

Wound Healing Using Acalypha Indica and Mexican Mint Extracts

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Abstract: Acalypha Indica have been used widely in Indian Ayurvedic medicine for treating various ailments. A paste made from the leaves of Acalypha Indica when applied on the affected skin areas it is useful for relieving skin conditions like eczema, scabies, sores and wounds because of its antibacterial properties. Acalypha Indica are used as a remedy for relieving acne and pimples. Mexican mint extracts applied on skin has medicinal properties in treating various skin diseases and wounds. A bandage cotton fabric should be taken Mexican mint should be converted in to paste form then fabric can be finished using the extracts. The paste can be fixed on the fabrics using Mordant. The present project work highlights the traditional herbs like Acalypha Indica and Mexican mint in healing wounds and skin problems. A bandage cotton fabric is to be taken wherein the extracts of Mexican mint, calypha Indica extracts are applied. The Antibacterial properties of the fabrics are studied by conducting wound healing and Antibacterial test. Comparative study is also to be conducted to find out the effectiveness of both herbs in wound healing.

Keywords: Ayurvedic, Acalypha Indica and Mexican mint, chronic wounds, natural herbs.

II. LITERATURE REVIEW

2.1 WOUND CARE DRESSING

Wounds can be classified into acute wounds and chronic wounds. While acute wounds take only a few weeks to heal. Chronic wounds require several months. Chronic wounds include venous leg and pressure sores.

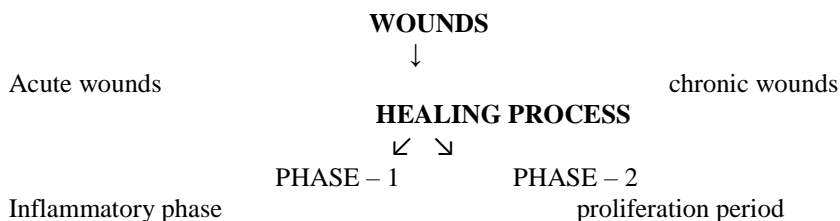


Figure 1 Wound Healing Process

2.2 WOUND HEALING PROCESS

The inflammatory phase which occurs immediately after injury to tissue and during which swelling takes place. The proliferation in which new tissues and blood vessels are formed. The maturation phase in which tissues laid down during proliferation stages are remodeled. Healing of wounds depends not only upon medication but also upon the use of proper dressing and suitable dressing material. Dressing should be easy to apply and painless on removal. They should be able to create the optimal environment for wound healing and should be designed to reduce nursing time by requiring fewer dressing changes.

Generally, the material is placed directly over the wound and is covered with an absorbent pad; the whole dressing is then retained with adhesive tape or a suitable bandage, depending on the location of the wound in the body. The primary dressing is expected to maintain the wound temperature and moisture level to permit respiration and to allow epithelial migration.

The secondary dressing must not be too absorbent as it may cause the primary dressing to dry out too quickly. Different shapes are available which are suitable for dressing wounds in difficult positions such as heels, joints, digits and the perineal area.

Wound dressing materials are mainly classified as absorbent and non-absorbent depending on the types of fibers used. Dressings vary with the type of wound and wound management and no single dressing is universally applicable.

An ideal dressing is normally expected to :

- Provide a barrier against microorganisms, dirt and other foreign bodies;
- Provide a humid environment at the wound surface;
- Control exudates; and
- Be capable of being removed without trauma

Dressings are also used to protect against further injury and abrasion by acting as a cushion and also help to promote rather than interfere with the healing process. Traditionally, cotton gauze is used for dressings because of its good absorption properties and soft handle. However, it has been established that cotton gauze allows moisture to evaporate from the wound: this means that cotton gauze dressings do not maintain the moist environment to facilitate faster wound healing. Furthermore, cotton gauze adheres to the wound bed. This means that patients suffer pain when the gauze is removed. Also, cotton gauze requires frequent changes. Modern wound dressing consists of absorbent layers held between a wound contact layer and a base material. The absorbent layer absorbs blood, body fluids and exudates.

2.3 TYPES OF WOUND

2.3.1 Chronic wound

Chronic wounds have a long duration or frequent return. Chronic wounds the patient may have many functional problems which affect his ability to heal. Venous leg ulcers, pressure and diabetic foot ulcers are some examples of chronic wounds.

2.3.2 Open and closed wound

Wounds are also differentiated as open or closed wound type. Open wounds: examples include incision or wounds, laceration, abrasion wounds and penetrating wounds. Closed wounds: examples include contusions and crush injuries.

2.3.3 Acute wounds

An acute wound is defined as a recent wound that has yet to progress through the stages of wound healing. It is acquired as a result of an incision or responds rapidly to treatment and heals without much complication. They may be cuts, abrasions, lacerations, burns, surgically created wounds. Surgically created wounds include all skin lesions that occur as a result of an underlying condition or as a combination of both.

2.4 COMMERCIAL WOUND DRESSING

2.4.1 Hydrophilic wound dressing

Fills the wound site with topical nutrients that rapidly mix with the form a protective coating to create and maintain most environments beneficial for granulation tissue growth and proliferation.

2.4.2 Occlusive wound dressing

Occlusive dressing provides a moist environment. Hydrogel occlusive dressing is soft and pliable, stretches with movement, absorbs secretion, reduces odor and does not liquefy the wound. Hydrogel occlusive dressing reduces the need for frequent change.

2.4.3 Hydro gel wound and burn dressing

Emergency first burn dressing relieves pain, cools and comforts, helps prevent contamination and is non-adherent, safe for use on all types of burn.

2.5 ECO- FRIENDLY NATURAL HERBS

In India as well as Africa, it is used as a medical plant. In West Africa, the leaves are cooked and eaten as a vegetable. In traditional Tamil Siddha, it is believed to rejuvenate the body. Indian Caliph is also eaten by cats to cure constipation in indigestion. The cats search for this plant and chew its leaves and roots. The plant of Indian Caliph reportedly possesses diuretic, purgative, and antibacterial properties.



Fig 2 MEXICAN MINT LEAVES



Fig 2 ACALYPHAINDICA LEAVES

III. FABRIC SELECTED

Table 1 Fabric Details

Fabric type	Warp count	Weft count	GSM	Tearing strength
Bandage Woven Fabric	42	49	44 GMS	0.5 g f

The fabric selected for the study is plain weave with EPI of 42 with a PPI of 49 with a GSM of 44 has been selected for this study.

IV. METHODOLOGY

The present work highlights the traditional herbs like AcalyphaIndicia and Mexican mint in healing wounds and skin problems. A bandage cotton fabric is to be taken wherein the extracts of Mexican mint, caliph indicia extracts are applied. The Antibacterial properties of the fabrics are studied by conducting wound healing and Antibacterial test. The paste can be fixed on the fabrics using Mordant. To find out Tearing strength and GSM, warp count weft count. The bandage cloth is treated with the extracts of both the herbs and the comparative effect on wound healing is studied.

4.1 Anti microbial effectiveness

The untreated and treated fabrics are evaluated using Parallel streak method of Zone of inhibition is studied.

4.2 Wound healing effectiveness

It is studied by conducting trial on the number of days for wound curing.

V. RESULTS AND DISCUSSIONS

Table 2 Antibacterial activity of given fabric against *E.coli* and *S. aureus*

S. No.	Fabric	<i>E.coli</i> MTCC 443			<i>S. aureus</i> MTCC 737		
		R1	R2	R3	R1	R2	R3
1.	MM	3	2	3	2	2	3
2.	Control	0	0	0	0	0	0

Table 3 Antibacterial activity of given fabric against *E.coli* and *S. aureus*

(Zone of inhibition in Mexican mint)

S. No.	Fabric	<i>E.coli</i> MTCC 443			<i>S. aureus</i> MTCC 737		
		R1	R2	R3	R1	R2	R3
1.	AI	2	1	3	1	2	1
2.	Control	0	0	0	0	0	0

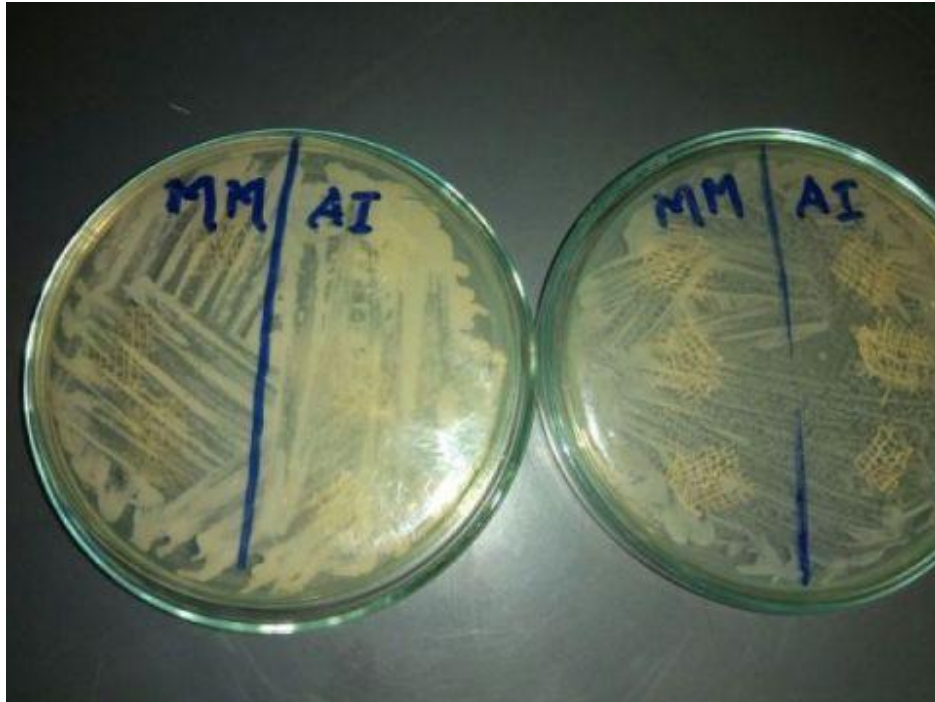


Fig 3 Anti bacterial Effectiveness test

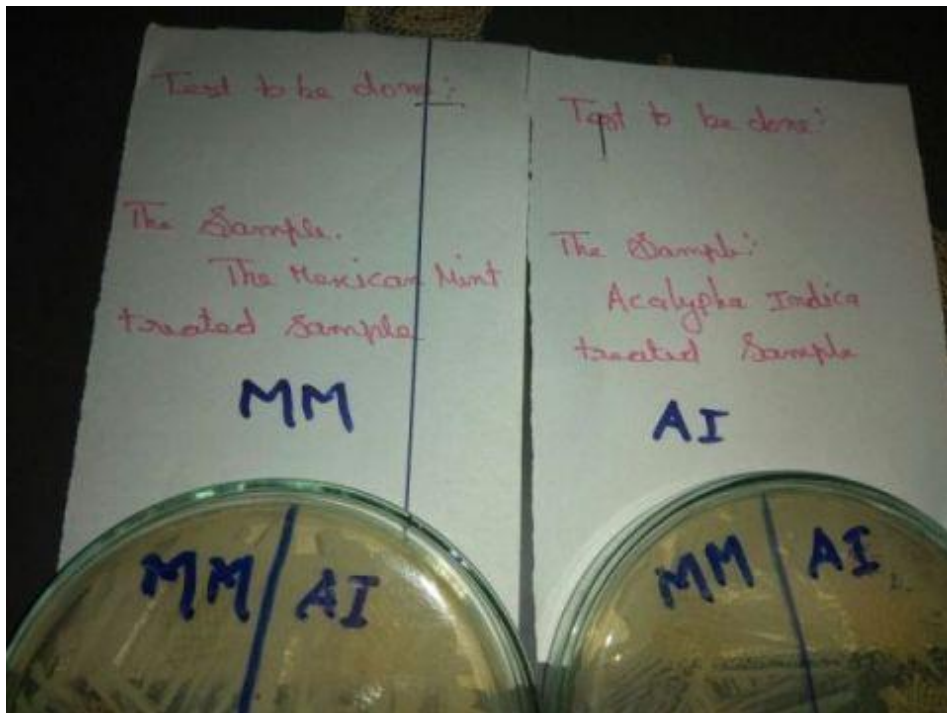


Fig 4 Antibacterial test Zone of inhibition

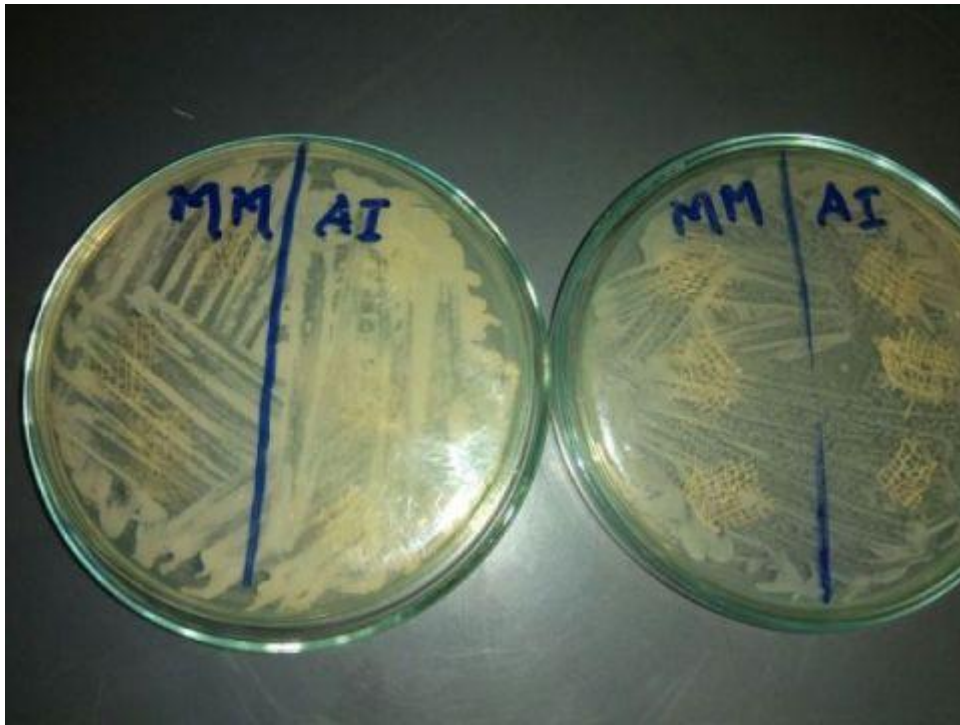


Fig 5 Comparative Zone of Inhibition

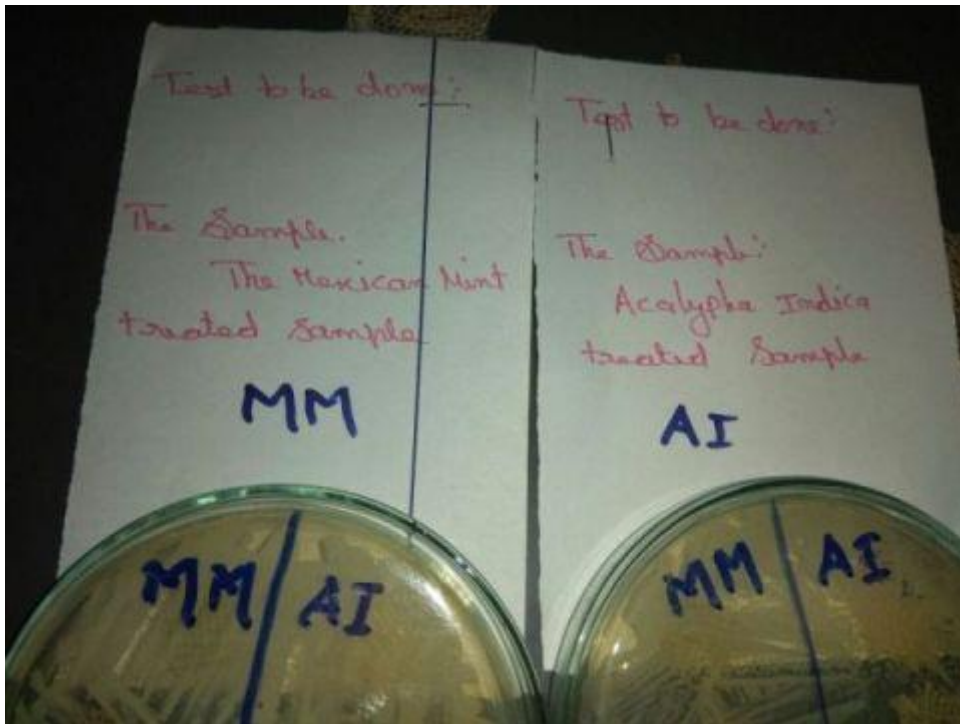


Fig 6 comparative Zone of Inhibition

Table 4 WOUND HEALING TIME

Treatment type	NO OF DAYS FOR WOUND HEALING	
	Mexican mint	Acalyphaindica
UNTREATED	10 days	10 days
TREATED	5 days	6 days

The zone of inhibition of Mexican mint against E-coli and S.aureus is 3 mm which is comparatively higher. The zone of inhibition of Acalyphaindica Against E-coli and S.aureus against Mexican mints comparatively higher than the untreated

sample. It is understood that Mexican mint treated and Acalypha indica treated fabrics shows better Anti bacterial properties. It is inferred that Mexican mint treated fabrics shows excellent Antibacterial activity compared to Acalypha indica. The wound healing test results shows the number of days for curing the wound is 5 days in case of Mexican mint which is lesser than Acalypha indica 10 days.

VI. CONCLUSIONS

It is concluded that natural herbs can be used as a medicine for healing of wounds. This project work highlights natural herbs like Mexican mint and Acalypha indica can have wound healing properties. When comparing both herbs we understood that Mexican mint treated a fabric has better wound healing. The antibacterial test and wound healing confirms these herbs can be used as a potential healing of wounds.

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BIOGRAPHIES



Mr. J. Anandha Kumar born on 04th January 1978 at Pollachi in Coimbatore District, South India. He has completed his M.Tech. in Textile Technology from P.S.G. College of Technology, Coimbatore with First Class. Earlier he worked in various academic institutions like University college of Technology, Osmania University, Hyderabad, Angel college of Engineering and Technology, Tirupur and worked as a Junior Scientific Officer at The South India Textile Research Association (SITRA), Coimbatore. He worked in various Textile industries occupying key positions. He is an active member of various professional institutions and societies. He is the Life Member of Indian Society of Technical Education (ISTE), New Delhi. He is pursuing his Doctoral work in the area of Textile Processing at ANNA University, Chennai. His area of interest in research includes Bio-processing of textile materials, Polyester fabrics hydrolysis, Colour analysis of textile substrates and salt free reactive dyeing of cotton materials. He has published number of articles in leading Journals and presented papers at various conferences. Currently he is working with the Department of Textile Processing, GRG Polytechnic College, Coimbatore, India.