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Review on Herbal Skin Cream for Wound Healing in Diabetic Patients

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Abstract: *Diabetic mellitus is a heterogeneous group of disorders or chronic metabolic disease characterised by hyperglycemia due to an absolute or relative deficit in insulin production or action. In diabetes, high blood sugar can cause blood vessels to reduce blood circulation, reduce oxygen and nutrient supply to injured site and affect wound repair. This study investigates the efficacy of a herbal wound healing cream formulated with natural ingredients known for their therapeutic properties including Aloe vera, turmeric, tulsi, neem. The cream was applied to diabetic ulcers over a period of four weeks. In review, the cream is for the diabetic patients to cure the wounds. Herbal wound healing cream in diabetic patients act as a antibacterial, anti-fungal, anti microbial, anti-inflammatory which cure the wounds or injuries in diabetic patients. The review of this would healing cream to formulate or evaluate the cream for diabetic patients from herbal products. In diabetic patients, the sugar level increase or decrease and then injuries can occurs and these herbal cream cure wounds. In review, herbs collected and mix in each other and by adding other excipients like bees wax, liquid paraffin, borax, methyl paraben, rose water, colouring agents, etc to make cream for diabetic patients. Key parameters measured included wound size reduction, infection rates and healing time. The finding suggests that the herbal cream may be a promising in diabetic patients. From study, it can be inferred that creams containing herbal extracts with wound-healing properties can be created and used to provide a skin barrier.*

Keywords: Wound healing, diabetes, herbal cream, antibacterial, aloe vera, turmeric, antioxidant

I. INTRODUCTION

Creams are semisolid dosage forms which can be applied topically on skin. Creams are oil-in-water (o/w) or water -in-oil (w/o) type.[1]They have a functional as well as an aesthetic purpose. These devices are pharmaceutical delivery systems used to treat cutaneous illnesses, and the skin is intended organ.The cream, formulated with natural ingredients known of their anti-inflammatory, anti-microbial and regenerated properties, was applied to diabetic ulcer over a specified treatment period.

Wound healing is a complex biological process that consist of hemostasis, inflammation, proliferation and remodelling. It is complex process, especially when compared by local and systemic factor. These herbal cream may serve as an effective adjunct therapy for enhancing wound healing in diabetic patient, promoting faster recovery and potentially reducing the risk of complications associated with chronic wounds.

Even when several kinds of cream are taken into consideration for wound healing, their rate of tissue regeneration still seems to be restricted. Creams helps to prevents infection and promotes healing. There are many types of antibiotic creams for diabetes that can be used for diabetic wound care.World Health Organization (WHO) as well our country has been promoting traditional medicine because they are less expensive, easily available and comprehensive, especially in developing countries.[2][3] Whole world including the developed country recognizes the relevance of traditional medicine and has treatment plans, standards and standard for ethnomedicine.[4][5]

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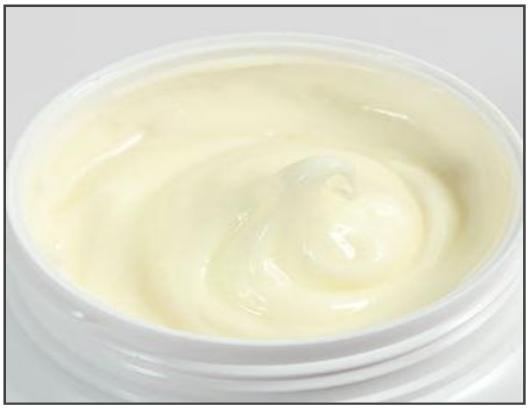

Fig.1. formulation of herbal wound healing cream

After through review of Ayurvedic and Homoeopathic system of medicines, the following herbs to formulate cream for wound healing –

- Aloe vera(treat burn wounds).
- Tulsi(promote wound healing & glow to skin)
- Turmeric (cure wounds)
- Neem(reduce redness,itching)
- Tea tree oil (used as oil)

Aloe vera gel is applied as a moisturiser, used to heal burn wounds, and used to lessen acne and pimples.[6][7] Neem is applied topically to minimise scars, pigmentation, redness, and itching of the skin in addition to its antifungal and anti-inflammatory properties.[1] [8]Tulsi is utilised to improve wound healing and skin radiance.[9]

Herbal medicines for Wound Healing:

Aloe vera :

Fig.2. Barbadensis Miller

Biological name:- Aloe Barbadensis Miller
Biological source:- Aloe barbadensis Miller or Aloe[10]
Family:- Asphodelaceae
Appearance:- pea- green,shrubby or arborescent, perennial, xerophytic
Chemical constituents:- minerals - Calcium, copper, chromium, sodium and zinc.

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Other - chromone, phenyl pylpyrone derivatives, flavonoids, lipids, lignins, saponins and proteins.[11]

Uses:- 1. It is used as alternative medicine.
2. Used in cosmetics.
3. Reducing dental plaque
4. Preventing wrinkles
5. Managing blood sugar

Aloe vera was found to be beneficial in accelerating wound healing and raising diabetic foot ulcer healing rates.[12] Aloe vera extract accelerated wound healing in diabetics, and research suggests that aloe vera therapy may be helpful for many stages of wound healing, including fibroplasia and collagen development.[13]

Mechanism of action:

In diabetic people, aloe vera decreases blood glucose levels. Additionally, it increases the body's tissues' receptivity to insulin, increasing the drug's efficacy. Aloe vera's active ingredients also assist in decreasing high blood pressure.[14]

Turmeric :

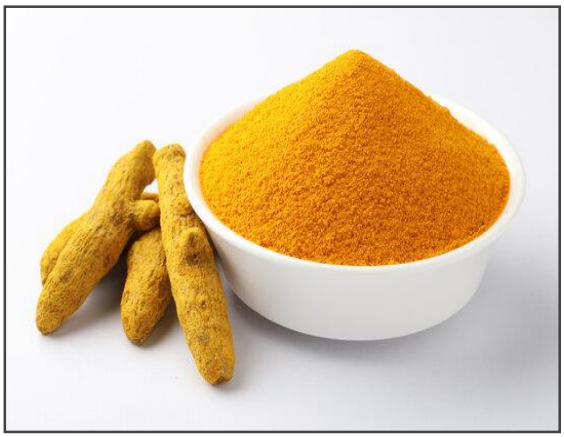

Fig. 3. Curcuma longa

Biological name:- Curcuma longa
Biological source:- rhizome (underground stem)[15]
Family:- zingiberaceae, the ginger family
Appearance:- Turmeric is a spice that comes from root of plant & has a bright, orange - yellow colour.
Chemical constituents:- Camphor, cineole, estragole, eugenol, germacrene, caryophyllene, and bisabolene
Uses:- 1. Used to cure wounds
2. Spice, dye, flavour , traditional medicine
3. Used as antibacterial agent.[16]

It scientifically knowns as Curcuma longa.The yellow hue is caused by curcumin, a medicinal substance found in it. The studies linked these outcomes to curcumin's antioxidant and anti-inflammatory properties.[17]The capacity of curcumin to suppress inflammation is one of the mechanisms by which it aids in wound healing in diabetics.The researchers came to the conclusion that curcumin might be a useful therapeutic agent for the treatment of diabetic wounds.[18]

Mechanism of action:

The hypoglycemic action of curcumin is its most valuable therapeutic beneficial.[19] The major pathophysiology of Diabetes mellitus is insulin resistance when there is little or no biological effects on tissues or cells for insulin.[20] The antimicrobial activity of curcumin aids in the healing of wounds. It has been demonstrated that curcuminoids have strong anti-inflammatory, anti-oxidant, anti-carcinogenic, anti-coagulant, anti-effective, and anti-diabetic properties.[21][22][23]

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Tulsi:

Fig.4. Ocimum tenuiflorum

Biological name:- Ocimum tenuiflorum
Biological source:- Tulsi is made from fresh and dried leaves of Ocimum sanctum and Ocimum basilicum plants.[24]
Family:- lamiaceae
Appearance:- It is a erect, much branched sub- shrub 30-60 cm tall,with simple opposite green or purple leaves.
Chemical constituents:- Camphor, cineole, sentragoal, eugenol, germacrene, caryophyllene, and bisabolene
Uses:- 1. Antiseptic, antiviral, and antibiotic
2. Help cure wounds and infections
3. Acne prevention and stress reduction.[25]

Tulsi's antimicrobial properties imply that it's utilised in lotions for treating wounds. This activity involves fighting a variety of diseases that affect both humans and animals. It works to support the ageing of good skin.

Mechanism of action:

In streptozotocin-induced diabetic rats, ocimum sanctum L. significantly lowers blood glucose, glycosylated haemoglobin, and urea while concurrently increasing glycogen, haemoglobin, and protein levels.[26]

Neem :

Fig.5. Azadirachta indica

Biological name:- Azadirachta indica
Biological source:- Neem is a natural plant material from the neem tree, Azadirachta indica.[27]
Family:- Meliaceae, mahogany family

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Appearance:- Neem is a fast- growing tree that can reach heights of 20-23 metres, with a straight trunk that's 4-5 feet in diameter.

Chemical constituents:- Azadirachtin, limonoids, polyphenolic flavonoids, alkaloids, saponins.

Uses:- 1. Neem has insecticidal properties and neem oil is extracted from its seeds and fruits.

2. Antibacterial and antifungal properties

Scientifically knowns as Azadirachta indica. The presence of bioactive substances including flavonoids, triterpenoids, and polysaccharides in neem, according to the researchers, is responsible for these effects.[28] The processes that underlie the anti-inflammatory, antibacterial, antioxidant, and immunomodulatory qualities of neem leaf in diabetes patients' wound healing activity.Neem oil's antibacterial qualities were particularly helpful in treating and preventing infections that are frequently linked to diabetic wound.[29]

Mechanism of action:

In diabetic rats, azadirachta indica dramatically lowers blood glucose levels by day fifteen.[30]Another noteworthy study revealed that Azadirachta indica leaf extracts had strong antidiabetic properties and may be used to treat diabetes mellitus.[31]

II. MATERIALS AND METHODS

TABLE 1:Formula[32]

Sr.no	Ingredients	Quantity taken	Roles
1.	Aloe vera	7 g	Anti-aging, reduce acne
2.	Turmeric	1 g	Antiseptic and anti-inflammatory
3.	Tulsi	1 g	Antibacterial, add glow to face
4.	Neem	2 g	Antibacterial and antifungal
5.	Bees wax	2 gm	Emulsifying agent
6.	Liquid paraffin	18.1 ml	Lubricating agent
7.	Borax	0.36 gm	Alkaline agent
8.	Methyl paraben	0.03 gm	Preservative
9.	Distilled water	q.s	Vehicle
10.	Rose water	q.s	Fragrance

MATERIAL USED:

Excipients used Bees wax, Liquid paraffin, Borax, Methyl paraben, Distilled water, Rose water.[33]

INSTRUMENTS:

Soxhlet apparatus, Mixer grinder, Breaker, Stirrer, Funnel, Tripod stand, Incubator, Test -tube, Petri plate, Autoclave, PH metre, heating mental, etc.[33]

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METHODS:

Collection of plant material-

Gathering of plant specimens Aloe vera, turmeric, neem and tulsi were picked from the nearby botanical park. Rhizomes are harvested when their concentration of chemical ingredients is maximum and they have a enough quantity of reserve food.[34]

Extraction process

Preparation of aloe vera extract :

Select a mature, fresh leaf off the Aloe vera plant, then give it a quick wash with distilled water. It is dried in a hot air oven. Cut the leaf longitudinally. Semi-solid aloe vera is harvested. After removing the fibres and impurities, aloe vera extract is produced.[35]

Preparation of turmeric extract:

In a 250 ml volumetric flask, heat 1 g of turmeric powder with 10 ml of distilled water for 5 to 10 minutes at 80°C to 100°C. Turmeric extract is created once it is filtered.

Preparation of tulsi extract:

The tulsi leaves were collected, washed with distilled water, and then baked with hot air. After the leaves were thoroughly dried, they were crushed up. Next, 1 gm of tulsi leaf powder and 10 ml of dimethyl sulfoxide were added to a volumetric flask. Prior to being filtered through filter paper and tulsi leaf extract, the solution was heated to a boil in a water bath between 80°C and 100°C for five to ten minutes.

Preparation of neem extract:

Neem leaves were collected and cleaned with distilled water and dried in hot air oven. Leaves were pulverised once they had properly dried. Next, 5g powdered neem leaves at 80–100 degrees Celsius. A volumetric flask containing dimethyl sulfoxide was placed on a REMI RSB-12 mechanical shaker and agitated for three days. After heating the mixture to between 80 and 100 °C on a water bath, it was concentrated to a volume of 20 millilitres and filtered through muslin fabric to eliminate any remaining contaminants. Next, the preparation was done using the filtrate, or filter product, which is a clear solution or clear extract of neem leaves.

FORMULATION OF CREAM:

1.Heat bees wax and liquid paraffin to 75°C in a borosilicate glass beaker.
2.In a different breaker, dissolve borax and methyl paraben in distilled water while keeping the water bath at 75°C.
3.The aqueous phase of solution should be agitated with a glass rod until all solid particles are dissolved.
4.While allowing to mix, slowly pour the heated aqueous phase into the heated oily phase. After mixing the first two steps, immediately add the aloe vera, turmeric, tulsi, and neem extracts.
5.Blend with the glass rod until a smooth cream forms. Once the cream has formed, add the rose oil for scent.[36]

In vitro evaluation of herbal cream

Skin irritation test:

In order to assess the cream's safety, experimental animals were used for the primary skin irritation test.

Evaluation of Cream:

1. Physical evaluation:

This test involved observing the cream's colour, odour, texture, and condition.

2.pH:

A digital PH metre was used to measure the pH after 0.5 g of cream had been distributed in 50 ml of distilled water.

EVALUATION PARAMETERS:

1 Organoleptic features:

Colour, smell, and appearance were all noted as organoleptic features.

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2. pH determination:
A digital pH metre was used at room temperature to measure the pH of a freshly produced emulsion.

3. Establishing homogeneity:
Both touch and visual inspection were used to assess the herbal preparation's homogeneity.

4. Determination of spread ability:
The region to which the topical treatment spreads after being delivered to the skin's afflicted area is referred to as

5. Washability: Formulation was put on the skin and then ease extend of washing with water and checked

III. RESULTS AND DISCUSSION

pH of skin is in between 4.7 to 5.75. The extracts of herbs turned into the cream by adding the excipients. The resulting cream were analysed and evaluation parameters were mentioned. The wound healing cream is made up from extraction process of herbs. Thus the study proves the diabetic effects of cream.

IV. CONCLUSION

This herbal skin cream is better than the marketed creams.It gives better response in less time because it is better than the allopathy or marketed products. In this use the pure extracts of the herbs. In diabetic patients it acts as a antibacterial, antifungal or antimicrobial as a wound healing cream. It cures the wounds in diabetic patients in less time because in this use pure extracts. It concludes that there is no any side effects occurs. The produced herbal cream has best qualities using less chemicals to protect the skin from wounds. The results of various cream test indicated that the formulation may be applied topically to shield skin from wound healing.

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