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Formulation & Evaluation of Herbal Antiseptic Cream from Giloy

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Abstract:

The present study focuses on the extraction and evaluation of *Tinospora cordifolia* stem extract for its phytochemical and antimicrobial properties. The extract was obtained using the Soxhlet extraction method and subjected to phytochemical screening. The antimicrobial efficacy of the extract was assessed against Staphylococcus aureus and Bacillus subtilis, showing zones of inhibition of 8 mm and 6 mm, respectively. Based on varying extract concentrations, four antiseptic cream formulations (A1, A2, A3, and A4) were developed and evaluated for stability, spreadability, viscosity, and pH. Among all formulations, A4 exhibited superior physicochemical characteristics and was selected as the final optimized formulation. Since herbal formulations pose stability challenges due to the complexity of Phytoconstituents, further stability studies are essential to determine the shelf life and long-term efficacy of the formulation. This study highlights the potential of *Tinospora cordifolia* as an antimicrobial agent in topical applications and emphasizes the need for extensive stability evaluation to ensure formulation efficacy and safety over time.

Keywords: *Tinospora cordifolia*, antiseptic cream, pH etc.

Introduction:

Creams are the topical preparations which can be applied on the skin. 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.[1] Creams are used for cosmetic purposes such as cleansing, beautifying, improving appearances, protective or for therapeutic function. These topical formulations are used for the localized effect for the delivery of the drug into the underlying layer of the skin or the mucous membrane. These products are designed to be used topically for the better site specific delivery of the drug into the skin for skin disorders. [2]

Creams are considered as a pharmaceutical product as they are prepared based on techniques developed in the pharmaceutical industry; un-medicated and medicated creams are highly used for

the treatment of various skin conditions or dermatoses. Creams can be Ayurvedic, herbal or allopathic which are used by people according to their needs for their skin conditions. They contain one or more drugs substances dissolved or dispersed in a suitable base. Creams may be classified as o/w or w/o type of emulsion on the basis of phases. The term 'cream' has been traditionally applied to semisolid formulated as either water-in-oil (e.g.: cold cream) or oil-in-water (e.g.: vanishing cream). [3]

Types of skin creams: They are divided into two types:

Oil-in-Water (O/W) creams: These are composed of small droplets of oil dispersed in a continuous phase, and an emulsion in which the oil is dispersed as droplets throughout the aqueous phase is termed an oil-in-water (O/W) emulsion.

Water-in-Oil (W/O) creams: These are composed of small droplets of water dispersed in a continuous oily phase. When water is the dispersed phase and oils the dispersion medium, the emulsion is of the water-in-oil (W/O) type. [4-6]

Classification of Creams: All the skin creams can be classified on different basis:

1. According to function, e.g., cleansing, foundation, massage, Medicinal Creams (Antiseptic, Antimicrobial, Wound Healing) etc. 2. According to characteristics properties, e.g., cold creams, vanishing creams, etc.
2. According to the nature or type of emulsion. Types of creams according to function, characteristic properties and type of emulsion: Make-up cream (o/w emulsion): a) Vanishing creams. b) Foundation creams.

a. Cleansing cream, cleansing milk, cleansing lotion (w/o emulsion)
b. Winter cream (w/o emulsion): a) Cold cream or moisturizing creams.
c. All-purpose cream and general creams.
d. Night cream and massage creams.
e. Skin protective cream.
f. Hand and body creams. [7-10]

Antiseptic Activity; These are chemical substance which inhibit the growth or kill micro-organisms on living surface such as skin and mucous membrane or these are anti-microbial substances that are applied to living tissue or skin to reduce possibility of infection, sepsis, putrefaction.

Properties of good Antiseptic Cream

a. Cidal
b. Non-staining and good odour.
c. Active against all pathogens.
d. Active in presence of pus, blood and exudates. 5)Rapid Acting
e. Non-Irritating to Tissues or non-corrosive

f. Non-absorbable
g. Non-Sensitizing

Mechanism of Action of Antiseptic Cream: Oxidation of bacterial protoplasm. Coagulation (Denaturation) of bacterial proteins and disrupt cell membrane. Detergent like action increases the permeability of bacterial membrane. [11]

Drug Profile:

Kingdom : Plantae
Family : Menispermaceae
Genus : *Tinospora*
Species : *T. cordifolia*

Common Names :

Latin : Tinospora cordifolia
Marathi: Shindilakodi, Gudvel.
English: Tinospora Gulancha.

Fig.01: Giloy Stems

Fig.02: Tinospora cordifolia (Giloy) plant (Leaves, stems and root)

India has a long history of traditional medicine, which has been used for centuries to treat diseases. Herbal medicines derived from plants offer multiple health benefits. The aqueous extract of medicinal plants is prepared and tested for its effectiveness against various diseases. In this study, the herbal extract was evaluated for its antiseptic properties against microorganisms that can affect human health. [12]

Tinospora cordifolia: A Medicinal Powerhouse:

Biological Source & Distribution: Tinospora cordifolia, a deciduous climbing shrub from the Menispermaceae family, is widely distributed across India, China, Africa, Sri Lanka, and Myanmar. It thrives in diverse soil types and climates. The stem, root, and leaves hold significant pharmaceutical value due to their rich bioactive compounds.

Phytochemical & Biological Properties: The plant is a reservoir of alkaloids, glycosides, flavonoids, Diterpenoids, and steroids, contributing to its antimicrobial, anti-inflammatory, and immunomodulatory properties. Jatrorrhizine exhibits antimicrobial effects, while Tinocordifolin and Tinosporide show antihypertensive activity. It also boosts memory, aids digestion, and supports liver health.

Medicinal & Therapeutic Uses: *T. cordifolia* is extensively used in Ayurvedic medicine to treat fever, diabetes, arthritis, infections, and digestive disorders. It acts as a natural immunity booster, antiseptic, antipyretic, and anti-diabetic agent. Additionally, it helps manage asthma, aging, vision problems, and even HIV by improving therapeutic responses.

Antiseptic Cream Formulation: A herbal antiseptic cream was formulated using Giloy extract (antimicrobial), beeswax (emulsifier), liquid paraffin (lubricant), borax (alkaline agent), methylparaben (preservative), and rose oil (fragrance). These ingredients ensure stability, effectiveness, and skin compatibility, making Giloy-based formulations highly beneficial for topical applications.

Experimental Work:

Tinospora cordifolia is collected from its natural habitat. It is a semi-evergreen climbing shrub that often grows on large trees like Mango and Neem. The plant can adapt to various soil types, from acidic to basic, with moderate moisture. Its stems are thick and moist, with large aerial roots growing from the branches.

Extraction of Giloy: The powdered Giloy stem is extracted for 16 hours by using soxhlet apparatus with methanol and acetone in the ratio 70:30 at 40^0 C.

Fig.03: Extraction of Giloy by Soxhlet Apparatus

Evaluation of Extract:

a. Test for Alkaloids: Chemical Test: A saturated solution of picric acid and Filtrate.
b. Test for Glycoside: A saturated solution of picric acid and Filtrate
c. Test for Steroids: Conc.H2SO4 and Filtrate.
d. Test for Flavonoids: NaOH sol and Filtrate.
e. Test for Diterpenoids: Conc.H2SO4 and Filtrate.

Formulation of Cream: Procedure: Heat liquid paraffin and beeswax in a borosilicate glass beaker at 75^0 C and maintain that heating temperature (Oil phase). In another beaker dissolve borax, methyl Paraben in distilled water and heat this beaker to 75^0 C to dissolved borax and methyl Paraben and to get a clear solution (aqueous phase). Then slowly add this aqueous phase to heated oily phase, then add measure amount of Giloy extract and stir vigorously until it forms a smooth cream then add few drops of rose oil as a fragrance. Mix the cream in geometric manner in the mortar and pestle to give a smooth texture to the cream and mix all the ingredients.

Table no. 01: Drug and excipients for preparation of Antiseptic Cream of Giloy:

Sr. No.	Ingredient	Role	Quantity
1	Giloy Extract	Antiseptic	0.5 ml
2	Bees Wax	Emulsifier	3 gm
3	Liquid Paraffin	Lubricant	10 ml
4	Borax	Alkaline Agent	0.2 gm
5	Methyl Paraben	Preservative	0.02 gm
6	Rose Oil	Fragrance	q.s.
7	Distilled Water	Vehicle	q.s.

Evaluation of Herbal Cream: Physical evaluation: [12-20]

a. In this test, the cream was observed for colour, odour, texture, state.
b. pH: 0.5 gm cream was taken and dispersed in 50 ml distilled water and then pH was measured by using digital pH meter.

Fig.04: pH was measured by using digital pH meter.

c. **Washability Test:** A small amount of cream was applied on the hand and it is then washed with tap water.

d. **Irritancy Test:** Mark the area (1cm) on the left-hand dorsal surface. Then the cream was applied to that area and the time was noted. Then it is checked for irritancy if any for an interval up to 24 hr and reported. [20-22]

e. **Spreadability:** The spreadability was expressed in terms of time in seconds taken by two slides to slip off from the cream, placed in between the slides, under certain load. Lesser the time taken for separation of the two slides better the spreadability. Two sets of glass slides of standard dimension were taken. Then one slide of suitable dimension was taken and the cream formulation was placed on that slide. Then other slide was placed on the top of the formulation. Then a weight or certain load was placed on the upper slide so that the cream between the two slides was pressed uniformly to form a thin layer. Then the weight was removed and excess of formulation adhering to the slides was scrapped off. The upper slide was allowed to slip off freely by the force of weight tied to it. The time taken by the upper slide to slip off was noted.

$$\text{Spreadability} = m \times l/t$$

Where,

m = Standard weight which is tied to or placed over the upper slide

l = length of a glass slide

t = time taken in seconds.

f. **Greasiness Test:** Here the cream was applied on the skin surface in the form of smear and checked if the smear was oily or grease-like.

g. **Stability Test:** Physical stability test of Herbal Antiseptic Cream was carried out for four weeks at various temperature conditions like 2℃, 25℃, and 37℃. The Herbal ointment was found to be physically stable at different temperature i.e., 2℃, 25℃, 37℃ within four Weeks. [22-24]

h. **Anti-Microbial Test:** Nutrient Agar was prepared using peptone, Yeast extract. Beef extract, Sodium Chloride and agar. For evaluation 2 micro-organisms was used S.A and B.S using the cup plate method? The Invitro Antibacterial activity was evaluated using the agar well Diffusion technique. [25]

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Table no. 02: Anti-Microbial Test for preparation of Antiseptic Cream of Giloy:

Sr. No	Ingredients	Gram/Litre
1	Peptone	5.0
2	Yeast extract	1.5
3	Beef extract	1.5
4	Sodium Chloride	5.0
5	Agar	15.0

i. **Viscosity:** The cream was taken in small beaker, P7 spindle was used to check viscosity at 100 RPM using Viscolead Instrument. [26]

Fig.05: Viscolead Instrument.

Results and Discussion:

Tinospora cordifolia was collected from its natural habitat, where it thrives as a semi-evergreen climbing shrub on large trees like Mango and Neem. It adapts to various soil types with moderate moisture.

For the formulation, liquid paraffin and beeswax were heated to 75°C (oil phase), while borax and methyl Paraben were dissolved in distilled water at the same temperature (aqueous phase). The aqueous phase was gradually added to the oil phase, followed by the measured quantity of Giloy extract. The mixture was stirred vigorously to form a smooth cream, with rose oil added for fragrance. The final formulation was blended using a mortar and pestle to achieve a uniform texture.

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Fig.06- Result of Preparation of Antiseptic Cream of Giloy

Table no. 03: Result of extraction process of Giloy:

Test Performed	Observation	Result
Test For Alkaloids	Yellow Coloured ppt	Positive
Test for Glycoside	Red colour Produce	Positive
Test for Steroids	Yellow Colour on Top	Positive
Test for Flavonoids	Yellow Colour Obtained	Positive
Test for Diterpenoids	The Green Colour on Bottom	Positive

Result of Physical evaluation of Antiseptic Cream of Giloy:

In this test, the cream was observed for colour, odour, texture, state of the four formulations were checked.

Table no. 04: Result of Physical evaluation for Antiseptic Cream of Giloy:

Sr. No	Test	A1	A2	A3	A4
1	Colour	Dark Brownish	Yellowish Brown	Brown	Creamy Yellowish
2	Odour	Pleasant	Pleasant	Pleasant	Pleasant
3	Texture	Smooth	Smooth	Smooth	Smooth
4	State	Semi Solid	Semi Solid	Semi Solid	Semi Solid

Result of pH: According to the results, the pH of all the four formulations that is A1, A2, A3 and A4 were found to be nearer to skin pH, so it can be safely used on the skin.

Table no. 05: Result of pH for Antiseptic Cream of Giloy:

Batch No.	Formulation	pH
1	A1	6.9
2	A2	6.5
3	A3	6.6
4	A4	6.8

Result of Irritancy Test: Mark the area (1cm) on the left-hand dorsal surface. Then the cream was applied to that area and the time was noted. Then it is checked for irritancy if any for an interval up to 24 h and reported. According to the results all the four formulations that are A1, A2, A3 and A4 showed no sign of irritancy.

Table no. 06: Result of Irritancy Test for Antiseptic Cream of Giloy:

Batch No.	Formulation	Irritant Effect
1	A1	Not Irritant
2	A2	Not Irritant
3	A3	Not Irritant
4	A4	Not Irritant

Result of Washability Test: Washability test was carried out by applying a small amount of cream on the hand and then washing it with tap water. All four formulations were easily washable**.**

Table No.07: Result of Washability Test for Antiseptic Cream of Giloy:

Batch No.	Formulation	Washability
1	A1	Easily Washable
2	A2	Easily Washable
3	A3	Easily Washable
4	A4	Easily Washable

Result of Spreadability: The Spreadability of the four formulations that is A1, A2, A3 and A4 was carried out and out of that for A2 and A4 the time taken by the 2 slides to prepare is less so as said in the description of evaluation test lesser the time taken for separation of the two slides better the spreadability so according to this statement A2 and A4 showed better spreadability.

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Table no. 08: Result of Spreadability for Antiseptic Cream of Giloy:

Batch No.	Formulation	Time in sec	Spreadability (gm.cm/sec)
1	A1	10	22.5
2	A2	7	32.14
3	A3	8	28.12
4	A4	7	32.14

Result of Greasiness: Here the cream was applied on the skin surface in the form of smear and checked if the smear was oily or grease-like. According to the results, we can say that all four formulations were non-greasy**.**

Table no. 09: Result of Greasiness for Antiseptic Cream of Giloy:

Batch No.	Formulation	Greasiness
1	A1	Non-Greasy
2	A2	Non-Greasy
3	A3	Non-Greasy
4	A4	Non-Greasy

Result of Stability Test: The Herbal cream was found to be physically stable at different temperature i.e., 2℃, 25℃, 37℃ within four Weeks.

Result of Anti-Microbial Test: The Anti-Microbial Test was performed on two strains of bacteria S. Aureus and B. Subtilis using cup plate method

Zone of Inhibition = πr^2

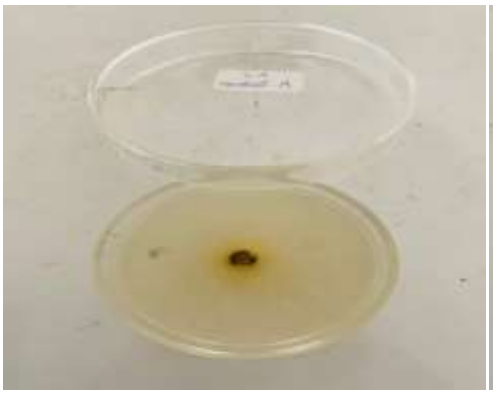

Fig.07: Zone of Inhibition of S.A

Fig.08: Zone of Inhibition of B.S

Table no. 10: Result of Viscosity Test for Antiseptic Cream of Giloy:

Batch No.	Formulation	Viscosity
1	A1	2142.3
2	A2	2182.4
3	A3	2123.1
4	A4	2183.7

Conclusion:

The extract of *Tinospora Cordifolia* stem was prepared by soxhlet extraction method and evaluated for phytochemical tests. Antimicrobial test has been performed and Zone of inhibition of *Tinospora Cordifolia* extract using S. Aureus was found to be 8 mm ±, and for B. Subtilis was found to be 6 mm ±. By using different concentrations of Tinospora *Cordifolia* extract four antiseptic cream formulation A1, A2, A3 & A4 were prepared. All formulations have been stable at room temperature, formulation A4 showed good spreadability, Viscosity, pH as compare to A1, A2& A3. So Formulation A4 has been selected as final formulation. As stability studies of herbal formulations is challenging because of complexity of constituents present in it, so further stability studies should be performed to know the shelf life of formulation.

Ethical Approval:

This review article does not content of any use of animal model.

Conflict of Interest:

Authors declared that no conflict of interest for review of article.

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References:

1. Saeed M, Naveed M, Leskovec J, Kakar I, Ullah K, Ahmad F, Sharif M, Javaid A, Rauf M, Abd El-Hack ME, Abdel-Latif MA. Using Guduchi (Tinospora cordifolia) as an eco-friendly feed supplement in human and poultry nutrition. Poultry science. 2020 Feb 1; 99(2):801-11.
2. Sinha K, Mishra NP, Singh J, Khanuja SP. Tinospora cordifolia (Guduchi), a reservoir plant for therapeutic applications: A Review.
3. Jagetia GC, Nayak V, Vidyasagar MS. Evaluation of the antineoplastic activity of guduchi (Tinospora cordifolia) in cultured HeLa cells. Cancer letters. 1998 May 15; 127(1-2):71-82.

4. Payyappallimana U, Ravikumar K, Venkatasubramanian P. Can Guduchi (Tinospora cordifolia), a well-known ayurvedic hepato-protectant cause liver damage?. Journal of Ayurveda and Integrative Medicine. 2023 Jan 1; 14(1):100658.
5. Krishna K, Jigar B, Jagruti PJ. Guduchi (Tinospora cordifolia): Biological and Medicinal properties, a review. The Internet Journal of Alternative Medicine. 2009; 6(2):1-0.
6. Saha S, Ghosh S. Tinospora cordifolia: One plant, many roles. Ancient science of life. 2012 Apr 1; 31(4):151-9.
7. Jagetia GC, Rao SK. Evaluation of the antineoplastic activity of guduchi (Tinospora cordifolia) in Ehrlich ascites carcinoma bearing mice. Biological and Pharmaceutical Bulletin. 2006; 29(3):460-6.
8. Patgiri B, Umretia BL, Vaishnav PU, Prajapati PK, Shukla VJ, Ravishankar B. Anti-inflammatory activity of Guduchi Ghana (aqueous extract of Tinospora Cordifolia Miers.). AYU (An International Quarterly Journal of Research in Ayurveda). 2014 Jan 1; 35(1):108-10.
9. Upadhyay AK, Kumar K, Kumar A, Mishra HS. Tinospora cordifolia (Willd.) Hook. f. and Thoms.(Guduchi)–validation of the Ayurvedic pharmacology through experimental and clinical studies. International journal of Ayurveda research. 2010 Apr; 1(2):112.
10. El Basuini MF, Teiba II, Shahin SA, Mourad MM, Zaki MA, Labib EM, Azra MN, Sewilam H, El-Dakroury MF, Dawood MA. Dietary Guduchi (Tinospora cordifolia) enhanced the growth performance, antioxidative capacity, immune response and ameliorated stress-related markers induced by hypoxia stress in Nile tilapia (Oreochromis niloticus). Fish & shellfish immunology. 2022 Jan 1; 120:337-44.
11. Spelman K. Traditional and clinical use of Tinospora cordifolia, Guduchi. Australian Journal of Medical Herbalism. 2001 Jan; 13(2).
12. Choudhary N, Siddiqui MB, Azmat S, Khatoon S. Tinospora cordifolia: ethnobotany, phytopharmacology and phytochemistry aspects. International Journal of Pharmaceutical Sciences and Research. 2013 Mar 1; 4(3):891.
13. Sharma R, Amin H, Shukla VJ, Kartar D, Galib R, Prajapati PK. Quality control evaluation of Guduchi Satva (solid aqueous extract of Tinospora cordifolia (Willd.) Miers): An herbal formulation. International Journal. 2013 Jul 1; 258.
14. Acharya RN, Buha MM, Sojitra NH. Guduchi [tinospora cordifolia (willd.) Miers]: a comprehensive review of its internal administration. Journal of Drug Research in Ayurvedic Sciences. 2020 Apr 1; 5(2):98-120.
15. Baghel P. Plant of versatile properties: A review of Tinospora Cordifolia (Guduchi). International Journal of Agriculture Innovations and Research. 2017; 5(5):2319-1473.

16. Joglekar AA, Vyas MK, Bhojani MK. Potential of Guduchi-Tinospora cordifolia (Willd.) Miers.(.) in the management of lifestyle disorders: a comprehensive review. Journal of Indian System of Medicine. 2022 Apr 1; 10(2):90-103.
17. Beriwal VK, Singh B, Thapliyal S, Thapliyal S. A clinical evaluation of Guduchi (Tinospora cordifolia) and Yashtimadhu (Glycyrrhiza glabra) as chemopreventive agent in cancer treatment. Asian J Oncol. 2019; 5(2):64-71.
18. Devi P. A review on Tinospora cordifolia: As an Immunomodulating agent. Himal. J. Health Sci. 2021; 6:6-14.
19. Pansare TA, Pranita D, Archana B. Review on medhya (intellect promoting) action of guduchi [Tinospora cordifolia (WILD) MIERS]. World Journal of Pharmaceutical Research. 2018 May 30; 7(14):556-77.
20. Joy A, Mansukhbhai BM, Sojeetra NH, Acharya RN. Guduchi (Tinospora Cordifolia [Wild.] Miers) and its Therapeutic External Applications: A Comprehensive Review. Indian Journal of Ayurveda and Integrative Medicine KLEU. 2021 Jul 1; 2(2):56-63.
21. Singh A. A Review on Traditional uses, Bioactive Chemical Constituents, Pharmacology, and Toxicity of Tinospora cordifolia (Guduchi or Giloy). Research Journal of Pharmacognosy and Phytochemistry. 2024 Apr 1; 16(2):107-11.
22. Modi B, Kumari Shah K, Shrestha J, Shrestha P, Basnet A, Tiwari I, Prasad Aryal S. Morphology, biological activity, chemical composition, and medicinal value of Tinospora cordifolia (willd.) Miers. Advanced Journal of Chemistry-Section B. 2020; 2020:36-54.
23. Shruthi RR, Aranha I, Venkatesh YP. Characterization of the immunomodulatory protein isolated from guduchi (Tinospora cordifolia) churna, an ayurvedic rejuvenator. Traditional Medicine and Modern Medicine. 2023 Sep 29; 6:27-38.
24. Prasad B, Chauhan A. Anti-oxidant and antimicrobial studies of Tinospora cordifolia (Guduchi/Giloy) stems and roots under in-vitro condition. Int J Adv Microbiol Health Res. 2019; 3(1):1-0.
25. Gurav A, Nabi S, Vijayakumar H, Mondal DB. Evaluation of hepatoprotective and antidiarrhoeal activity of guduchi, Tinospora cordifolia (Willd.) Miers ex Hook. f. & Thoms. in experimental rats. Annals of Phytomedicine. 2017 Jul 1; 6(2):156-61.
26. Singh AK, Kumar S, Kumari P, Tiwari SN. A Pharmaceutical Standardization of Guduchi (Tinospora cordifolia). International Journal of Ayurveda and Pharma Research. 2023 Dec 10:1-5.