

Preparation and Evaluation of Wound Healing Cream of Tridax Procumbens

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Abstract: *Tridax procumbens*, commonly known as coatbuttons or tridax daisy, is a species of flowering plant in the family Asteraceae. India's fields are home to a prevalent weed called *Tridax procumbens*. Ancient ages have long utilized the leaves of *Tridax procumbens* to cure wounds. The mature leaves were crushed to make a paste and were further rubbed over the wounded area. They are also used as anticoagulant, antifungal and insect repellent by many civilization. *Tridaxprocumbens*linn. Strongly proved for its anti-inflammatory and analgesic activity in animal study and it is also used to treat boils, blisters and cuts by local healers in parts of India. This ongoing study aims to evaluate this wound-healing activity and further formulate an herbal cream from the paste/extract of *T. Procumbens*. The extraction process involved isolating bioactive compounds from the aerial parts of *Tridax procumbens*, followed by phytochemical screening. The herbal extract was then incorporated into a cream base, ensuring optimal consistency, stability, and pH suitable for dermal application. The formulated cream underwent rigorous evaluation for its physical properties. This formulation holds promise as a natural, effective alternative to synthetic topical agents, warranting further clinical studies to confirm its efficacy and safety for various dermatological application

Keywords: *Tridax procumbens*, Phytochemicals, Bioactive Compounds, Qualitative Analysis, Quantitative Analysis, Wound Healing Properties, Herbal Cream

I. INTRODUCTION

Cream: Creams are defined as “viscous liquid or semi-solid emulsions of either the oil-in-water or water- in-oil type” dosage forms which consistency varies by oil and water.

Wound: An injury to live tissue on upper layer of skin's epithelial integrity is referred to as a wound .

According to World health organization (WHO) wounds can cause the skin system of open up or break down, which can further cause disruption to anatomy, physiology and function of skin .to restore the protective barrier of skin and region the strength and volume of injured tissue healing is important. One of the primary function of wound healing is to restore the protective epithelial barrier for the compromised functional state and broken anatomical continuity to be restored wounds must heal properly .The most beneficial wound healing techniques are those that minimize tissue damage, maximize tissue perfusion, debride nonviable tissue, and create a moist wound healing environment . Therefore, when given topically, a medication that promotes vascularization, collagenation, and re-epithelization is expected to work best.

Dermal wound is a common pathologic condition and may be defined as any break in the integrity of the skin. It is associated with high degree of morbidity due to blood loss, pain, edema, inflammation and loss of functionality. Cutaneous wound are characterized by migration and proliferation of fibroblasts, endothelial and epithelial cells, deposition of connective tissue, angiogenesis, re-epithelization, and finally contraction of wound.

Why wound healing is needed?

Proper healing of wounds is essential for restoration of disrupted anatomical continuity and disturbed functional state. Impaired healing of open wounds is one of the troublesome complications that have been recognized for many years. It is debatable, whether systemic drugs can hasten healing in a nutritionally and endocrinally normal individual. In such cases, the basic principles of wound healing that include minimizing tissue damage, debriding nonviable tissue, maximizing tissue perfusion and oxygenation, proper nutrition, and a moist wound healing environment prove to be

most useful. Thus, a drug that can enhance vascularization, re-epithelization, and collagenation, when applied topically, should prove ideal.

Tridax procumbens: Plants are a good source of novel bioactive molecules with therapeutic potential. There is a plethora of pharmaceutically important molecules, but only a small percentage of plants have been explored for their phytochemical constituents .

T. procumbens possesses a wide spectrum of biological activities. The ethyl acetate extract of this plant showed strong allelopathic and larvicidal activities . In pharmaceutical activities, methanol and ethanol extracts exhibited anti-hyperglycemic , anti-fungal , anti-leishmanial and hepatoprotective activities , while ethyl acetate extract exerted anti-inflammatory, anti-cyclooxygenase, and antioxidant activities . The acetone extract of this herb obtained anticoagulant, anti-hepetic, antibacterial activities

Tridax procumbens is said to possess a high concentration of bioactive substances, Such as tannins, alkaloids, flavonoids, and saponins which are responsible for its therapeutic qualities. These compounds are thought to be responsible for the plant’s medicinal properties. Tridax procumbens extracts are frequently used in herbal formulations because of their antimicrobial and wound-healing properties, which makes them useful in topical creams and ointments Intended to treat cuts, wounds, and skin infections. Furthermore, the plant’s antioxidant and anti-inflammatory qualities are utilized in tinctures and health supplements to fight oxidative stress and lessen inflammation.

The versatility of Tridax procumbens in these various products underscores its importance in natural and herbal medicine. As these properties came into notice and gained importance, there Is a need to research and develop new herbal medications to improve patient compliance and acceptance. Therefore, the primary goal of the current study is to create and assess an herbal cream that has numerous applications including antimicrobial, anti-inflammatory, and wound healing .



Fig.1 Tridax procumbens leaves

Classification of Tridax procumbens(table no. 1)

Division	Classing
Kingdom	Plantae
Sub-kingdom	Tracheobionta
Division	Spermatophyta
Sub-division	Magnoliophyte
Class	Magnoliopsida
Sub-class	Asteridae
Order	Asterales
Family	Asteraceae
Genus	Tridax
Species	Tridax procumbens

II. LITERATURE REVIEW

1. Antidiabetic activity

Bhagwat D. A. Et al., 2008 – Dried aqueous, alcoholic, and petroleum ether (60- 80°C) extracts of leaves of *Tridax procumbens* were subjected for hypoglycaemic activity in Wistar rats (150-200 g). Blood sugar level was determined using digital glucometer. Experimental studies reveal that the aqueous and alcoholic extracts from *Tridax procumbens* leaves (200 mg/kg) orally administered for 7 days produced a significant decrease in the blood glucose level in the model of alloxan-induced diabetes in rats. Petroleum extract exhibits weak anti-diabetic activity. It also proves the traditional claim with regard to *Tridax procumbens* for its anti-diabetic activity.

2. Analgesic and anti-inflammatory activity

Prabhu V. V. Et al., 2011 – Lyophilized extract of *Tridax procumbens* was found to be potent analgesic. In accordance to the present study, it has been observed that *Tridax procumbens* has marked beneficial effects against centrally, peripherally and inflammatory pain models. This protective action may be attributed towards the presence of flavanoid and sterols. We would like to conclude that it is worthwhile to think, to use *Tridax procumbens* as drugs and further studies should be initiated to establish exact mechanism of action and elaborative phytochemical investigations to find out which active constituents responsible for analgesic activity. These reports may serve as a foot step in the research of potent analgesic drug. Used in diarrhoea and dysentery.

3. Inflammation:

Palladino M. A. et al., (2003) and Ferrero-Miliani L. et al., (2007) - Inflammation is a complex biological response of vascular tissue to harmful stimuli, pathogens, irritants characterized by redness, warmth, swelling and pain. Inflammation is either acute or chronic inflammation. Acute inflammation may be an initial response of the body to harmful stimuli. In chronic inflammation, the inflammatory response is out of proportion resulting in damage to the body.

4. Analgesic and anti-inflammatory activity

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5. Antifungal activity

Jindal A. (2013) - *Tridax procumbens* L. Disc diffusion assay was performed against two pathogenic fungal strains (*Aspergillus flavus* and *Aspergillus niger*). Minimum inhibitory concentrations (MIC), minimum fungicidal concentrations (MFC) and total activity were also evaluated for determination of antifungal potential of each active extract. The flavonoid extracts showed remarkable activity against *A. niger* whereas alkaloid extracts were found inactive against both the test fungi. Excellent antifungal potential was recorded for free flavonoid of stem and bound flavonoid of stem and flower *A. niger*. Study indicated that *Tridax procumbens* can be used as a source of formulations of antifungal drug for treatment of diseases caused by *A. niger*.

6. Immunomodulatory Activity

Mahajan R. (2012) – Ethanol insoluble fraction of aqueous extract of *Tridax Procumbens* has been reported for immunomodulatory activity. It significantly increases the phagocytic index, leukocyte count and splenic antibody secreting cells. The immunomodulatory activity of ethanolic extracts of leaves of *Tridax Procumbens* Linn. Have been also studied in Albino rats with *Pseudomonas Aeruginosa*, which has ability to inhibit the proliferation of this microorganism.

Aim: Preparation and evaluation of wound healing cream using Tridax Procumbene

Objective :

The project’s main objective is to create formulation based on Tridax procumbene paying particular attention to products stability, safety and effectiveness. Following are specific goals of consideration

Collection of foliage parts of Tridax procumbene

Extraction and Isolation

Physio-chemical Analysis

Formulation Development

Biological Testing and Evaluation

Product Optimization

To develop a well balanced and stable formulation of wound healing cream using Tridax Procumbene

Plan of work : (table no.2)

Selection of sample
Authentication
Preparation of rextract
Formulation of cream
Physico-chemical characterisation of cream
Qualitative test
Carbohydrates test
Alkaloids test
Amino acid test
Saponin test
Protein test
Quantity test
Determination of alkaloids content
Determination of tannin content

III. MATERIALS AND METHOD

1.Collection of Plant Material and Authentication

Fresh leaves of Tridax procumbens were collected in months of October and November from the areas around Aditya Education Trust, Beed, Maharashtra. The plant was authenticated at Aditya ayurvedic College garden. The leaves of plant were washed with running water and were kept for drying.

2. Preparation of Liquid Extracts : Leaves of T. Procumbens were first ground into a fine paste from which the obtained paste was Filtered twice through filter paper.

3.Preparation of Powdered Extract : Leaves of T. Procumbens were first ground into pestle and mortar under liquid nitrogen and were then kept in a freezer overnight. The frozen paste was then lyophilized to obtain fine powder.



Fig.no.2 dried leaves powder of T.procumbene.



Fig.no.3 fine powder of T.procumbene

4. Formulation of Tridaxprocumbens Cream :

The formulation of Tridax procumbens cream was carried out using all the components mentioned in the Table below. Three different phases (water phase, oil phase, and cool down phase) were prepared separately and then mixed. After mixing all the components, homogenization was carried out by giving constant stirring for 20 minutes.



Fig.no.4 cream of Tridax procumbene

Composition of Tridax procumbens cream

Water phase (table no.3)

Glycerine	0.8 ml
Xanthan gum	0.04 gm
Distilled water	14.46 ml

Oil phase (table no.4)

1.stearic acid	0.6gm
2.cetyl alcohol	0.8 gm
3.coconut oil	0.6ml
4.polysorbate 80	0.8ml

Cool down phase (table no.5)

1.Tridax procumbene powder	0.2
2.Benzyl alcohol	0.2ml
3. Ester	0.1 ml
4.citric acid	0.2 ml

Physio-chemical Characterization of formulated Cream :

- pH Determination: pH is determined on a scale of 10. The pH was determined using litmus paper.
- Phase Separation: The phase separation is checked by centrifugation. The cream’s formulation called for 8000rpm for five minutes.
- Stability: The formulated product is stored at different temperatures and parameters such as color, texture, pH, and homogeneity were observed for 30 days from the day of formulation.
- Viscosity: The viscosity is measured by a viscometer using spindle 63 at different rpm. The change in the value of viscosity was recorded as the speed increased.
- Spreadability: The spreadability of the formulated cream is calculated by measuring the diameter. 1ml of the product is poured on a glass plate using a pipette and leave it for 5 minutes. The diameter is measured after 5 minutes using a scale.

Qualitative test:

A series of phytochemical tests were performed to evaluate and confirm the presence of bioactive compounds present in Tridax procumbens.

Carbohydrate Test :

To test for the presence of carbohydrates in the plant paste, two to three drops of the Molisch reagent were added to the plant paste and mixed in a test tube. Then, roughly 2-3 drops of sulphuric acid were added. The appearance of a violet ring indicates the presence of carbohydrates.

Alkaloid Test :

To detect the presence of alkaloids, add a small amount of plant sample paste to a test tube, and then add 2 drops of Mayer’s reagent carefully along the sides of the tube. If a white or Smooth precipitate is formed, it indicates the presence of alkaloids.

Protein Test:

Add 4-6 drops of copper sulfate solution and 2 ml of sodium hydroxide to the plant Paste, mix the contents well by gently shaking the test tube, and allow the mixture to rest for about 4-5 minutes. A bluish-violet color indicates the presence of protein.

Flavonoid Test:

When an aqueous plant crude paste was mixed with a 2.0% NaOH solution, a deep yellow color was observed, which indicated the presence of flavonoids. The addition of a few drops of dilute acid neutralized the color, confirming the existence of flavonoids in the paste.

Saponin Test:

A plant paste was placed in a test tube, followed by vigorous shaking and the addition of a few drops of double-distilled water. The formation of foam indicates the presence of saponin.

Quantitative test:

1. Determination of Tannin Content:

Make aliquots of extract in test tubes, and make up the volume accordingly with distilled water and Folin-Ciocalteu reagent followed by the addition of sodium carbonate solution. Vortex the tubes and record absorbance at 725nm.

2. Estimation of Total Alkaloids Content:

10% of acetic acid is added in ethanol, covered, and left to settle for a few hours. To the extract concentrated ammonium hydroxide is added dropwise until the precipitation is complete. The solution is then allowed to settle and the precipitate is collected and washed with dilute ammonium hydroxide followed by filtration, drying, and weighing.

IV. RESULT

Parameters observed on the day of formulation. (Table no 6)

PARAMETERS	OBSERVATION
Color	Green
PH	7.3
Consistency	Smooth
State	Semisolid
Homogenicity	Homogenous
Odour	Pleasant/sweet
Viscosity	1240mPas
Wash ability	Washable
Spreadability	15mm

Stability test :

The formulated cream was kept under two different temperatures (at room temperature and 4°C) for thirty days following the formulation’s first day, Characteristics including the cream’s color, consistency, and homogeneity were noted. The cream samples were stable at both temperatures after 30 days as no alterations in the observation were noticed.

Observation of stability (30 days): (table no 7)

No.of days	Parameters	4°C	Room temp.
Day 1	Color Consistency Homogeneity	Unchanged Smooth Homogenous	Unchanged Smooth Homogenous
Day 6	Color Consistency Homogeneity	Unchanged Smooth Homogenous	Unchanged Smooth Homogenous
Day 12	Color Consistency Homogeneity	Unchanged Smooth Homogenous	Unchanged Smooth Homogenous
Day 18	Color Consistency Homogeneity	Unchanged Smooth Homogenous	Unchanged Smooth Homogenous
Day 24	Color Consistency Homogeneity	Unchanged Smooth Homogenous	Unchanged Smooth Homogenous
Day 30	Color Consistency Homogeneity	Unchanged Smooth Homogenous	Unchanged Smooth Homogenous

V. SUMMARY AND CONCLUSION

The aim of the project was to prepare and evaluate wound healing cream the present study helped us to understand what actual wound and how outer layer of skin get damaged. Herbal treatment by Tridax procumbens studied briefly. As the study shows that the Tridax procumbens shows positive, safe and effective study towards healing wound and other antiseptic, anticoagulant, and antibacterial properties with containing active ingredient like tannin, carbohydrates, proteins, saponin, flavonoids etc. Tridax procumbens cream will not only provide relief from skin conditions but will also promote overall skin health. Thus, it can be said that herbal formulations are a valuable gift from nature. Herbal medicines are thought to be safer than allopathic ones because allopathic medicines tend to have adverse side effects. In a similar vein, Tridax procumbens ointment will be a valuable addition to any medicine cabinet. Its effectiveness, accessibility, and affordability make it a must-have for anyone looking for a natural and safe way to treat their skin conditions.

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