

Preparation and Evaluation of Antiseptic Cream Containing Tridax Procumbens

Simran J. mulani¹, Sifa I. Mujawar², Shrunkhala S. More³,
Vaibhavi B. Mhalungekar⁴, Yashraj S. Mane⁵

^{1,2,3,4,5}Student, Sarojini college of pharmacy

ABSTRACT:

This study focuses on the formulation and evaluation of an antiseptic cream containing Tridax procumbens extract. Tridax procumbens, commonly known as coat buttons, possesses inherent antimicrobial properties, making it a potential candidate for antiseptic formulations. The cream was prepared using a standardized procedure, incorporating Tridax procumbens extract along with suitable emulsifiers, preservatives, and excipients to ensure stability and efficacy. Various physicochemical parameters, including pH, viscosity, spreadability, and stability, were evaluated to assess the quality of the cream. Additionally, the antimicrobial activity of the cream against a panel of pathogenic bacteria and fungi was determined using well-established methods. The results indicate that the formulated cream exhibited desirable physical properties, good stability, and significant antimicrobial activity against the tested microorganisms. This study underscores the potential of Tridax procumbens as a natural source of antimicrobial agents and highlights the feasibility of developing an effective antiseptic cream for various dermatological applications.

1. INTRODUCTION

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. Creams are used for cosmetic purposes such as cleansing, beautifying, improving appearances, protective or for therapeutic function. [1]

Antiseptic means a chemical agent that slows or stops the growth of microorganisms on external surfaces of the body and helps to prevent infections. They are used daily in medical setting to reduce the risk of infection and stop the spread of germs.

Natural antiseptic herbs are used to kill or inhibit the growth of microorganisms when applied to skin or living tissue. It kills or inhibits the growth of microorganisms on the external surface of the body. It reduces the possibilities of infections, sepsis. Where antiseptic cream heals wounds and protects against infections can be used to treat cuts and grazes. It can be applied directly to the affected area to promote healing and reduce the risk of bacterial or fungal infections [2-3]

Tridax procumbens (L) is a medicinal plant which is best known as a gregarious weed distributed throughout the tropics and sub-tropics. It belongs to the family *Asteraceae* and is commonly known as coat buttons. Traditionally in India, *Tridax Procumbens* leaves have been used as one of the most popular remedies for dermal wounds. It also possesses antidiabetic, anti-bacterial, antiplasmodial, anti-oxidant, antimicrobial and wound healing properties. [4-5]

The chemical constituents present are flavonoid procumbenetin, polysaccharides, alkyl esters, sterols, pentacyclic, triterpenes, fatty acids etc. The plant is rich in minerals such as zinc, iron, copper, manganese, and sodium and other. Organic solvent extraction with ethyl acetate has flavonoids, while the aqueous extract contains phytochemicals such as alkaloids, steroids, carotenoids, flavonoids, saponins and tannins. [6-7]



Fig. 1.1 tridax procumbens

Kingdom	: Plantae
Class	: Tracheophytes
Clade	: Angiosperm
Family	: Asteraceae
Genus	: Tridax
Species	: T.procumbens
Biological name	: T.procumbens L.
Biological source	: Leaves of T.procumbens
Common name	: Coatbuttons, Dagadi pala
Ayurveda name	: Jayanti veda

T. procumbens is a little green color plant having perennial, 15-40 cm high, roots arising at the nodes stems procumbent arising from woody base, hairy, leaves ovate to lanceolate petiole 4-30 mmlong. It has two types of flowers ray florets and disk florets with basal placentation 3-6, tubular at the base with pale yellow or cream-white ligules, 2.5-5 mm long, 2-5 mm wide, the disk of corollas yellow (Powell, 1965). Fruit is a hard achene covered with stiff hairs and has a plume, feathery like white pappus at the one end. The calyx is represented by scales or reduced to pappus. Seed have pendulous endosperm, embryo is absent.

2. RATIONALE/HYPOTHESIS

Incorporation of antimicrobial agent in an antiseptic cream could provide a safe and effective antiseptic formulation

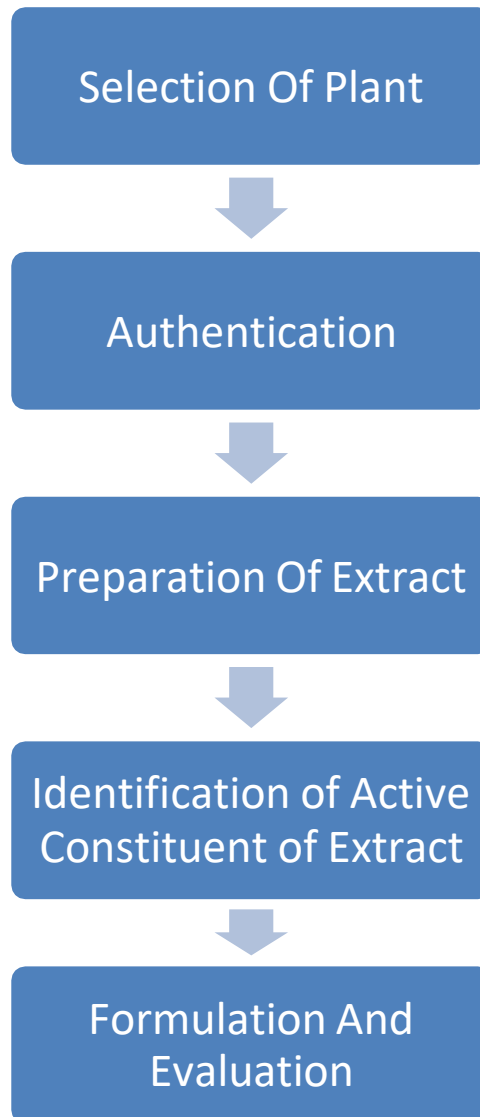
3.1 OBJECTIVES

- To prepare and evaluate antiseptic cream by using tridax procumbens
- To prevent or treat infections in minor cuts, wounds and burns.
- To inhibit or kill the growth of bacteria, fungi and other microorganisms on the skin.
- To developed a well-balanced and stable formulation of the antiseptic cream containing Tridax

procumbens L. extract

3.2 PLAN OF WORK :

To achieve the set objective for the project, the work is divided into following sections



4. LITERATURE REVIEW

- **Prof.(Dr.)Yasmin Khatoon (2022):** Examined that it has been demonstrated in various scientific investigations shows number of valuable constituents present in tridax procumbens such as flavonoid (procumbenetin), terpenoids, lipids, and polysaccharides with significant pharmacologist activities such as ant-diabetics, anti-inflammatory, wound healing, antimicrobial, anticancer etc.
- **Rushika Jaiswal (2020):** Examined that a new flavonoid (procumbenetin) isolated from the aerial part of Tridax Procumbens has been characterized as 3, 6-dimethoxy 5, 7, 2'3'4' pentaahydroxyflavone 7-O-D-gluco- pyranoside on the basis of spectroscopic techniques.
- **Suryawanshi H.P (2018):** Examined that morphological features of and taxonomical classification

Tridax procumbens Linn. (TP) like also shows pharmacological activities of plant parts like stem leaves flower shows effects such as antioxidant, hepatoprotective effect diarrheal dysentery etc.

- **Rajendra Gurjar (2023):** Examined that the basic method of preparation of cream by using some herbs including neem, carrot, aloe Vera sandalwood etc. with their pharmacological effects.
- **L. Slaviero (2018):** Examined that Tridax procumbens used as antiseptic for burns, the ideal topical antimicrobial agent should have wide spectrum activity and have low toxicity.
- **Rupali Deshmukh (2018) :** Examined that formulation and evaluation of tridax procumbens include collection, preparation of extraction. Also shows that the wound healing activity of Tridax procumbens.
- **Lokesh Prasad (2017):** Examined that formulation and evaluation of herbal cream, ointment, gel containing Tridax Procumbens gives methods for preparations of cream and their composition shows that they are effective and easily formulated. A powdered plant parts were extracted with methanol by using soxhlet apparatus.
- **Pallavi Tanawade (2014):** Examined that formulation and evaluation of topical herbal ointment from tridax procumbens wound healing activity after completion with formulation it was evaluated for its physiochemical parameters like color, odor, pH, spreadability, Consistency, solubility and washability etc.
- **Rohit Kumar Bijauliya (2022):** Examined that the Tridax procumbens Linn. is rich Medicinal plant and phytochemically, pharmacologically as well as traditional medicinal system also proves this. Every part of plant phytochemical study reveals present of site that source of phytomolecules.

5. EXPERIMENTAL WORK

5.1 Drug Profile:

5.1.1 Tridax Procumbens

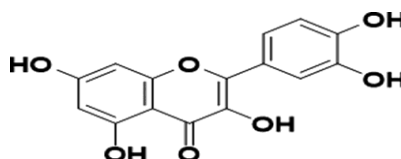
Chemical Name : Tridax Procumbens
 : 4-[7-(beta-D-Glucopyranosyloxy)-5-hydroxy-3-methoxy-4-oxo-4H-chromen-2-yl]-2-hydroxyphenylbeta-D-glucoopyranoside
 Molecular Formula : C₁₈H₃₂O₁₇

Molecular Weight : 640.5 g/mol

Hydrogen Bond Acceptor : 17

Hydrogen Bond Donor : 10

Structural Formula :



Description

Color : Yellowish Green

Melting Point : $>275^{\circ}\text{C}$
 Solubility : Insoluble in water soluble in ethanol
 Therapeutic Uses : Antiseptic, antibacterial : Class II (low aqueous solubility and highpermeability)

5.2 Excipients Profile:

5.2.1 Stearic Acid:

1. Synonym: Stearophanic Acid
2. Molecular Formula : $\text{C}_{18}\text{H}_{36}\text{O}_2$
3. Molecular Weight : 58.44 g/mol

4. Structural Formula :

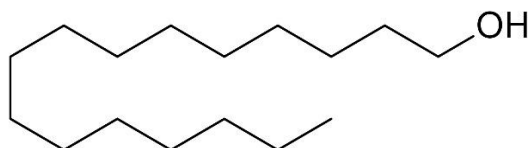


Description

5. Color : Colorless or White
6. Melting Point : 69.3°C
7. Solubility : Soluble In Ethanol
8. Therapeutic Uses : Lubricating Agent
9. Half Life : Indefinite

5.2.2 Cetyl Alcohol:

10. Synonym : Hexadecanol or n-hexadecyl alcohol
11. Molecular Formula : $\text{C}_{16}\text{H}_{34}\text{O}$
12. Molecular Weight : 242.44 g/mol
13. Structural Formula :



Description

- 5 Color : Waxy white solid or flakes.
- 6 Melting Point : 49.3°C
- 7 Solubility : Insoluble in water and soluble in alcohol and water
- 8 Therapeutic Uses : Used as a moisturizer
- 9 Half Life : 2 years

5.2.3 Glycerol:

1. Chemical Name : Propane – 1,2,3 -triol
2. Synonym : Glycerine
3. Molecular Formula : $\text{CH}_3\text{H}_8\text{O}_3$
4. Molecular Weight : 92.09 g/mol



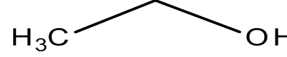
Description

- 6. Color : Colorless
- 7. Melting Point : 17.8°C
- 8. Solubility : Soluble in water
- 9. Therapeutic Uses : Used as a solvent
- 10. Half Life : 10 min to 1 hour

5.2.4 Ethanol:

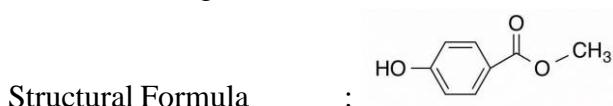
- 1 Chemical Name : Ethanol
- 2 Synonym : ethyl alcohol, grain alcohol
- 3 Molecular Formula : C₂H₆O
- 4 Molecular Weight : 46.07 g/mol
- 5 Structural Formula :

Description

- 6 Color : Clear,  tid
- 7 Melting Point : -117.3.4 °F
- 8 Solubility : Soluble in organic solvents
- 9 Therapeutic Uses : Used as a solvent and preservative
- 10 Half Life : 4 to 5 hour

5.2.5 Methyl Paraben:

- 1 Chemical Name : Methyl Paraben
- 2 Synonym: Methyl 4-hydroxybenzoate
- 3 Molecular Formula : C₈H₈O₃
- 4 Molecular Weight : 152.15 g/mol

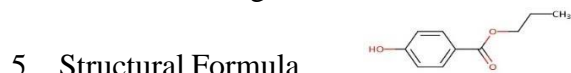


Description

- 5 Color : White Needles
- 6 Melting Point : 213 °C to 217 °C
- 7 Solubility : Soluble in water
- 8 Therapeutic Uses : Used as a preservative

5.2.6 Propyl Paraben :

- 1 Chemical Name : Propyl 4- hydroxybenzoate
- 2 Synonym: Propyl 4- hydroxybenzoate
- 3 Molecular Formula : C₁₀H₁₂O₃
- 4 Molecular Weight : 180.2 g/mol



Description

- 6 Color : Colourless crystal

- 7 Melting Point : 96°C
 8 Solubility : Soluble in alcohol
 9 Therapeutic use : Antibacterial and antifungal property

6 MATERIALS AND RESEARCH METHODOLOGY

6.1 MATERIALS & EQUIPMENTS

6.1.1 List of Material

Sr. No.	Material	Suppliers
1.	<i>Tridax Procumbens</i>	BOTANICAL GARDEN KOLHAPUR
2.	Ehanol	CHANGSHU HONGSHENG FINE CHEMICAL CO. LTD
3.	Cetyl Alcohol	LOBA CHEMIE PVT. LTD
4.	Steric Acid	LOBA CHEMIE PVT. LTD
5	Tri ethanol amine	LOBA CHEMIE PVT. LTD
6	Methyl Paraben	LOBA CHEMIE PVT. LTD
7	Propylene Glycol	LOBA CHEMIE PVT. LTD
8	Propyl Paraben	LOBA CHEMIE PVT. LTD

6.1.2 List of Equipment's:

Sr.No	Equipment's	Manufacturer
1	Digital weighing balance	Shimadzu, Japan
2	Beaker	J-SIL, Agra
3	Funnel	J-SIL, Agra
4	Stirrer	J-SIL, Agra
5	Measuring Cylinder	J-SIL, Agra
6	Tripod stand	J-SIL, Agra
7	Conical Flask	J-SIL, Agra
8	Brookfield Viscometer	J-SIL, Agra
9	Soxhlet Apparatus	J-SIL, Agra
10	Digital pH Meter	EQUIPTRONICS, Model EQ 610

6.2 RESEARCH METHODOLOGY

6.2.1 Collection Of plant: Leaves of *Tridax Procumbens L.* were collected from different localities of Kolhapur and its nearby areas and washed thoroughly with distilled water. The cleaned plant parts are then allowed for complete shade drying and then made fine powder with mechanical grinder

and stored in an airtight container.

6.2.2 Authentication: The plant was Authenticated from the New college Botanical department from Kolhapur

6.2.3 Preparation of Extraction: A powdered plant were extracted successfully with the methanol by using soxhlet apparatus. The extraction was carried out for 24 hours at room temperature with mild shaking. The extract were filtered and concentrated by using rotary vacuum evaporator.[10-15]



Fig.6.2.3 Extraction Setup

6.2.4 Formulation Of Cream

An oil-in-water (O/W) emulsion-based cream of *Tridax Procumbens* Linn. Was formulated. The emulsifier (stearic acid) and other oil-soluble components (Cetylalcohol) ethanol extract of *Tridax Procumbens* Linn. were dissolved in the oil phase (Part A) and heated to 75°C. The preservatives and other water-soluble components, namely triethanolamine, glycerol, Were dissolved in the aqueous phase (Part B) and heated to 75°C. After heating, the aqueous phase was added in portions to the oil phase with continuous stirring until cooling of emulsifier takes place. [16]

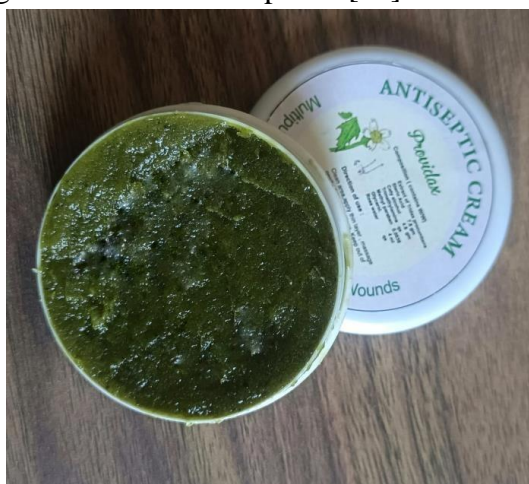


Fig.6.2.4 Antiseptic cream

7 RESULT AND DISCUSSION:

7.1 Phytochemical Test :

Phytochemicals	Presence / Absence
Alkaloid	Present
Flavonoid	Present
Tannin	Present
Carbohydrate	Present
Terpenoids	Absent

Fig 7.1. Phytochemical tests

7.2 Optimized Batches:

Sr no.	Ingredient	F1	F2	F3
1	Tridax Procumbens	6	6	6
2	Steric Acid	5	7	7.6
3	Cetyl Alcohol	6	5	4.6
4	Methyl paraben	1	2	q.s
5	Propyl Paraben	2	1	q.s
6	Glycerol	9	8	4
7	Trimethylamine	1	1	q.s
8	Rose water	q.s	q.s	qs

From above table no 6.2 we optimized batch no F3 were is no signs are of phase separation in F3 batch

7.3 General Appearance:

Sr no	Parameter	Observations
1	Nature	Semisolid
2	Colour	Yellowish Green
3	Odour	Pleasant
4	Texture	Smooth

7.4 pH:

Cream pH was measured with a digital pH meter. A total of 10% solution of cream was prepared in distilled water and the solution was immersed in the pH meter. pH of the formulation was found to be 7

7.5 Spreadability:

The spread ability of cream was determined by the parallel plate method. Two glass slides of 20/20 cm were selected. About 1 gm of the cream formulation was placed over one of the slides. The other slide was placed upon the top of the cream such that the cream was sandwiched between the slides and 125 gm weight placed upon the upper slide so that cream between the two slides was pressed uniformly to form a thin layer. The weight was removed and the spread diameter was measured.

7.6 Irritancy test:

No skin Irritancy was observed.

7.7 Phase Separation:

We prepared cream in 3 batches as per Table no 6.1 and the cream was kept in a closed container at a temperature of 25-100 °C away from light. Then phase separation was checked for 24 h for 30 gm. formulation

7.8 Viscosity:

Viscosity was evaluated in Brookfield viscometer using the LV-3 spindle. The rotation rate was adjusted to 50 rpm. The formulated cream was directly immersed into the spindle and the viscosity 23130 was measured

7.9 Antimicrobial Study:

The antimicrobial activity of the cream was determined by using the modified agar well diffusion method against Gram-positive Staphylococcus aureus NCIM 2654 and Gram negative E coli NCIM 2832 bacterial pathogens with slight modifications. For further study, the respective test pathogen suspension was prepared in sterile saline then pathogens were spread on the surface of nutrient agar plates using a sterile spreader for the antimicrobial activity test. After that, an agar well was created using a 0.7 cm diameter sterilized cork borer. Then a desired amount of the formulations was weighed on an analytical balance and placed aseptically into the respective well. Then plates were placed at 4 °C for 10 min for sample diffusion in a culture medium and transferred to an incubator at 37 °C for 24 h. Furthermore. The diameter of the inhibition zone was measured in mm and the results were recorded

Test Organisms	Zone of Inhibitions in mm
E coli	22
Staphylococcus aureus	26
P aeruginosa	30

Table no 7.9 Zone of inhibition of formulated product against test organisms



Fig 7.9.1 Antimicrobial activity against p. aeruginosa



Fig 7.9.2 Antimicrobial activity against E coli



Fig 7.9.3 Antimicrobial activity against S. aureus

8 SUMMARY & CONCLUSION

A topical antiseptic cream was prepared in this research. The formulation was optimized and important parameters like pH, viscosity, irritancy, and spreadability were also evaluated. All the parameters were found within the acceptable range.

The formulated cream was studied for antimicrobial activity against staphylococcus aureus, Pseudomonas aeruginosa and E coli here is no sign of microbial growth was visible.

From the above results it is concluded that the formulated cream showed good consistency and spreadability, viscosity, pH and there is no phase separation during study period and it is safe to use and they did not show any signs of irritancy. The formulated cream showed good antimicrobial activity against skin infections. As the cream was made from Ingredient *Tridax Procumbens*, it is safe, effective, showing less side effects and Improves patient compliance than synthetic once.

9 FUTURE SCOPES:

1. Antimicrobial Properties: Tridax procumbens has shown significant antimicrobial activity against various pathogens. This makes its extracts suitable for developing antiseptic creams that can effectively prevent infections and promote wound healing.
2. Wound Healing: The plant is known for its wound healing properties, partly due to its ability to enhance collagen synthesis and reduce inflammation. An antiseptic cream containing Tridax procumbens can be particularly beneficial in treating cuts, scrapes, and other minor wounds.
3. Anti-inflammatory Effects: Its anti-inflammatory properties can help in reducing pain and swelling associated with wounds and skin infections. This dual action (antimicrobial and anti-inflammatory) enhances its potential as a comprehensive wound care product.
4. Natural and Organic Trends: With an increasing demand for natural and organic skincare products, Tridax procumbens-based antiseptic creams could appeal to consumers looking for herbal and chemical-free alternatives.
5. Traditional Knowledge: The plant has been used in traditional medicine for its healing properties,

providing a historical basis for its effectiveness. This traditional knowledge can support the development and marketing of new antiseptic products.

6. Research and Development: Continued research into the bioactive compounds of *Tridax procumbens* could lead to the discovery of new therapeutic applications and more effective formulations for antiseptic creams.
7. Market Expansion: The global market for antiseptic products is expanding, driven by rising healthcare awareness and the need for infection control. A unique product based on *Tridax procumbens* can tap into this growing market.
8. Sustainability: As a readily available and hardy plant, *Tridax procumbens* offers a sustainable source for developing medicinal products, aligning with the global shift towards sustainable and environmentally friendly production methods.

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