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Formulation and Evaluation of Herbal Cream having Wound Healing Potential

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Abstract

A wound is a break of living tissue's biological, anatomical and functional decency created by the physical, chemical, electrical or microbial warning to the tissues. Wound healing is defined as a complex process occurring by regeneration of damaged tissues. The normal response to wound healing is concerted sequence of events that begins with an small or big injury. Wound healing agents support the natural healing process, reduce trauma and likelihood of secondary infections and hasten wound closure. Various studies have been done to access the wound healing potentials of plants. Plant extract that have been used in most of those studies have shown comparable efficacy with respect to positive controls used. This study aimed at formulating and preparing a herbal ointment establishing the quality, wound healing efficacy and toxicity profile of the prepared herbal ointment. Methanolic extracts of leaves of the study plan were prepared. Standard test for ointment quality and microbiological stability were done. An experimental controlled study was carried out to determine the efficacy of drug which appears specific colour with determined surfaces. the plants had the fastest rate of wound reduction, and the shortest epithelialization and healing times compared to the other treatment.

Keywords: Wound healing, tissues, herbal ointments, methanolic extract.

Introduction

Wound may be described as a disruption of the everyday cellular, anatomical, and useful continuity of a structure. Thus, wound recovery is a complicated technique has been goals to restore the structural and useful integrity of the wounded tissue. Wound recovery may be divided into three stages, inflammation, proliferation, remodeling and maturation stages which concerned the interplay of numerous cells, cytokines, and growth factors.

In a few pathological issues like diabetes mellitus, renal failure, malnutrition, wound recovery is substantially impaired. In diabetic patients, the incidence of diabetic foot ulcers become 4–10% and the remedy of foot ulcers are highly-priced and extensive. Previous studies examine has proven that unfastened radical inhibits the wound recovery technique. Thus, the wound recovery technique may be accelerated through the usage of antioxidants.

Herbal drug treatments were taking part in revitalization amongst customers everywhere in the world. There are masses of medicinal plant life which have long records of healing homes towards numerous illnesses and ailments. However, screening of herbs for his or her interest could be very essential and needs vital interest which will recognise the price of the herbs.

Recently, studies has targeted on using herbal antioxidants like a natural extract on wound restoration. The useful results of herbal supply

on wound restoration have specifically been studied the use of animal models. Oral and topical software of herbal supply has been proven to beautify restoration in diabetic, open and closed wound animal models. The topical software of herbal supply become extra powerful in accelerating wound restoration compared to oral administration. Honey is one of the oldest recognised medicines. Some powerful methods, including recombinant been valued exceedingly withinside the Middle East and have been stated withinside the Holy Quran considering that 1436 years ago. It has been used for the remedy of respiration illnesses, urinary illnesses, gastro intestinal illnesses and pores and skin illnesses including ulcers, wounds, eczema, psoriasis and dandruff [1].

Honey reduces inflammation, edema, and exudation promotes restoration, diminishes the scar length and stimulates tissue regeneration [2-4]. The basis of the use of beeswax withinside the combination becomes derived from the commentary that beeswax has antibacterial homes 5. One such ability burn dressing is olive oil, which become decided on for numerous reasons: while destruct of the pores and skin happens, as occurs with burns, one of the first reactions of the cells withinside the stratum corneum is to secrete fatty acids have been ordered to repair the permeability barrier [6, 7]. On the alternative hand, they may be extra proof against oxidative stress, which happens withinside the burn area, than polyunsaturated fatty acids. Finally, fatty acids have antimicrobial homes 8, which can probably lessen wound contamination. Olive oil additionally incorporates and phenol compounds including hydroxytyrosol, tyrosol, oleuropein, 1- acetoxypinoresinol and (+)-pinoresinol, which are recognised to have effective antioxidant ability [9-10].

Wounds are bodily accidents that bring about a gap or breaking of the skin. Proper restoration of wounds is essential for the recuperation of disrupted anatomical balance and disturbed practical repute of the skin. Repair of injured tissues takes place as a series of events, which incorporates irritation, proliferation, and migration of various mobileular types. The irritation degree starts without delay after injury, first with vasoconstriction that favours homeostasis and releases irritation mediators. The proliferative segment is characterized via way of means of granulation tissue proliferation shaped specially via way of means of fibroblast and the angiogenesis process.

The transforming degree is characterised via way of means of reformulations and development in the additives of the collagen fibre that will increase the tensile strength. Factors that make contributions to causation and perpetuation of the chronicity of wounds encompass repeated trauma, negative perfusion or oxygenation, and immoderate irritation Imbalance in loose radical generations and antioxidants has been determined to result in oxidative pressure and tissue harm and not on time wound restoration. Therefore, elimination of ROS can be an vital approach in restoration chronic wounds. Bacopa monniera (BM, Scrophulariaceae) referred to as water hyssop is a prostrate herb, usually located in moist or marshy habitats and alongside the flow and river margins throughout India. The Charaka Samhita considers BM (Synony) as medhya rasayana and Ayurvedic texts endorse using BM in ascites, enlarged spleen, indigestion, irritation and leprosy, and so on and, as a result, researchers have evaluated its sedative and tranquillizing, cognition, antidepressant and antianxiety, antiepileptic, antioxidant and adaptogenic, antiulcer, and anti-Helicobacter properties. Recently, alcoholic extract of Bacopa monniera and its remoted constituent Bacoside-A have been screened for wound restoration interest via way of means of excision, incision, and lifeless area wound on Swiss albino rats and have been located to enhance wound restoration in phrases of boom in tensile strength, wound epithelization, and connective tissue formation .The gift look at was, therefore, undertaken to do an intensity look at the wound restoration sports of ethanol extract of complete plant of Bacopa monniera in incision, excision, and lifeless area wound fashions in rats while given via way of means of oral route.

Material and Method

Plant material

The leaves of Grewia asiatica for proposed work were collected from forest of Mala

(Pilibhit) in the month of October 2022. The leaves of Abutilon indicum have been collected from Agra in same month. The leave of Aloe vera is collected from department of pharmacy MJPRU Bareilly and authenticated in the department of Plant science of MJPRU Bareilly. A voucher specimen is preserved in herbarium section of Plant science department of MJPRU Bareilly, India and crude drug sample was preserved in the Department of pharmacy, MJPRU Bareilly. The whole plant material was dried under shade and mechanically reduced to moderate coarse powder and stored in air tight container for further use in extraction process.

Preparation of plant extract

The powdered material of Grewia asiatica has been extracted successively with methanol solvent to obtain aqueous extract of this plant by using Soxhlet apparatus. The powdered material of Abutilon indicum has been extracted successively with methanol solvent to obtain aqueous extract of this plant by using Soxhlet apparatus.

Formulation of herbal cream [Dermal healed cream (DHC)]

The component of oil stage (A) turned into melted in a beaker via way of means of the use of water bath on strong stirring on 50°C. The Components of aqueous stage (B) have been blended collectively and warmed to approximately identical temperature of oil stage (50°C.). The preservative methyl paraben and propyl paraben have been delivered into aqueous stage and heated . Then oil stage turned into delivered to water stage step by step on strong stirring. Aqueous extracts of every plant have been blended with uniform stirring withinside the formulated cream base. Water turned into delivered in the end and blended.

The composition of formulated herbal cream is given in table.

	Ingredients	**Qty.% w/w**
Oil Phase	Stearic acid	1%
	White Beeswax	5%
	Cetyl alcohol	3%
Aqueous Phase	Propylene glycol	5%
	Glycerine	4%
	Methyl Paraben	0.5%
	Propyl Paraben	0.5%
	Water	Upto 100%
Plant Extracts	Abulitonindicum	5gm
	Aloe barbadesis	5gm
	Grewia asiatica	5gm

Evaluation of DHC

pH 1.0 g cream was weighed and dispersed in 100 ml water. Using a digital pH meter, the pH of the dispersion was calculated. The pH meter was calibrated before use with a standard buffer solution at 4.0, 7.0 and 9.0. The readings of pH were done in triplicate and average values were calculated.

Spreadability: One of the important criteria for a topical formulation is that it should possess good Spreadability. It is the term used to denote the extent of the area to which formulation readily spreads when applied to the skin or affected part. The therapeutic efficacy of a formulation depends upon its spreading value. To determine the Spreadability

Experimental animals

All the experiments were carried out using female Albino wistar rats weighing between 100-150 gm. All the experimental procedure and protocol used in this study were reviewed by the Institutional Ethical Committee and were allotted the no. MJPRU/PY/IAEC/22/16. All animals were housed in polypropylene cages and maintained under standard laboratory conditions. Animals were housed at a temperature of 24±2□C and relative humidity

of 60-70%. A minimum of 6 animals were used in each group.

Excision Wound Model

An excision wound has been inflicted through reducing away a 200 mm2 complete thickness of pores and skin from a predetermined shaved area. Rat's wound has been left undressed to the open. The cream base, standard drug cream (0.1% Silver sulfadiazine) and formulated natural cream has been carried out topically to the control batch, standard batch and treated batch respectively until the wound became absolutely healed. In this recovery assessment model, wound contraction and epithelialization length has been monitored. Wound contraction has been measured as percentage contraction in every four days after wound formation.

Result

Evaluation of Dermal Heal Cream [DHC]

The pH was found to be neutral pH, thus the formulations can be used without the risk of skin irritancy. By the results, we can infer that the selected ingredients for cream formulation did not alter the pH of the formulation. The values of Spreadability for DHC were found out to be 8.4, 8.5, 8.6 cm indicating that the cream is easily spreadable by less amount of shear. The results concluded that the formulation can be applied easily without being runoff. This assures that the formulation maintains a good wet contact time when applied to the targeted site. DHC formulations were good in appearance and homogeneity.

Excision wound model

In this excision wound model, the wound was measured. The mean area of wound heal on 7th day in the control group was 3.97±78 mm and in the standard, it was 3.40±0.30 mm. After 21st day the mean area of Dermal heal cream treated group was, it has a highly significant effect.

S.No.	No. of Days	Control	Standard	Dermal healed cream(DHC)
1.	1st	4.00mm	4.00mm	4.00mm
2.	7th	3.97±0.78mm	3.40±0.3mm	3.50±0.2mm
3.	14th	3.25±0.69mm	2.18±0.15mm	2.24±0.32mm
4.	21st	2.95±0.18mm	0.97±0.32mm	1.00±0.12mm
5.	28th	2.19±0.24mm	Full Healed ±	Full Healed

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