-orange color and its distinctive zing, but is also spices most powerful medical constituent vestgowing it with powerful health benefits.

### **2.2.2 A Safe Yet Potent Anti-inflammatory**

Turmeric has traditionally been used as a remedy for inflammatory conditions such as arthritis, osteo-arthritis and rheumatoid arthritis. For latterly thousands of years, it has been the standard anti-inflammatory in Indian and chinese system of medicine.

Both laboratory and animal studies have provided evidence of spice's powerful anti-inflammatory activity. In fact, potency of turmeric's anti-inflammatory and anti-arthritic effects have been equated with that of the popular pharmaceutical anti-inflammatory drugs such as motrin and hydrocortisone-without the potential side effects and toxicity of these manufactured drugs. A 1986 study, for example, showed that a daily dosage of curcumin was even more effective in easing post-surgical inflammation as the regular anti-inflammatory prescriptions.

Recent research attributes turmeric's anti-inflammatory mechanism to this powerful capacity to inhibit the activity of enzymes COX-2 and lipoxygenase. It also eases the inflammation caused by the body's allergic reaction to histamines, as well as trauma, injury and the stiffness of over-or under-activity.

### **2.2.3 A Potent Anti-Oxidant**

Clinical studies have shown that turmeric has potent anti-oxidant properties. Anti-oxidants are essential disease fighting compounds that unstable oxygen molecules in the body, which cause great tissue damage through oxidation.

The combined effect of turmeric anti-inflammatory and anti-oxidant properties work to provide relief from the painful symptoms of arthritis. Free radicals have been shown to contribute to the pain of inflammation and the damage caused to the joints that is common with rheumatoid arthritis.

### **2.2.4 A Proven Anti-Carcinogen**

Ayurvedic medicine recommended turmeric for treating cancer, particularly breast and uterine cancer, as well as benign tumors. A number of early but promising animal and laboratory clinical studies show its anti-cancer properties to be helpful in treating other types of cancer, including skin.

Turmeric helps to prevent the formation of cancer-causing enzymes, reducing the risk of cancerous cell-formation and cell growth. One of turmeric's anti-cancer mechanisms involves inhibiting the activity of the enzyme Topoisomerase, which is essential to the replication of the cancer. This, in turn, limits the ability of cancer cells to metastasize, spreading to other healthy parts of the body. It also prevents cancerous tumors from growing new blood vessels, effectively starving them of nutrients and inhibiting their growth.



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### **2.2.5 A Natural Liver Protective**

Turmeric has significant liver protective effects, helping to minimize damage from pathogens and toxic compounds such as heavy metals, radiation, nicotine and other chemicals. It helps prevent damage resulting from prolonged use of alcohols and drugs paracetamol, both of which tax the liver and lay cause liver disease. One of the mechanism by which turmeric protects the liver is by promoting the secretions and movement of bile. In effect, turmeric keeps the liver healthy, helping its functions optimally has the body primarily detoxifier.

### **2.2.6 An Effective Anti-Septic and Anti-biotic**

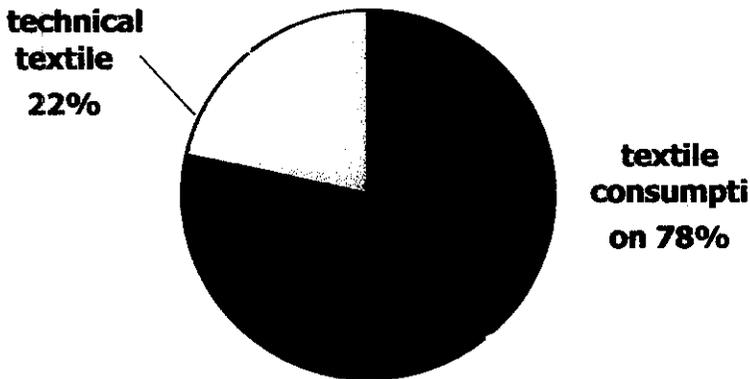
Turmeric is naturally anti-septic and anti-biotic that has historically been used as an herbal to treat everything from minor cuts and scrapes to scabies, skin and even leprosy. Turmeric essential oil is a powerful topical antibiotic that helps prevent infections and sepsis in wound.

## 2.3 TECHNICAL TEXTILE:

Reliance industries limited said [6.3], Technical textiles are defined as textile materials and products used primarily for their technical performance and functional properties rather than their aesthetic or decorative characteristics.

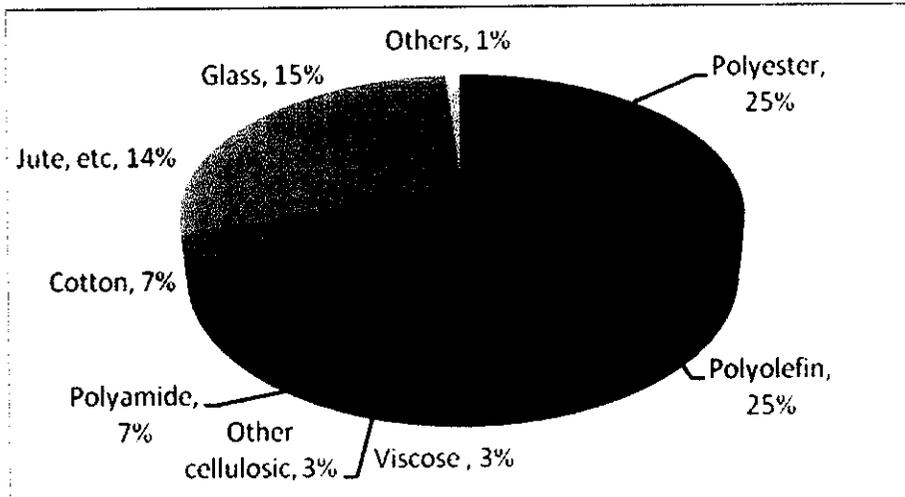
### 2.3.1 END USE OF FIBERS:

**FIG.7 Shows the end use of fiber in technical textile**



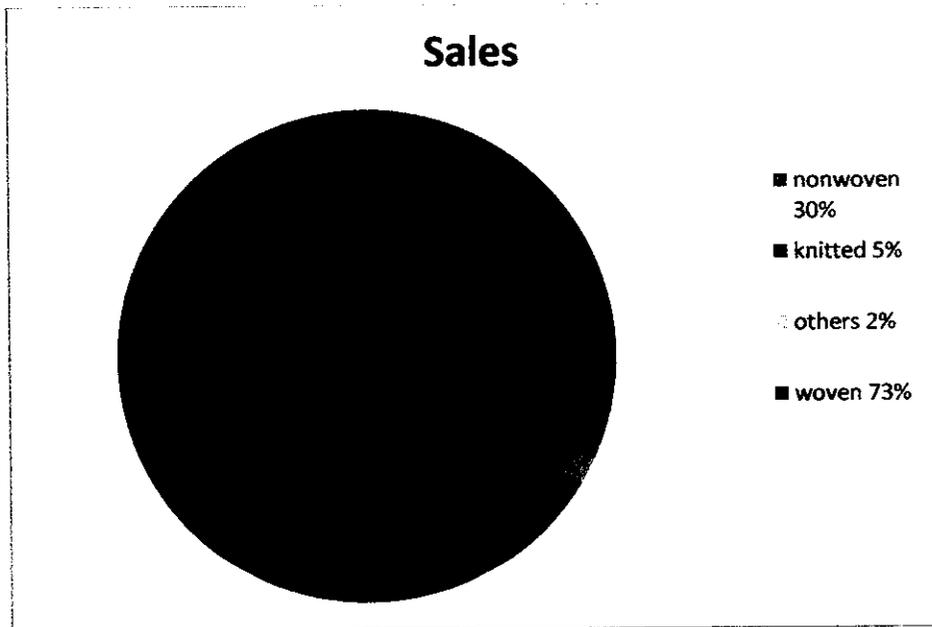
From the above figure, 22% textile fiber consumed for technical textile application than the others.

The following fibers are used for technical textile applications.



**FIG.8 Shows the Fibers used in technical textile**

### 2.3.3 END USE OF FABRIC



**FIG.9 Shows the end use of fabric in technical textile**

From the above figure. 20% of non-woven fabrics are used for technical textile application than the knitted, woven and other fabrics.

## **2.4 WOUND DRESSING**

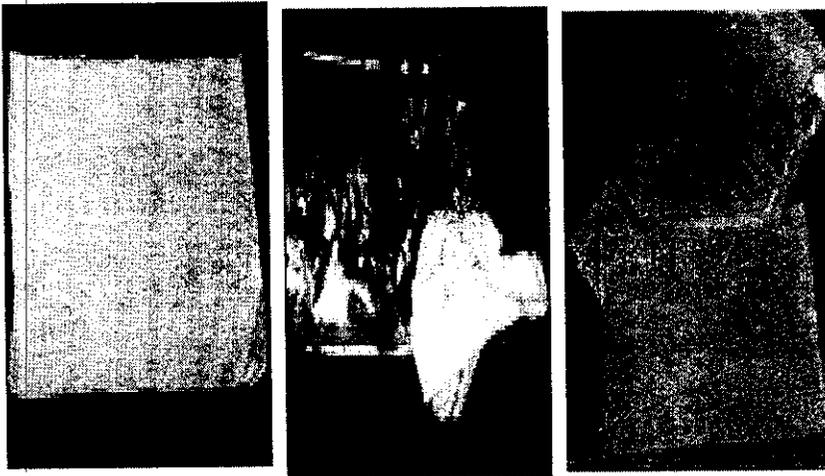
### **2.4.1 Synthetic wound dressings**

In online journal (Wound Dressing) deals [6.4], Synthetic wound dressings originally consisted of two types; gauze-based dressings and paste bandages such as zinc paste bandages. In the mid-1980s the first modern wound dressings were introduced which delivered important characteristics of an ideal wound dressing: moisture keeping and absorbing (e.g. polyurethane foams, hydrocolloids) and moisture keeping and antibacterial (e.g. iodine-containing gels).

During the mid 1990s, synthetic wound dressings expanded into the following groups of products:

- vapour-permeable adhesive films
- hydrogels
- hydrocolloids
- alginates
- synthetic foam dressings
- silicone meshes
- tissue adhesives
- barrier films
- silver- or collagen-containing dressings

**FIG.10 Shows the Silver containing dressings**



#### **2.4.2 Ideal wound dressing**

No single dressing is suitable for all types of wounds. Often a number of different types of dressings will be used during the healing process of a single wound. Dressings should perform one or more of the following functions:

- Maintain a moist environment at the wound/dressing interface
- Absorb excess exudate without leakage to the surface of the dressing
- Provide thermal insulation and mechanical protection
- Provide bacterial protection
- Allow gaseous and fluid exchange
- Absorb wound odour
- Be non-adherent to the wound and easily removed without trauma
- Provide some debridement action (remove dead tissue and/or foreign particles)
- Be non-toxic, non-allergenic and non-sensitising (to both patient and medical staff)

- Only use on minor wounds or as secondary dressings removed

- Dressings can stick to the wound surface and disrupt the wound bed when

## Gauze

dressings and their main properties.

The following table describes some of the many different types of wound

### 2.4.4 Dressing types

Type	Properties
Passive	Traditional dressings that provide cover over the wound, e.g. gauze and tulle dressings
Interactive	Polymeric films and forms which are mostly transparent, permeable to water vapour and oxygen, non-permeable to products
Bioactive	Dressings which deliver substances active in wound healing, e.g. products
	hydrocolloids, alginates, collagens, chitosan

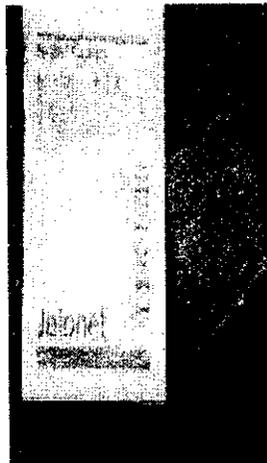
following types. Synthetic wound dressings can be broadly categorized into the



**FIG.11 Shows the Gauze Dressing**

## **Tulle**

- Dressing does not stick to wound surface
- Suitable for flat, shallow wound
- Useful in patient with sensitive skin
- E.g. Jelonet, Paranet



**FIG.12 Shows the Tulle Dressing**

## **Semipermeable film**

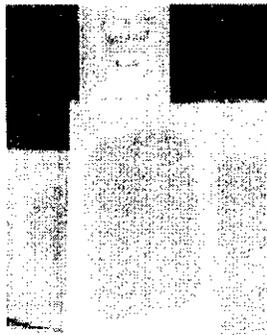
- Sterile sheet of polyurethane coated with acrylic adhesive
- Transparent allowing wound checks
- Suitable for shallow wound with low exudate
- E.g. OpSite, Tegaderm



**FIG.13 Shows the Semipermeable film**

### **Hydrocolloids**

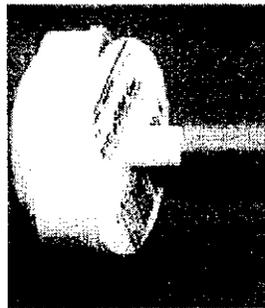
- Composed of carboxymethylcellulose, gelatin, pectin, elastomers and adhesives that turn into a gel when exudate is absorbed. This creates a warm, moist environment that promotes debridement and healing
- Depending on the hydrocolloid dressing chosen can be used in wounds with light to heavy exudate, sloughing or granulating wounds
- Available in many forms (adhesive or non-adhesive pad, paste, powder) but most commonly as self-adhesive pads
- E.g. DuoDERM, Tegaserb



**FIG.14 Shows the Hydrocolloids Dressing**

## Hydrogels

- Composed mainly of water in a complex network or fibres that keep the polymer gel intact. Water is released to keep the wound moist
- Used for necrotic or sloughy wound beds to rehydrate and remove dead tissue. Do not use for moderate to heavily exudating wounds
- E.g. Tegagel, Intrasite

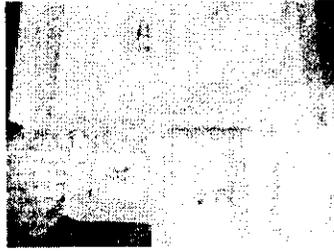


**FIG.15 Shows the Hydrogels**

## Alginates

- Composed of calcium alginate (a seaweed component). When in contact with wound, calcium in the dressing is exchanged with sodium from wound fluid and this turns dressing into a gel that maintains a moist wound environment
- Good for exudating wounds and helps in debridement of sloughing wounds
- Do not use on low exudating wounds as this will cause dryness and scabbing
- Dressing should be changed daily

E.g. Kaltostat, Sorbsan



**FIG.16 Shows the Alginates**

### **Polyurethane or silicone foams**

- Designed to absorb large amounts of exudates
- Maintain a moist wound environment but are not as useful as alginates or hydrocolloids for debridement
- Do not use on low exudating wounds as this will cause dryness and scabbing E.g. Allevyn, Lyofoam



**FIG.17 Shows the Polyurethane or silicone foams**

### **Hydrofibre**

- Soft non-woven pad or ribbon dressing made from sodium carboxymethylcellulose fibres

- Interact with wound drainage to form a soft gel
- Absorb exudate and provide a moist environment in a deep wound that needs packing



**FIG.18 Shows the Hydrofibre**

### **Collagens**

- Dressings come in pads, gels or particles
- Promote the deposit of newly formed collagen in the wound bed Absorb exudate and provide a moist environment

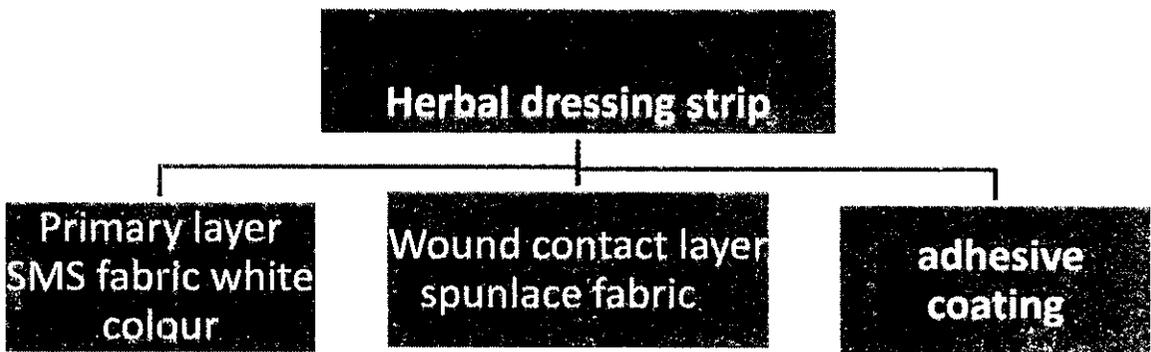
**MATERIALS**  
**AND**  
**METHODS**

### 3. MATERIALS AND MEHODS

#### 3.1 MATERIALS

Primary contact layer – spunbond -meltblown –spunbond (SMS) nonwoven white fabric primarily composed of polypropylene filaments. The SMS fabric is considered to possess good filtration ability. .

Wound Contact layer – Spunlace nonwoven fabric composed of viscose and polyester . This material is plased on to the primary layer which help of adheres



### **3.2 METHODOLOGY**

Various types of textile substrates primarily composed of nonwoven fabric free from lint and hypoallergenic to skin are proposed for the study. The wound contact layer reinforced on to the textile substrate is a liquid repellent nonwoven fabric. The contact layer is incorporated with desired composition of neem and curcumin extracts, the composition and method of application is carried out using padding mangle method. However several percentage of composition of neem and curcumin would be evaluated for its performance. The primary layer is given an adhesive coating on the side which adheres on to the skin. The wound contact side of the dressing is protected using release label.

The wound dressing is a flexible adhesive based dressing which can be applied on to various contours of body. The wound contact layer of each dressing is protected from external environment with adhesive release paper. The dressing is proposed to be sealed and packed in a transparent pouch which allows the user to examine the dressing prior to application

**Raw materials**

**Herbal Treatment**

**Testing**

**Product assembly**

**Commercial product**

### 3.3 METHODS

In this project two herbal components have been identified based on the fact that these components aid in the process of wound healing by providing an anti-microbial and anti-bacterial effect. The herbal components are below.

- Neem
- Curcumin

Above Herbal components have been identified as the complementary constituents in promoting accelerated wound healing. All these components are in powder form, which are taken in known weights and are mixed thoroughly in mild Luke worm distilled water. There different solutions were prepared initially:

1. 50% : 50% Neem: Curcumin
2. 70% : 30% Neem: Curcumin
3. 30% : 70% Neem : Curcumin

The test solutions were allowed to settle down on the room temperature with intermittent motion given to those containers with these solutions. In the subsequent stages, the herbal constituent was modified due to reduced shelf life of the herbal impregnated wound contact layer, as the fabric structure developed fungus/mildew at room temperature. In addition, the fine particles of herbal constituent also produced very rough fabric surface. Therefore, the herbal solution was filtered twice to remove coarse particles and result is a clear and fine herbal solution free from particles. A mild colorless clear liquid, 8% of

Cross linking agent that is soluble in water was used as a preservative to increase shelf life of the dressing. The following combinations were explored:

	Neem	Curcumin
Sample 1 :	1%	1%
Sample 2 :	0.7%	0.3%
Sample 3 :	0.3%	0.7%

M:L =1:50

### **CALCULATION FOR SAMPLE 1:**

Weight of the Sample 1 = 1.9g

Total Amount of Liquor =  $1.9 * 50 = 95$  ml

Total Amount of neem =  $1/100 * 95 = 0.95$  gm

Total Amount of Curcumine =  $1/100 * 95 = 0.95$  gm

Total Amount of crosslinking agent =  $8/100 * 95 = 7.6$  ml

Total Amount of water =  $95 - [0.95 + 0.95 + 7.6] = 85.5$  ml

### **CALCULATION FOR SAMPLE 2:**

Weight of the sample 2 = 0.99 gm

Total Amount of liquor =  $0.99 * 50 = 50$  ml

Total Amount of neem =  $0.7/100 * 50 = 0.35$  gm

Total Amunt of curcumine =  $0.3/100 * 50 = 0.18$  gm

Total Amount of cross linking agent =  $8/100 * 50 = 4$  ml

Total Amount of water =  $50 - [0.35 + 0.18 + 4] = 45.47$  ml

### **CALCULATION FOR SAMPLE 3:**

Weight of the sample 3 = 1.06 gm

Total Amount of liquor =  $1.06 \times 50 = 53.15$  ml

Total Amount of neem =  $0.3/100 \times 53.15 = 0.15$  gm

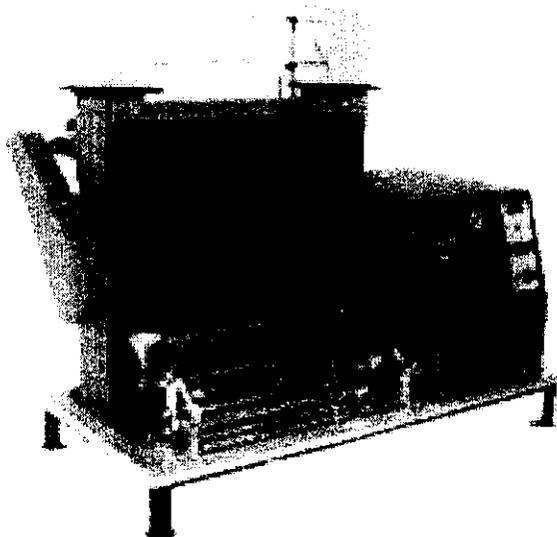
Total Amount of curcumine =  $0.7/100 \times 53.15 = 0.37$  gm

Total Amount of cross linking agent =  $8/100 \times 53.15 = 4.25$

Total Amount of water =  $53.15 - [0.15 + 0.37 + 4.25] = 48.38$  ml

From above calculation we treat the wound contact layer material using padding mangle method. The treated fabric is allowed to dry for 24hrs before analysis and product was assembled.

**FIG.19 Shows the Padding Mangle Machine**



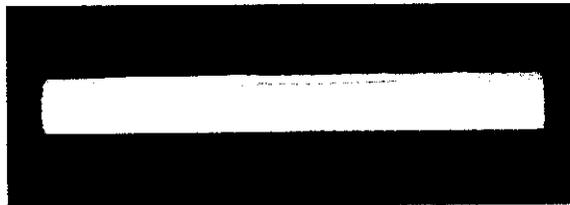
### 3.4 Procedure for wound dressing preparation :

The primary layer was cut according to the required length. That layer is a non-woven material produced by SMS technique. And the wound contact layer is cut according to the primary layer width [non-woven material produced by spunlace technique] and re-inforced that two layer by using adhesive and finally the releasable lable is pasted on the surface to protece the wound dressing is Shown in FIG.

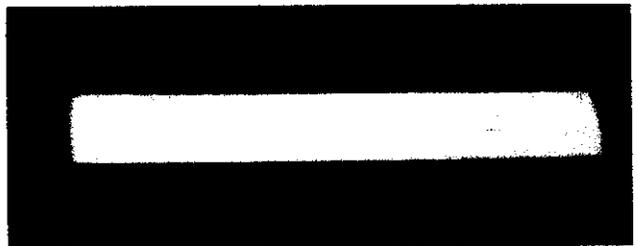
#### PRIMARY LAYER



#### PRIMARY LAYER+WOUND CONTACT LAYER



#### FINISHED PRODUCT



**FIG.20 Shows the wound dressing preparation**

**RESULT  
AND  
DISCUSSION**

## 4. RESULT AND DISCUSSION

- Test parameter for primary layer
- Test parameter for wound contact layer
- Breathability of the fabric
- Anti-Microbial test
- Dressing application test

**Table 1 Test parameters for primary layer (SMS) – Nonwoven fabric**

Test parameter	Standards	Outcome	Interpretation
Water repellency	AATCC 22-2005	Rating 0 (ISO5)	No sticking or wetting on the surface
Spray impact test	AATCC 22-2005	0	Difference in before and after weight; percentage.
Alcohol repellency	BS7209	Fail	Liquid absorption
Moisture vapour permeability (g/m <sup>2</sup> / 24 hrs)	BS7209	2487	Higher value

### **INFERENCE:**

The water repellency and spray impact test and moisture vapour permeability of the primary layer (Polypropylene produced by SMS technique) was excellent because polypropylene has low moisture absorption. But the alcohol repellency was failure.

S. No	PARAMETERS	WZ70JX
1	Area density in $g/m^2$	76
2	Thickness in mm	0.4
3	Bulk density in $g/cm^3$	0.189
4	Tearing strength in gms	75
5	Bursting strength in $kg/cm^2$	6
6	Abrasion resistance in % (5000 cycles)	24.5
7	Absorption capacity in g/g	4.6
8	Vertical wicking g cm	8.7
10	Bending length in cm	1.25
11	Flexural rigidity mg cm	1.015
12	Bending modulus kg/cm	194.25
13	Air permeability in $ltr/m^2/sec$	73

**Table 2 Test parameters for spunlace fabric (WZ70JX) wound contact layer**

**Breathability of the wound dressing**

<b>Breathability of the wound dressing</b>	<b>32.93 cc/s/cm</b>
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**TABLE.3 Shows the Breathability of Bandaid**

# ANTIMICROBIAL ACTIVITY TEST

## Introduction:

An **antimicrobial** is a substance that kills or inhibits the growth of microorganisms such as bacteria, fungi, or protozoans. Antimicrobial drugs either kill microbes (microbicidal) or prevent the growth of microbes (microbistatic). Disinfectants are antimicrobial substances used on non-living objects. The history of antimicrobials begins with the observations of Pasteur and Joubert, who discovered that one type of bacteria could prevent the growth of another. They did not know at that time that the reason one bacterium failed to grow was that the other bacterium was producing an antibiotic. Technically, antibiotics are only those substances that are produced by one microorganism that kill, or prevent the growth, of another microorganism. Of course, in today's common usage, the term antibiotic is used to refer to almost any drug that attempts to rid your body of a bacterial infection. Antimicrobials include not just antibiotics, but synthetically formed compounds as well.

The discovery of antimicrobials like penicillin and tetracycline paved the way for better health for millions around the world. Before penicillin became a viable medical treatment in the early 1940's, no true cure for gonorrhea, strep throat, or pneumonia existed. Patients with infected wounds often had to have a wounded limb removed, or face death from infection. Now, most of these infections can be cured easily with a short course of antimicrobials.

However, the future effectiveness of antimicrobial therapy is somewhat in doubt. Microorganisms, especially bacteria, are becoming resistant to more and more antimicrobial agents. Bacteria found in hospitals appear to be especially resilient, and are causing increasing difficulty for the sickest patients—those in the hospital. Currently, bacterial resistance is combated by the discovery of new

drugs. However, microorganisms are becoming resistant more quickly than new drugs are being made available; thus, future research in antimicrobial therapy may focus on finding how to overcome resistance to antimicrobials, or how to treat infections with alternative means, such as species-specific phages.

### **BROTH DILUTION TEST:**

This method is used to determine the minimum concentration of extract required for inhibit the growth of microorganisms

### **PROCEDURE:**

1. Two flasks are taken and named as test and control.
2. In two flasks nutrient broth was prepared and then autoclaved.
3. The bacterical culture staphylococcus aures and Equilie was inoculated in to the nutrient broth.
4. Treated cloth is added to the test.
5. Then the flask are kept in in a shaker for 24 hr at 37 degree celcius.
6. After 24hr readings are documented using calorimeter at 660nm.

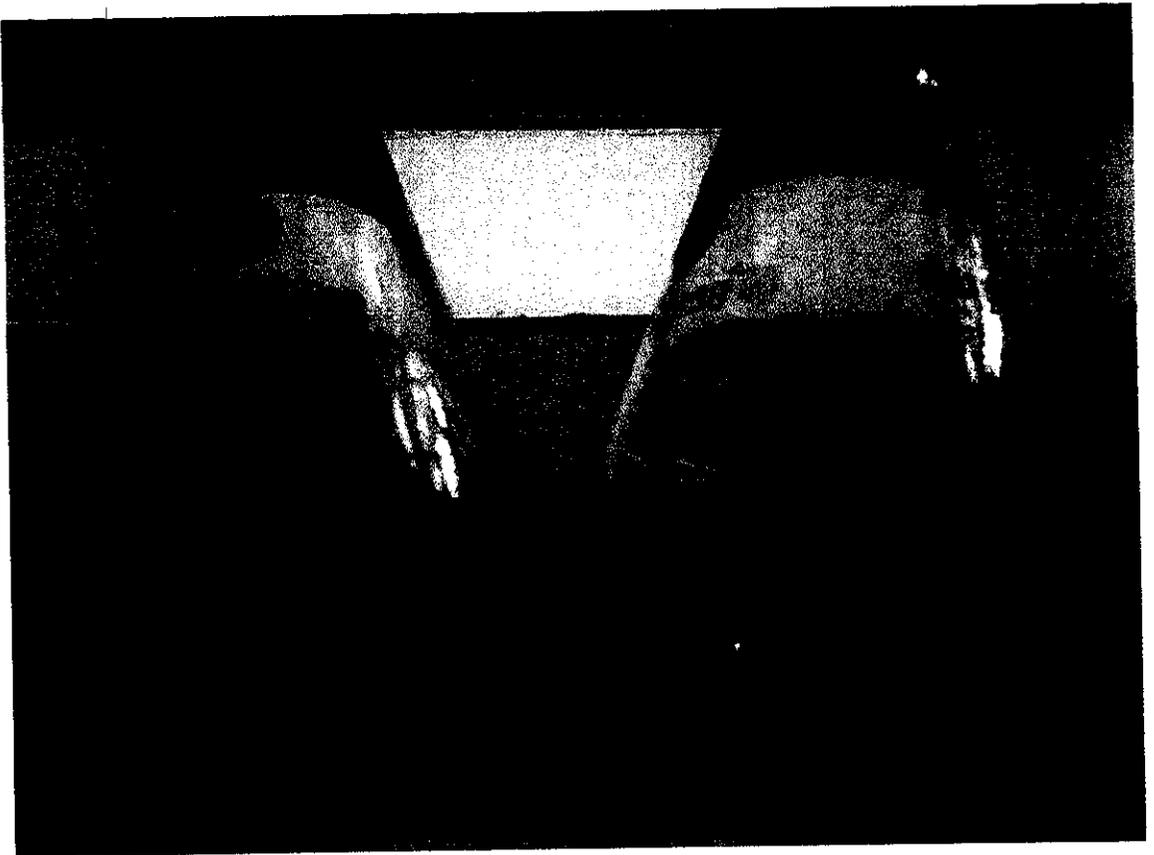
1 st Sample = 1% Neem + 1% Turmeric

**Organism: Staphylococcus aureus**

Culture OD at 660nm = 1.00

**TABLE.4 Shows the antimicrobial test for Sample 1  
(Organism:Staphylococcus aureus)**

Sample	0 hr	1 hr	2 hr	24 hr
1	0.97	0.90	0.88	0.44



**FIG.21 Shows the antimicrobial activity test for sample 1(Organism:  
Staphylococcus aureus)**

2 nd sample = 0.7% Neem + 0.3% Turmeric

**TABLE.5 Shows the antimicrobial test for Sample 2**

**(Organism: Staphylococcus aureus)**

Sample	0 hr	1 hr	2 hr	24 hr
2	0.98	0.92	0.89	0.50



**FIG.22 Shows the antimicrobial activity test for sample 2(Organism: Staphylococcus aureus)**

3 rd sample = 0.3% Neem + 0.7% Turmeric

**TABLE.6 Shows the antimicrobial test for Sample 3**

**(Organism: Staphylococcus aureus)**

Sample	0 hr	1 hr	2 hr	24 hr
3	0.97	0.91	0.86	0.49



**FIG.23 Shows the antimicrobial activity test for sample 3(Organism: Staphylococcus aureus)**

## Dressing application test

### Procedure

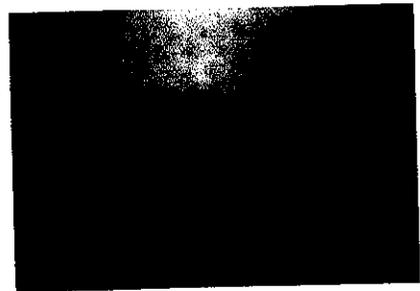
The three different concentration Of wound dressing were tested by using rabbit. The following fig. shows three different concentration Of wound dressing,

Sample 1 (1% neem and 1% curcumin)

Wound



Wearing bandaid



Healling wound



**FIG.25 Shows the dressing application test for sample 1**

1 st Sample = 1% Neem + 1% Turmeric

**Organism: Equillie**

Culture OD at 660nm = 1.00

**TABLE.7 Shows the antimicrobial test for Sample (Organism: Equillie)**

Sample	0 hr	1 hr	2 hr	24 hr
1	0.99	0.92	0.85	0.40

2 nd sample = 0.7% Neem + 0.3% Turmeric

**TABLE.8 Shows the antimicrobial test for Sample 2(Organism: Equillie)**

Sample	0 hr	1 hr	2 hr	24 hr
2	0.99	0.95	0.91	0.55

3 rd sample = 0.3% Neem + 0.7% Turmeric

**TABLE.9 Shows the antimicrobial test for Sample 2(Organism: Equillie)**

Sample	0 hr	1 hr	2 hr	24 hr
3	0.94	0.90	0.84	0.45

### **INFERENCE:**

We test the sample of three different neem and curcumin concentrations. All the three concentrations tested in two organism [Staphylococcus aureus and equillie]. In that all concentration shows better result because neem and curcumin has high anti-microbial activity.

**Sample 2 (0.7% neem and 0.3% curcumin)**

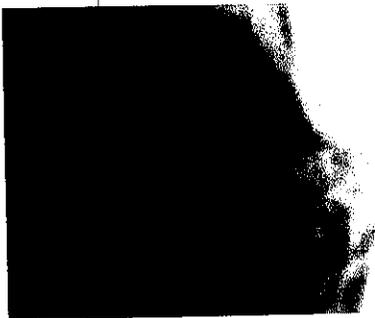
**Wound**



**Wearing bandaid**



**Healing Wound**



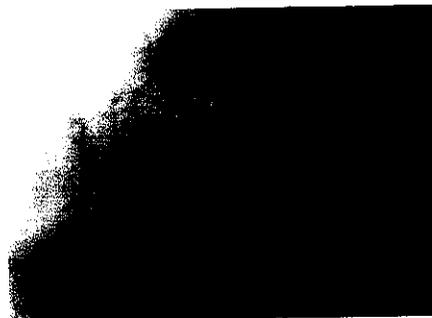
**FIG.26 Shows the Dressing application test for sample 2**

Sample 3 (0.3% neem and 0.7% curcumin)

Wound



Wearing Bandaid



Healing Wound



**FIG.27 Shows the Dressing application test for sample 3**

### **INFERENCE**

The wound dressing was tested on rabbit . All three concentration sample shown good healing but the sample 1 give better healing property as per doctor certificate.

## **4.6 BENEFITS**

The herbal wound dressing has a good scope of promoting the wound healing process as neem and curcumine process anti-bacterial,anti septic values.The dressings with neem and curcumine extract can serve as a primary first aid to minor wounds preventing from further infection.

# **CONCLUSION**

## 5. CONCLUSION

In anti- microbial activity test all the three concentration samples shows better result because both neem and curcumine have high anti-microbial activity.

The bandaid is prepared in three concentration they are as followes,

	Neem	Curcumin
Sample 1 :	1%	1%
Sample 2 :	0.7%	0.3%
Sample 3 :	0.3%	0.7%

The above samples are tested using rabbits. The sample 1 gives better result for capability of wound healing.

## **6. FUTURE SCOPE OF THE PROJECT**

These tests are to be experimented with human beings and it is to be commercialised.

# REFERENCE

## 7. REFERENCE

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