



Formulation And Evaluation Of Herbal Wound Healing Ointment

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ABSTRACT

Wound care is continuously evolving with the advance and modified medicament for the treatment of acute and chronic wounds. The perfect wound healing material was not found due to various challenges. To find the perfect wound care authorities was revisited for the recovery of wounds. In ancient time when medical science was not much developed, peoples was believing on the nature. For the treatment of wound peoples was dependant on many herbal plants. In this study ointment had been formulated based on wound healing property with the help of herbal plants extracts like Neem (*Azadirachta indica*) and Turmeric (*Curcuma longa*). The respected formulation has good washability, good spreadability and consistency. From this research we found that, it is possible to modify ointment with natural herbal plants extract which ha wound healing properties and which protects the skin.

Keywords: healing activity, ointment, wound healing properties.

INTRODUCTION

Research concerning healing wound therapy focuses on finding new herbal remedies that are assumed to have fewer side effects, lower cost and similar efficacy compared to conventional synthetic drugs. [6][7]

Wound healing involves mainly an inflammation process with vasoconstriction and mediators release, the proliferation of fibroblasts and keratinocytes, formation of granulation tissue, and maturation with collagen fibers remodeling.

One definition of a wound is the loss or disruption of the cellular, anatomical, or functional continuity of live tissue. It results from tissue damage caused by physical, chemical, thermal, microbiological, or immunological

factors. The body's normal process of renewing dermal and epidermal tissue is known as wound healing or wound repair. Healing requires the collaborative efforts of various tissues and cells. It involves the aggregation of platelets, the clotting of blood, and fibrin formation, an inflammatory response to injury, and an alteration in the ground substances, angiogenesis and re-epithelialization. Healing the process is not complete until the disrupted surfaces are firmly knit by collagen. [10-13]

There are different classes of compounds which promote wound healing, such as phenolic derivatives, flavonoids, non-flavonoid polyphenols (phenolic acids as caffeic acid, chlorogenic acid), tannins, lignans, and essential oils such as lavender, chamomile, teatree, thyme, ocimum oil, isoquinoline alkaloids from the Papaveraceae and Berberidaceae families, terpenes, saponins, and phloroglucinol derivatives (arzanol). These bioactive substances manifest antioxidant, anti-inflammatory, antimicrobial or antifungal properties, positively influencing wound healing by preventing the development of pathogens, enhancing cell proliferation, increasing collagen production, improving wound contraction, and promoting epithelialization, vascularization and a normal regeneration avoiding fibrosis.

Despite the fact that many different kinds of Ointments are used for wound healing, although the pace of tissue regeneration still seems to be limited in these. Consequently, following a thorough examination of etiology Along with several conventional and alternative forms of wound care, we have undertaken the task of creating a herbal ointment that would be efficient. It is also true that 8% of the world's population gets their primary healthcare from medicinal plants. Traditional medicine is valued around the world, including in modern nations, and there are treatment plant and recommendations available. The World Health Organisation (WHO) and our nation both support traditional medicine since it is more affordable, widely accessible, and thorough, especially in developing nations. Finding new herbal treatments for wound healing is the main goal of research, as they are thought to be less expensive and more effective than traditional synthetic medications. This study aimed to characterized that these ingredients possess different activities in favour to wound healing properties. For this reason, we did research. [10-16].

WOUND HEALING

Anatomical and cellular continuity of a tissue is broken when there is a wound. A wound can develop as a result of a tissue being harmed by bacteria, chemicals, heat, physical force, or the immune system. Skin and other body tissues begin to mend during the healing of wounds. following trauma, the damage. A number of cellular and biochemical processes take place in the tissues during this healing process, which helps the damaged or wounded tissue regain its strength while also recovering its structural and functional integrity. [9,10]

The aim of treating wound is to both shorten the time required for recuperation or to minimize the undesired consequences. Medical treatment of wound consists of administration of drug each topically or systemically aiming the recuperation of wounds. Antibiotics, antiseptics, dissolving agent, wound restoration promoters (tretinoin, aloe vera extract, honey, benzoyl peroxide, chamomile extract) are certain retailers which are used

topically for wound healing. [11,12].

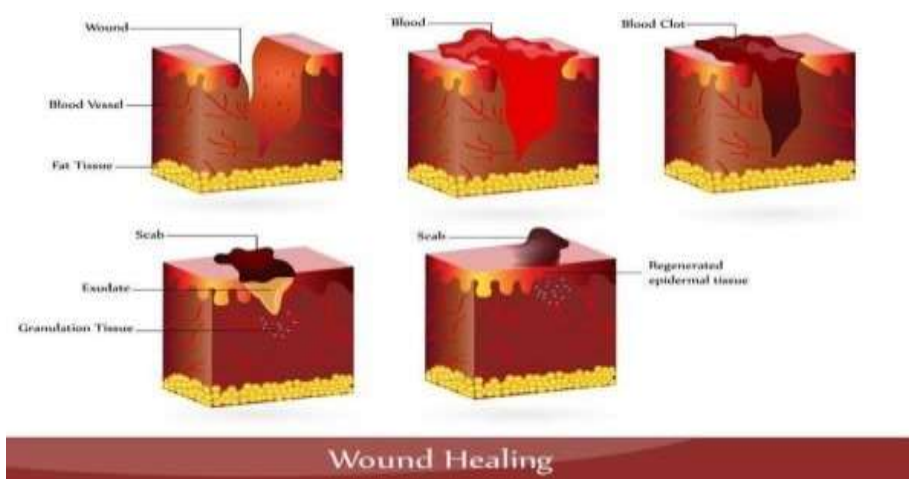


Fig no: 1 Wound Healing

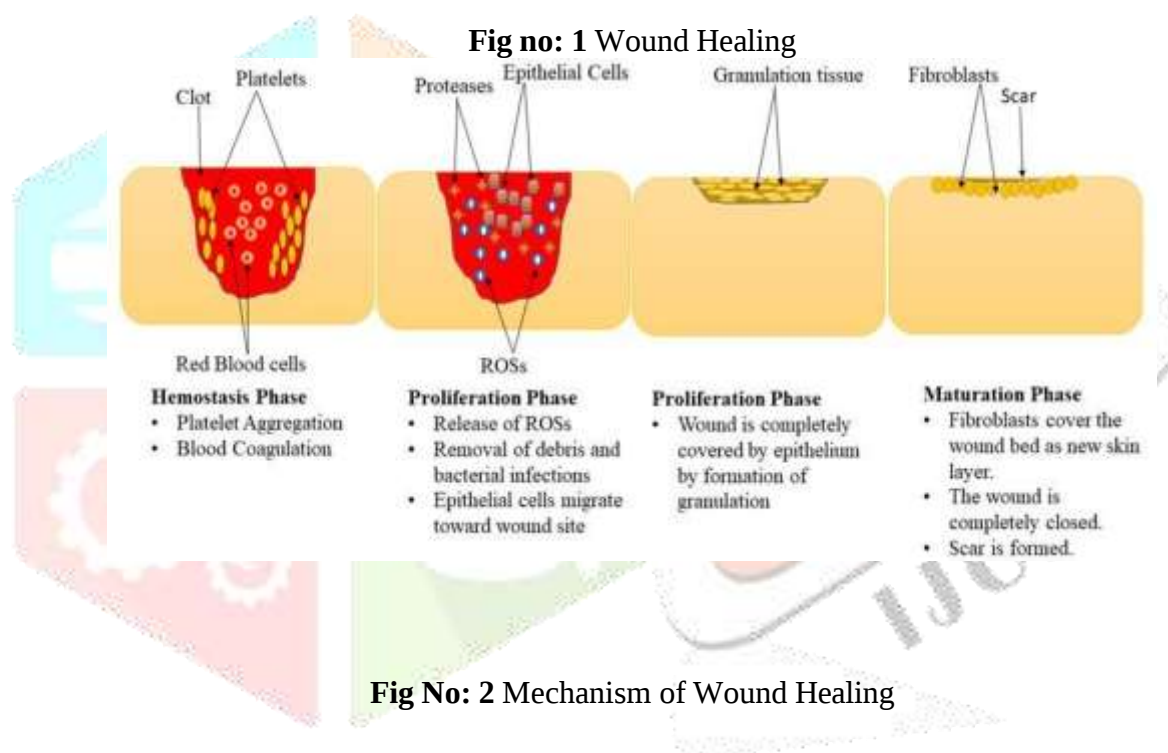


Fig No: 2 Mechanism of Wound Healing

Mechanism of wound healing process:

Wound is any damage or injury or break in the surface of the skin tissues. Wound healing mechanism: process of wound healing is divided into four stages that is:

- 1) **Hemostasis phase:** Hemostasis is the first stage of wound healing. This stage is responsible to stop the bleeding. After injury or any kind of damage repair system activates. Platelets accumulates at the site of infections which is responsible for formation of blood clot. Fibrinogen is responsible for clot formation
- 2) **Inflammatory phase:** This is the second stage of wound healing process. In this stage all the bacteria pathogens are removed from the wound. The first phase in inflammatory phase is macrophage. In this phase phagocytosis of pathogen takes place. This process is done by macrophages cells. The inflammatory phase shows

pain, redness, itching and swelling as a immune response. Also fibroblast cells takes part in this stage to secrete or make collagen fibers.

3) Proliferative phase: It is the third stage of wound healing process. This stage is also known as multiplication stage because multiplication of epithelial cells takes place at site of infection. Closure of wound takes place in this stage and appears pinkish in colour.

4) Maturation phase: This is the final stage of wound healing process. I this stage, fibroblast completely covers all the infected skin area. Formation of scar takes place in this stage

HUMAN SKIN

The top layer of the human body is its skin. The greatest organ of the integumentary system is the skin. The skin is made up of several layers of tissues that support the bones, ligaments, and muscles that lie underneath the skin's layer. Skin is incredibly vital for protecting the body. It protects the body from infections and minimizes excessive water loss. Temperature regulation, insulation, sensibility, vitamin D production, and vitamin B folate protection are some of the additional functions of the skin. Hairy skin and globous skin are the two main categories of skin. Because follicles are present, almost all skin seems to be hairless. Skin that has been damaged begins to regenerate or mend itself by generating scar tissues.

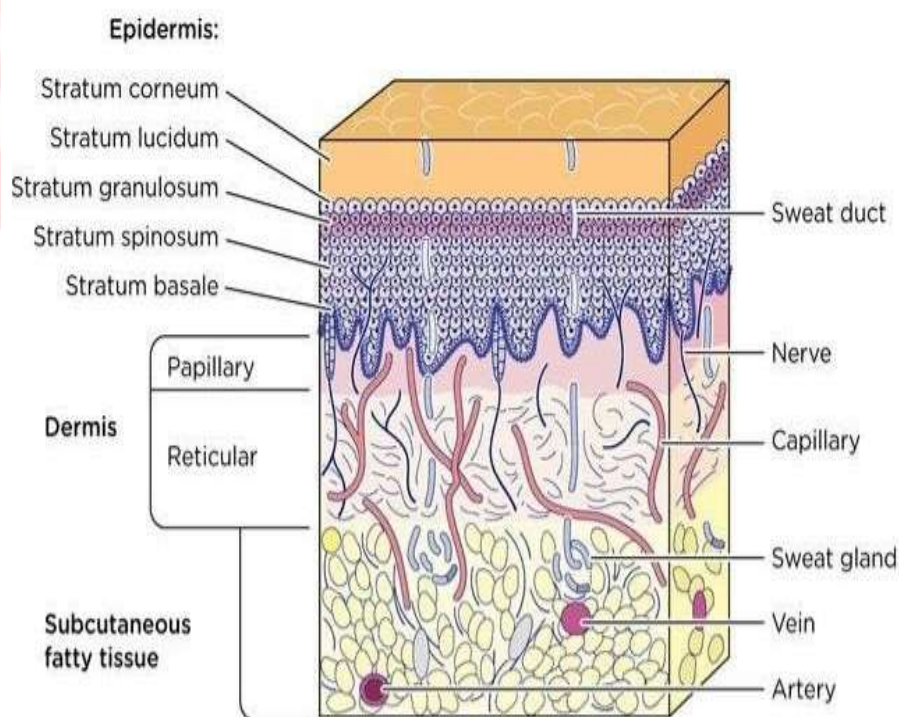


Fig no: 3 Sublayers of Epidermis and Dermis

SKIN COMPONENTS

Skin is made up of three layers that is dermis, epidermis and hypodermis. Epidermis is in addition divided into stratum basal, stratum spinosum, stratum granulosum, stratum lucidum and stratum corneum. In these layers, stratum basal is the deepest component of epidermis and stratum corneum is the most superficial portion. Stratum corneum layer helps to hold water in the pores and pores and skin and continues skin hydrated. Stratum basal helps in formation of new pores and pores and skin cells.

Dermis of pores and skin are divided into two layers I. Papillary dermis (located at higher layer of dermis) and reticular dermis (lower layer of dermis). Papillary dermis are skinny in nature while reticular dermis is thick in nature. Dermis has blood vessels, sebaceous glands and sweat glands, nerves, hair follicles and different structures. [15,16,17]

FUNCTION OF SKIN

- 1) Provides a protective barrier against mechanical, thermal, physical injury and hazardous substances.
 - 2) Prevents loss of moisture.
 - 3) Reduces harmful effects of UV radiation.
 - 4) Acts as a sensory organ.
 - 5) Helps to regulate temperature.
 - 6) It is an immune organ which helps to detect infections.
 - 7) Production of vitamin D.
 - 8) Protecting against pathogens. Langerhans cells in the skin are part of the immune system.
 - 9) Storing lipids (fats) and water.
 - 10) Creating sensation through nerve endings that detect temperature, pressure, vibration, touch, and injury.
 - 11) Controlling water loss by preventing water from escaping by evaporation.
- Providing water resistance by preventing nutrients from being washed from the skin [18].

LITERATURE SURVEY

- 1) Pankaj M. *et. al.*, Chaudhari, Rupali B. Shimpi, Sachin M. Mahajan, Prakash H. Patil., *et al*, Synthesis and Characterization of Herbal Gel on using Plants Extract, In the present study, dried powdered Tulsi leaves, Neem seeds & Turmeric rhizomes were subjected to extraction with methanol. SNPs of all tree extract were prepared using standard method Confirmation & Characterization of silver nanoparticles were done by U.V. Spectroscopy. The most important application of silver and SNPs is as topical ointments to prevent infection against burns and open wounds.

- 2) Sharmin Akter *et al.* Dolan Das, Md. Ashraf Zaman Faruk, Sobrata Das, Md Rizwanul Islam Tuhin., *et al*, Comparative efficacy of neem and turmeric extracts as growth promoter in broilers, The aim of this work was to assess the effect of dietary supplement with neem (*Azadirachta indica*) and Turmeric (*Curcuma longa*) extract in drinking water as a growth promoter agent on growth performance in broiler.
- 3) Uzair Muhammad, Tariq Nawaz Khattak, Hazir Rahman., *et al*, effects of Neem (*Azadirachta indica*) seed and Turmeric (*Curcuma longa*) rhizome extracts on aphids control, plant growth and yield in okra, The present study was conducted to screen the extracts of Neem seed and Turmeric rhizome for pesticidal activities against okra pests (aphids: *Aphis gossypii*). Experiments were conducted in field with four plots. One plot was kept as a control (unsprayed) and one was sprayed with synthetic pesticides.
- 4) E Joeniarti, S Purwanti, S Hidayati and N Nurlina., *et al*, Mixed formula of neem leaves extract and curcumin as botanical insecticides for sustainable agriculture, The result of research showed that the mixed formula of the botanical insecticides containing neem leaves extract and curcumin caused mortality of bean pod sucking bugs in vitro significantly.
- 5) Vidhi Chhabra Rathi, Anshul Jain., *et al*, Evaluation of the efficacy of neem and turmeric in wound healing in orthodontic extraction sockets, Herbal extract therapy should be administered in extraction sockets though a larger sample size may reveal more comprehensive picture.
- 6) William N. Setzer, Miquel Martorell., *et al*, Turmeric has a long history of use as spice and food additive, widely used to ameliorate foodstuffs' palatability and storage stability through its specific yellow color, taste, and antioxidant potential. The evaluation of the turmeric rhizomes' organoleptic features revealed that they are yellowish in color, have an aromatic odor, and a slightly bitter taste.
- 7) Dr. Sakthivel M, Dr Mohammad Halith, the *Azadirachta indica* is a fast growing ever green popular tree found commonly in India, Africa and America. It has been used in ayurvedic medicine for more than 4000 years due to its medicinal properties. Neem is called 'arista' in Sanskrit a word that means 'perfect, complete and imperishable.
- 8) Wardatul Husna Irham, Rini Hardiyanti., *et al*, Traditional people of Sumatera Utara, Indonesia, mostly used *Curcuma Longa* Linn as a wound medicine. This research aims to see the wound healing bioactivity of *Curcuma Longa* Linn. Identify *Curcuma Longa* Linn content with the phytochemical screening; the displayed results contain alkaloid, terpenoid/steroid, phenolic, and saponin. FTIR analysis indicated the presence of secondary metabolite Alkaloid, Phenolic, Saponin and Terpenoid are the various of phytochemical compound that had therapeutic value at wound healing process.
- 9) Sanjay Balasaheb Bhawar, Sunil A Nirmal., *et al*, Formulation and evaluation of herbal ointment for wound healing activity, *Solanum nigrum* and *Argemone mexicana* are important medicinal plants in tropical and subtropical countries, widely used in folk medicine for wound healing. To prepare an herbal ointment from *Solanum nigrum* and *Argemone mexicana* extracts and evaluate it for wound healing activity.
- 10) Praveen Nasa, Hitesh Kumar, Pinki Phougat., *et al*, Formulation Development and Evaluation of

herbal Ointment For Wound Healing Activity, Wound healing is a challenging clinical problem which needs efficient wound management. Wound is a disruption of the typical anatomical structure and function of skin which can also leads to the organ damage. The wound healing can be divided into 4 major phases according to their mechanism of action i.e Hemostasis, Inflammation, Proliferation and Remodeling.

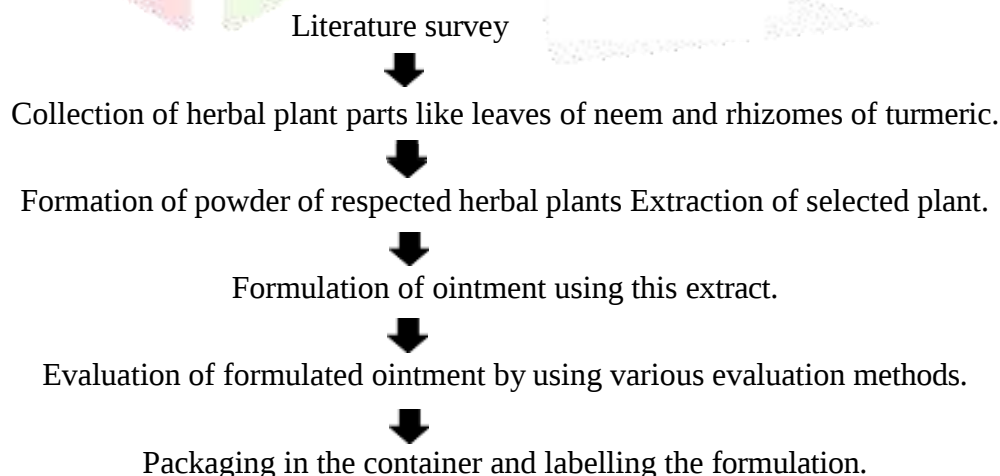
Aim & Objective

Aim: Formulation and Evaluation of herbal wound healing ointment

Objectives

1. To produce wound healing effect.
2. Incorporation of the medicament.
3. To decrease the pain.
4. prepare barrier for skin
5. To protect the wound from environment.
6. To protect the wound from soiling the body fluids or waste.
7. To immobilize the injured body part, promote wound healing.
8. To evaluate the compatibility and spreadability.
9. To avoid loss of water from skin.

Plan of Work



Selection of Herbal Plants:

1. Azadirachta indica:

- **Common name** – Neem
- **Family** – Meliaceae
- **Chemical constituents** – Tetranortriterpenoids, azadirachtin, diterpenes



Fig no: 4 Leave extract of Azadirachta indica

Azadirachta indica is many times referred to as neem and this plant has quite a number medicinal properties. Neem is particularly recommended for curing skin ailments. It is used to deal with pores and skin ailments like ringworm and scabies. Neem is a powerful insects repellent, antibacterial, antifungal, antiviral, anti-inflammatory. Neem is additionally used to support the ordinary immune response of body. Neem oil consists of fatty Acids which builds collagen, promotes wound recovery and maintains elasticity of the skin. The active ingredient of neem help in technique of wound healing and skin is capable to keep its suppleness as the wound heals. Neem gives moisture to the website of application and furnish soft texture to skin. [19,20]

Almost each of neem tree is considered for its therapeutic values has been used as traditional medicinal drug to deal with big vary of human troubles in view that ancient times. Antimicrobial activity of neem has appreciably been recognized [21,22].

CURCUMA LONGA

- **Common name** – Turmeric
- **Family** – Zingiberaceae
- **Chemical constituents** – curcuminoids, phenolic diarylheptanoids, curcumin, Mono desmethoxycurcumin, turmerone



Fig no: 5 *Curcuma longa*

Curcuma longa is typically known as turmeric and in Hindi it is considered as Haldi. *Curcuma longa* has antibacterial, antioxidant, antifungal and anti-inflammatory activity. The rhizomes of turmeric are used as an active part. Curcumin has outstanding anti-inflammatory and analgesic properties. [23]

Turmeric has been used to treat and heal wounds. Presence of vitamin A and proteins in turmeric results in early synthesis of collagen fibres with the resource of fibroblastic venture. Juice of turmeric rhizomes is generally utilized on the wounds for restoration purpose. [24]

Methodology:

Collection of plant material:

- 1) Leaves of neem were collected from the local area of Nashik.
- 2) Dried rhizomes of turmeric were purchased from the local market of Nashik.

Preparation of neem extract:

- 1) Leaves of neem were collected and dried under shade for about 7 days.
- 2) Dried neem leaves were powdered.
- 3) After that, extraction was done by Soxhlet extraction process 90% ethanol was used as a solvent for the extraction.

Preparation of Turmeric extract:

Dried rhizomes of turmeric were ground and powder obtained.

That powder was extracted with the help of Soxhlet extraction process same as above. 90% ethanol was used as a solvent for the extraction.

Formulation of ointment:**Table 1:** formulation of ointment base

Sr. No	Name of Ingredient	Quantity to be taken
1.	Wool fat	0.5 gm
2.	Cetostearyl alcohol	0.5 gm
3.	Hard paraffin	0.5 gm
4.	White soft paraffin	8.5 gm

Table 2: Formulation of Herbal ointment

Sr. No.	Name of Ingredient	Quantity to be taken
1.	Prepared neem extract	0.06 gm
2.	Prepared Turmeric extract	0.06 gm
3.	Ointment base	10 gm

Procedure for preparation of herbal ointment

- a) Initially ointment base was prepared by weighing accurately grated hard paraffin which was placed in evaporating dish on water bath. After melting of hard paraffin remaining ingredients were added and stirred gently to aid melting and mixing homogeneously followed by cooling of ointment base.
- b) Herbal ointment was prepared by mixing accurately weighed Neem and Turmeric extract to the ointment base by levigation method to prepare a smooth paste with 2 or 3 times its weight of base, gradually incorporating more base until to form homogeneous ointment, finally transferred in a suitable container.

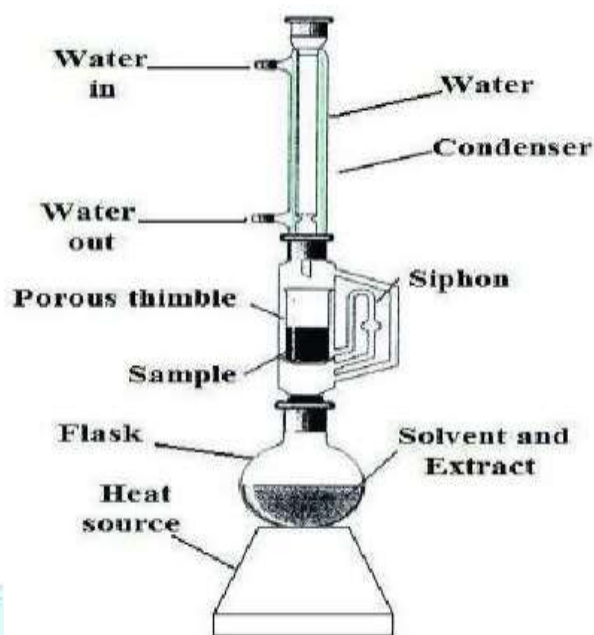


Fig no: 5 Soxhlet Apparatus

SOXHLET EXTRACTION

In this method, finely ground sample used to be placed in the porous bag or 'thimble' which is made from strong filter paper or cellulose. Extraction solvent that is ethanol used to be heated in the round bottom flask, vaporizes into the pattern thimble, that vapors have been condenses in the condenser and drip back. When the liquid content reaches the siphon arm, the liquid content emptied in the flask as soon as more and this system used to be continued. The final ethanolic extract used to be once collected.

FORMULATION OF OINTMENT BASE

Initially ointment base used to be equipped with the useful resource of weighing accurately grated challenging paraffin which was positioned in evaporating dish on water bath. After melting of challenging paraffin last ingredients were brought and stirred gently to beneficial resource melting and mixing homogeneously discovered by cooling of base.

FORMULATION OF HERBAL OINTMENT

Herbal ointment was prepared by mixing accurately weighed neem and turmeric extract to the ointment base by levigation method to prepare a smooth paste with 2 or 3 times the weight of base, gradually incorporating more base until to form homogeneous ointment. Finally transferred suitable container.



Fig no: 6 Levigation Method

EVALUATION OF OINTMENT

- 1) Physical evaluation of the formulation: The formulation was inspected visually for their appearance, colour and odour.
- 2) Washability: A little amount of product was applied on skin and the washed it to check its washability.
- 3) Irritancy: The ointment was evaluated for primary skin irritation test
- 4) Consistency: Smooth and no greediness is observed.
- 5) Spreadability: The spreadability was determined by placing excess sample on the slide and another slide was placed on that. The distance travelled by product was the spreadability.



Fig No: 7 Spreadability Test

RESULT

Sr. No.	Physicochemical parameters	Observations
1.	Colour	Yellow
2	Odour	Characteristic
3	Spreadability	6 cm
4	Washability	Good
5	Irritancy	Non irritant
6	Consistency	Smooth
7	pH	5 to 6



Fig no: 8 pH determination



Fig no: 9 Prepared Herbal Ointment

SUMMARY & CONCLUSION

The anticipated objective of current work used to be to formulate and evaluate ointment for wound healing. Although various kinds of ointments are regarded for wound recuperation but these are nonetheless seeming to be constrained in charge of tissue regeneration. Plants are more powerful healers due to the fact they produce repair mechanism in herbal way.

In the present study, skin wound healing ointment used to be prepared with the aid of the use of herbal vegetation such as Azardirachta indica and Curcumin longa. Various formulation was prepared by way of varying the quantity of excipients such as wool fat, cetostearyl alcohol, hard paraffin, white soft paraffin etc. The ointment for wound healing used to be successfully developed and that meet the relevant pharmaceutical characteristics. Parameters like stability, spreadability, washability, visible appearance, irritancy, pH were evaluated via a number method. So, it can be concluded that it is possible to increase medicament containing herbal extracts and can use as a barrier to guard skin.

From the ancient time Neem and Turmeric is used for their various medicinal properties like antibacterial, antifungal, anti-inflammatory etc. Thus, this ointment could become a media or use these medicinal properties

effectively and easily as a simple dosage form. The prepared ointment was pleasant easily spreadable and washable thereby there is chance of increase the patient compliance. The activity may be due to anti-inflammatory effect of the curcumin

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