

FORMULATION DEVELOPMENT AND EVALUATION TEST FORBONE FRACTURE BANDGES

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ABSTRACT

The aim of review is to formulate and evaluate bio adhesive bandage .A bandage is used to hold a dressing in place over a wound, to create pressure over a bleeding wound to prevent rapid blood loss and splinting of injured part of the body, which provide support to an injured part .Bio-bandages are made from herbal compounds that impart host compatible therapeutic properties..A bandages prepared with an adhesive inside, to which a pad is fixed to a central portion of inside of the bandage containing herbal composition and a protective paper having opposed end portions removable attached to inside of the bandage. Band aid with herbal preparations can best aid towards microbial medicament of bio adhesive tape which are magnificence in appearance.

Keyword: - Bio adhesive bandage, herbal, natural fiber, evaluation parameters, antimicrobial.

1. INTRODUCTION:-

Bandage is piece of material used to support medical device such as dressing or to provide support and to restrict the movement of part of body A bandage is used to hold a dressing in place over a wound, to create pressure over a bleeding wound to prevent rapid blood loss and splinting of injured part (1).The term ‘Dressing’ and ‘Bandage’ are often used synonymously, but primary layer in contact to wound is dressing while Bandage is referred to material used to cover wound & to keep dressing in its place. (2)

1.1 TRADITIONAL KNOWLEDGE-

In traditional systems of medicine, modern medicines, Nutraceuticals, food supplements, folk medicines, pharmaceutical intermediates and chemical entities for synthetic drugs plant are main sources of drug. (3) Traditional bone setting practice is quite popular in India. PutturKattu is quite popular in Tamilnadu, Maharashtra, Andhra Pradesh, Kerala and other northern states. kasamarda (Latin name – cassia accidentalis) herb is used for making paste (4). As injury is fresh the herbal paste acts as anti-inflammatory agent who helps to reduce swelling and pain due to injury. The paste with white portion of egg is accelerating the formation of hard callus and remodeling of bone (5).

Herbal extracts and plant products are coated on textile surfaces and used in medical and protective textiles. Such products will have the functionality of textiles along with curative ability of compounds. In the developed world use

of herbal medicine continue to rise due to novel drugs delivery system and their bioactive principles form the basis in medicine, Nutraceuticals, pharmaceutical intermediates and lead compounds in synthetic drugs (6)

1.2 PLASTER OF PARIS BANDAGE -

- ❖ Synthetic bandages are usually preventing mobilization of body in fractures, fixation and diseases of joints.
- ❖ To immobilize joint or limb fracture are used; applied as a slab, splint or full cylindrical cast.
- ❖ Commonly used due to rapid setting property (7)

2. MODIFICATION IN FORM OF BANDAGES: -

BIO - ADHESIVE BANDAGES

Bio-bandages are made from herbal compounds that impart host compatible therapeutic properties. Preparation of adhesive bandages are such a that make them adhesive inside which fixed at central portion containing herbal composition and a protective paper having opposed end portions removable attached to inside of the bandage. Adhesive wound pad consist of sterilized fabric impregnated with herbal ointment.. It is antiseptic fabric adhesive bandage used as elementary material is more suitable to all person the formulated quantity of herbal composition was loaded in the fabric pad. (8) Neem tree was usually used as natural adhesive glue. Bio-bandages made of herbals posses antimicrobial properties that are chemical free, non-toxic and eco friendly. Bio adhesive tapes applied to strap or tape injury for light weight support, to split soft part, or to serve as semi rigid support to limit mobility of injured part. (9)

2.1 MATERIAL AND METHODS OF FORMULATION-

- **Selection of Fiber -**
Bamboo and cotton fiber has good absorbency and more over bamboo has anti-bacterial character in nature (10)
- **Fiber web formation-**
Blending of 50% bamboo and 50% cotton
Cotton + Bamboo fiber weight – 40 grams, web weight (final) - 35 grams, carding process usually used for opening of fiber.
- **Selection of herb –**
The particulars of the medicinal herbs and natural materials used for the development of health care product are furnished
- **Extraction -**
Extraction and coating of natural herb: Solvent extraction of collected herbs
 1. leaves of selected medical plant were collected and dried in shadow dry method which then converted into powder
 2. By dissolving 6 grams of drug powder in 100 ml of 80 % methanol carried out extraction
 3. Sterile conical flasks incubated at 37°C incubator with shaking at 120 rpm for 24 h. The content was filtered with Whatmann No. 1 filter paper and the residue was again treated with 40 ml of absolute alcohol and incubated as mentioned earlier.
 4. Repeat it 3 times. The evaporation of filtrates was carried under vacuum using distillation. Reconstitute the extract with 5 ml ethanol.
 5. The product is packed in sterile glass vials .the storage condition (4⁰c) until use. (11)
- **Collection of test organism and preparation of stock culture –**
The bacterial cultures used in this study include Bacillus subtilis (Gram positive) and Escherichia coli (Gram negative). Test organisms were sub cultured onto fresh nutrient broth media and incubated at 37±1°C for 24 h. The stock cultures were maintained at 4°C.

- **Test for effective herb-**

The agar well diffusion method is suitable for plant extracts against test organisms. Mueller-Hinton agar usually used in antimicrobial assay. Wells are made in Mueller-Hinton agar solid media plates using cork borer (5 mm diameter) and inoculate containing bacteria were spread on the solid plates with a sterile swab moistened with the bacterial suspension and 25, 50, 75, 100 micro liters of the working suspension/solution of different plant extract and same volume of extraction solvent for control was filled in the wells with micropipette. Lid closed medium left for some time for extract diffusion and incubated at 37°C for 24 h. zone of inhibition (zi) was checked after overnight incubation. Antimicrobial activity of the extracts was determined by measuring the diameter of inhibition zone in millimeter produced against the test organisms. Activity against gram positive B.subtilis is more important as it is the bacterium present on the epidermis of the skin. Gram negative E.coli is present in intestine of human beings. All the coated bandages showed activity against both B.subtilis and E.coli. (11)



Figure 1 - Zone of inhibition

- **Preparation of Ointments by Trituration method -**

Table - 1: Formulation Table of Simple Ointment

Preparation of simple ointment (base) (Simple ointment I.P, 1966)			
1.	Wool fat	5.0g	Base
2.	Hard paraffin	5.0g	Base
3.	Cetostearyl Alcohol	5.0g	Solidifying agent
4.	White soft paraffin or yellow soft paraffin	85.0g	Base
5.	Neem and Turmeric	2.5g	API

(12), (13)

2.2 PROCEDURE-

- All ingredients were accurately weighed.
- Hard paraffin and cetostearyl alcohol were melted on water bath.
- To this wool fat and white soft paraffin was incorporated.
- All ingredient was Stirred until get melted.
- Contents were examined for foreign particles and fibers.
- The mixture was stirred until attained room temperature (12)

- Incorporation of powdered active ingredients-**
 The required amount of herbal powders was weighed and mixed homogeneously. Mixed powder was triturated with prepared base until homogeneous ointment formed.
 On basis of Preformulation studies observation the ingredients was selected by comparing zone of inhibition of individual ingredient with marketed clindamycin ointment
- Herbal adhesive bandage preparation -**
 The woven fabric was cut into suitable dimension 7×2 cm(length \times width) Wound pad of 2.5×1.2 cm size prepare and fix on adhesive woven fabric



The fabric pad is coated with neem and turmeric in 1: 2 ratios respectively. According to this ratio 10 mL turmeric and 5 mL neem is useful in making bandage. The fabric pad is linked to the adhesive bandage with glue extracted from neem.



(12)

The bandage is prepared and applied over injured part were the fabric to the surrounding skin which prevent dirt or other microorganism from entering the wound. Then prepared herbal ointment was spread over wound pad. The backing plastic material having same size was fixed over the adhesive woven fabric Hence, band aid with herbal preparations can best for curative aid towards microbial medicament of Adhesive bandage showed good elegance and appearance.

This developed herbal wound pad was suitable medicament for antiseptic bandages infections for human.
(11)

2.3 EVALUATION PARAMETERS –

Table 2 - Evaluation parameters

Sr. no	Parameters	Method of measurement
1.	Physical appearance	Visual examination
2.	Consistency	Must be Smooth and no grittiness
3.	Spreadability	Determined by placing the excess sample in between two slides which were compressed to uniform thickness by placing a definite weight for a specific time. The time required separate the two slides was measured as spreadability

4.	pH	Measured with the help of digital pH meter [6-8]
5.	viscosity	Measured by CAP- 2000 Brookfield viscometer
6.	Solubility	Soluble in boiling water and miscible with ethanol, ether and chloroform.
7.	Washability	The ointment was applied to the skin and then ease the extent of washing with water was checked
8.	Non-Irritancy test	ointment has been applied to the skin of human being and observed for the effect

(11), (12), (13)

3. ADVANTAGES OF NATURAL AIDS :-

- A. Hypoallergenic
- B. Reduced Skin Irritation
- C. Breathable
- D. Compostable
- E. The Band-aids Will Not Cause You Allergies
- F. The Band-aids Fight Off Bacteria.
- G. Prevent irritation of skin. (13)

4. CONCLUSIONS:-

Bioadhesive bandages are easy to formulate. The study concludes that the use of herbal bandages is free from side effects and safe for topical dosage forms. The relation of human and herbs is enumerable from many years. Hence use of Herbal product assures patient for perfect results. Bio-bandages made of herbs possess antimicrobial properties that are chemical free, non-toxic and eco friendly. They are comfortable and compatible for all fractures. Unlike plaster of Paris; they are biodecomposable and prevent pollution. Hence bioadhesive bandages have advantage in all aspects.

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