International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

“ Novel Herbal Anti – Inflammatory Cream Formulated With Terminalia Arjuna And Ipomoea Carnea”

Dr. Sonali Uppalwar[1], Lokesh Vyas[2], Siddhant Sankhe[3], Lokesh Rathod[4], Aditi Renushe[5], Purva Salunke[6], Chandan Saw[7]

[1,2,3,4,5,6,7]Ideal Institute Of Pharmacy, Posheri , Wada , Palghar , India

Abstract:
Inflamation is the body’s natural respose to injury or infection. However chronic inflammation can causesevere tissue damage and its associated with numerous disorders. The present study aimed to developed a natural effective and skin friendly anti inflammatory cream using terminalia arjuna extract and ipomoea cornea extract. The natural medicines are safer and have fewer side effects than synthetic ones makes them more acceptable the demand for herbal formulations is rising on the global market establishing the herbal anti-inflammatory cream with terminalia arjuna and ipomoea carnea extract is a trending approach this highlights the potential benefits of using a natural ingredients like terminalia ajuna and ipomoea carnea in the cream while imphasizing its safety profile.The cream was formulated using natural oils and emulsifiers and evaluated for parameters like pH, spreadability, washability, irritancy, and phase separation. The final product exhibited excellent physicochemical properties, was stable, non-irritant, easily spreadable, and demonstrated potential anti-inflammatory benefits. Thus, the herbal anti-inflammatory cream represents an eco-friendly and effective alternative to synthetic formulations

Keywords: Tannis, Terminic acid, Galic acid,Arjunolic acid, Terminalia beleria,Terminaliachebula, flavonoids, Ipomoea carnea, Phytoconstituents

I. Introduction

Inflammation is the body’s natural response to injury or infection. However, long-term inflammation can damage tissues and cause many diseases. This study aimed to develop a natural, safe, and skin-friendly anti-inflammatory cream using extracts of Terminalia arjuna and Ipomoea carnea. Herbal medicines are preferred because they are safer and produce fewer side effects than synthetic medicines.The cream was prepared using natural oils and emulsifiers and evaluated for pH, spreadability, washability, irritancy, and phase separation.[1] The formulation showed good stability, easy application, non-irritant nature, and potential anti-inflammatory activity, making it an eco-friendly alternative to synthetic creams .Ipomoea carnea, commonly called Besharam in Maharashtra, is widely used in traditional medicine. Its leaves are used for inflammation, skin diseases, and scorpion bites.[2] The plant contains important phytochemicals like swainsonine and calystegines.Terminalia arjuna is a famous Ayurvedic medicinal plant from the Combretaceae family. It is traditionally used for heart diseases and contains tannins, flavonoids, and polyphenols, which provide strong medicinal and antioxidant properties.[4]

Anti-inflammatory cream : an anti-inflammatory cream is a topical medicine or skincare product applied on the skin to reduce inflammation such a redness, swelling, pain, irritation, and heat. It is commonly used for muscle pain, joint pain, skin allergies, insect bites, rashes, minor injuries and inflammatory skin conditions.[3]

These cream work by slowing down the body inflammatory response and soothing the affected area. Anti-inflammatory cream may contain herbal ingredients, non-steroidal drugs or corticosteroids depending on their purpose.[5]

II. MATERIAL & METHOD

Ingredient	Role
Terminalia arjuna	Active ingredient
Ipomoea carnea	Active ingredient
Steric acid	Emulsifying agent
Cetyl alcohol	Thickening agent
Liquid paraffin	Emollient
Glycerine	Humectant
Triethalamine	Neutralizer
Methyl paraben	Preservative
Cetric acid	Ph adjuster
Water	Vehicle

Materials
TERMINALIA ARJUNA
Biological source : Terminalia arjuna bark
Family : Combretaceae

Physical nature :

- Large deciduous tree.
- Bark is smooth and greyish brown.
- Inner bark appears reddish pink
- Leaves are green, oblong, shiny
- Texture is hard, fibrous, rough from outside
- Inner surface is smooth and powdery after drying
- Odour is slightly earthy smell[8]

Properties :

- Anti-inflammatory property
- Anti- oxidant property
- Anti-microbial activity
- Cardioprotective activity
- Wound healing activity [9]

Medicinal uses :

- Used to reduced inflammation and pain
- Help in wound healing
- Supports heart health
- Helpful in skin disorders and infections [12]

IPOMOEA CARNEA :
Kingdom : plantae
Family : Convolvulaceae

Description : ipomoea carnea is a perennial shrub commonly found in tropical and marshy regions. It grows rapidly and has green leaves with pinkish purple flowers. The plant is widely used in traditional herbal medicine because of its therapeutic properties. [18]

Physical properties :

- Soft woody shrub
- Green, broad, and smooth leaves
- Hollow stem structure
- Funnel shape pink
- Mild characteristics odour
- Soft and fibrous texture [21]

Chemical properties :

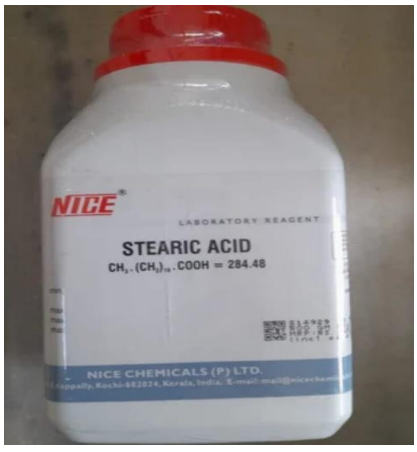
- Alkaloids
- Flavonoids
- Tannins
- Glycosides
- Saponines

Medicinal uses :

- Used as an anti-inflammatory agent
- Helps reduce pain and swelling
- Promotes wound healing
- Used in herbal creams and ointments[28]

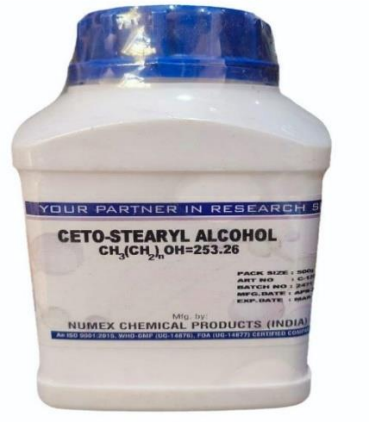
STERIC ACID :

In an anti-inflammatory cream, stearic acid is mainly used as an emulsifying agent, thickening agent, and stabilizer. It helps to mix oil and water phases properly and gives the cream a smooth, creamy texture. Stearic acid improves the consistency and spreadability of the cream, making it easier to apply on the skin. It also helps maintain the stability of the formulation by preventing phase separation during storage. In addition, stearic acid provides a soft and protective feel on the skin, which enhances the overall quality and appearance of the anti-inflammatory cream.[27]



CETYL ALCOHOL

Cetyl alcohol in an anti-inflammatory cream is used mainly to improve the texture, stability, and skin feel of the formulation. It is a fatty alcohol that acts as a thickening agent, emulsifier, emollient, and stabilizer. Purpose of Cetyl Alcohol in Anti-Inflammatory Cream Cetyl alcohol helps to make the cream smooth, soft, and easy to apply on the skin. It increases the viscosity of the cream and prevents the formulation from becoming too thin. It also helps in mixing the oil and water phases properly and maintains the stability of the cream by preventing phase separation during storage.In anti-inflammatory creams, cetyl alcohol works as an emollient that moisturizes and softens the skin, reducing dryness and irritation. It improves the spreadability of the cream and gives a non-greasy and pleasant feel after application. Additionally, it helps the active anti-inflammatory ingredients remain on the skin surface for a longer period, supporting better therapeutic action.Overall, cetyl alcohol enhances the quality, consistency, stability, and effectiveness of anti-inflammatory cream formulations.[31]



LIQUID PARAFFIN

Liquid paraffin is widely used in anti-inflammatory creams as an emollient, moisturizing agent, protective agent, and base material. It is a purified mineral oil that helps improve the texture and therapeutic performance of the cream. [31]

GLYCERINE

Glycerin is commonly used in anti-inflammatory creams as a humectant, moisturizing agent, skin softener, and protective ingredient. It is a clear, colorless, and water-soluble compound that helps maintain skin hydration and improve the effectiveness of the cream.[32]

TRIETHALAMINE

Triethanolamine is commonly used in anti-inflammatory creams as a pH adjuster, emulsifying agent, stabilizer, and formulation aid. It helps improve the texture, stability, and compatibility of the cream with the skin.[34]

METHYL PARABEN

Methylparaben is commonly used in anti-inflammatory creams as a preservative. It helps protect the cream from microbial contamination and increases the shelf life of the formulation.[35]

CETRIC ACID

Citric acid is commonly used in anti-inflammatory creams as a pH adjusting agent, stabilizer, antioxidant support ingredient, and skin-conditioning agent. It helps maintain the quality, stability, and skin compatibility of the cream formulation.[32]

DISTILLED WATER

Distilled water is commonly used in anti-inflammatory creams as a solvent, vehicle, and base ingredient. It is purified water free from impurities, minerals, and microorganisms, making it suitable for pharmaceutical and cosmetic formulations.[38]

III METHODOLOGY

Methods of Extraction

TERMINALIA ARJUNA EXTRACT

1) Collect the terminalia arauma bark and day it in Shade.
2) Then deep into the water 24 hours.
3) Then hard bark become a soft.
4) Then 50-60 gram bark weigh on the weighing balance machine.
5) Them Soxhelt Extracter Chamber in drug are filled.
6) Then Soxhlet Extracter chamber are connected to the round bottom fiask.
7) Then connect the condenser above the Extractor.
8) Ensure proper coater flow through the Condenser.
9) Heat the Solvent using a healing mantle.
10) The Solvent Evaporates, condenser in the condeser and drip Onto the Sample.
11) When the Extrador fills to 0 Certain level, it Siphans back into the fiask.
12) This cyae, repeats automatically.
13) Continue Extraction 6-8 hours or untill the Solvents in the Siphon tube becomes colorless.

IPOMOEA CARNEA

1) Collect the *Ipomoea carnea* bark and day it in Shade.
2) Then deep into the water 24 hours.
3) Then hard bark become a soft.
4) Then 50-60 gram bark weigh on the weighing balance machine.
5) Them Soxhelt Extracter Chamber in drug are filled.
6) hen Soxhlet Extracter chamber are connected to the round bottom fiask.
7) Then connect the condenser above the Extractor.
8) Ensure proper coater flow through the Condenser.
9) Heat the Solvent using a healing mantle.
10) The Solvent Evaporates, condenser in the condeser and drip Onto the Sample.
11) When the Extrador fills to 0 Certain level, it Siphans back into the fiask.
12) This cyae, repeats automatically.
13) Continue Extraction 6-8 hours or untill the Solvents in the Siphon tube becomes colorless.


Processs of formulation

Step 1 : Oil Phase Preparation

1. Weigh stearic acid (3g) ,weigh cetyl alcohol (0.9g) ,weigh liquid Paraffin(2.4ml) .
2. Heat on water bath 70-80 degree Celsius until completely melted.

Step 2 : Aqueous Phase Preparation

1. Dissolve methyl paraben in distilled water.
2. Add glycerin (1.5ml) and triethanolamine (0.3ml).
3. Heat this phase to 75-80 degree Celsius.

Step 3 : Emulsification

1. Slowly add aqueous phase into oil phase with continuous stirring.
2. Stir continuously to form a smooth oil in water cream.

Step 4 : Addition Of Extract

1. Cool the mixture to about 40 degree Celsius.
2. Add Terminalia arjuna extract (1.5ml) and Add Ipomoea carnea Extract (1.5ml).
3. Mix thoroughly for uniform distribution.

Cream formulation

Ingredient	Terminalia arjuna
Terminalia arjuna	1.5 ml
Ipomoea carnea	1.5ml
Steric acid	3 gm
Cetyl alcohol	0.9gm
Liquid paraffin	2.4ml
Glycerine	1.5ml
Triethalamine	0.3ml
Methyl paraben	0.06ml
Cetric acid	0.05gm
Water	Q.S

Evaluation parameter

1] physical Evaluation

2] Ph determination

The Ph of various semi solid formulation were determined by using digital PH meter weight 2.5g of cream and dispersed in 25 ml of distilled water and stored for 2 hours. Then measurement of PH by using digital Ph meter.[42]

3] spreadiability test

The spread ability test for a herbal anti inflammatory cream assesses its ability to evenly distribute and cover a given surface area upon application. This test typically involves placing a fixed quantity of the cream onto a standardized surface such as glass or skin mimic substrate and measuring the diameter of the spread after a specified time period. Factors like viscosity , texture and formulation components influence the cream's spread ability. A cream with good spread ability ensure uniform coverage, easy application and enhanced efficacy. This test help in optimizing formulation param ester to achieve desired spreadindcharacteristics for better consumer experience and therapeutic outcomes.[44][45][48]

4] Homogencity

The homogeneity of herbal anti inflammatory cream is crucial for consistent effectiveness and application. Ensuring uniform distribution of active ingredient throught the product is essential to guarantee each application delivers the intended benefits.

Sr.no	Properties	Observation
1	Colour	Off-white
2	Odour	Pleasant
3	Appearances	Semi solid
4	Texture	Smooth

Achieving homogeneity involves meticulous formulation and manufacturing processes, including through mixing of ingredients and quality control measures. Manufacturers utilize techniques like blending, emulsification, and particles size reduction to achieve desired consistency. Additionally, analytical methods such as visual inspection, microscopy and spectroscopy are employed to assess homogeneity. By maintaining homogeneity.[23][50][55]

IV RESULT

Sr.no	Test	Result
1	Colour	Off-white
2	Odour	Pleasant
3	Appearances	Semi solid
4	Texture	Smooth
5	Ph determination	6
6	Spread ability test	Easy application
7	Homogeneity	Homogeneous
9	Washability	Good
10	Phase separation test	No phase separation
11	Stability test	Stable

V CONCLUSION

The novel herbal anti-inflammatory cream formulated with Terminalia arjuna and Ipomoea carnea showed good stability, safety, and effective anti inflammatory activity. The cream had suitable pH, smooth texture, good spreadability and skin compatibility without irritation. The herbal extract provided synergistic action in reducing inflammation and improving skin healing. Overall, the formulation can be considered a safe, natural, and cost-effective alternative for topical anti-inflammatory treatment with potential future pharamaceutical and cosmetic application.

REFERENCES:

1. Amalraj A, Gopi S. Medicinal properties of Terminalia arjuna (Roxb.) Wight & Arn.: A review. J Tradit Complement Med. 2017;7(1):65–78.
2. Dube N, Nimgulkar C, Bharatraj DK. Validation of therapeutic anti-inflammatory potential of Arjuna Ksheera Paka – A traditional Ayurvedic formulation of Terminalia arjuna. J Tradit Complement Med. 2017;7(4):414–420.
3. Ramesh P, Palaniappan A. Terminalia arjuna, a cardioprotective herbal medicine: Relevancy in the modern era of pharmaceuticals and green nanomedicine. Pharmaceuticals. 2023;16(1):126.
4. Sundar M, Lingakumar K. Investigating the efficacy of topical application of Ipomoea carnea herbal cream in preventing UVB-induced skin damage in a rat model. Heliyon. 2023;9(9):e19161.
5. Chopra RN, Ghosh S. Terminalia Arjuna: Its chemistry, pharmacology and therapeutic action. Indian Med Gazette. 1929;64(2):70–73.
6. Rana MS, Walia R, Dixit A, et al. To compare and evaluate the anti-inflammatory efficacy of Terminalia arjuna with diclofenac sodium on rats. Int J Basic Clin Pharmacol. 2016.
7. Gaikwad D, Jadhav N. A review on biogenic properties of stem bark of Terminalia arjuna: An update. Asian J Pharm Clin Res. 2018;11(8):35–44.
8. Biswas M, Biswas K, Karan TK, et al. Evaluation of analgesic and anti-inflammatory activities of Terminalia arjuna leaf. J Phytology. 2011;3(1):33–38.
9. Abo-Elghiet F, Abd-elsttara A, Metwaly AM, Mohammad DI. Antioxidant, anti-inflammatory, and antimicrobial evaluation of Terminalia arjuna leaves, fruits, and bark. Azhar Int J Pharm Med Sci. 2022;2(2):148–158.
10. Kokate CK, Purohit AP, Gokhale SB. Pharmacognosy. Pune: Nirali Prakashan; 2019.
11. Khandelwal KR. Practical Pharmacognosy. Pune: Nirali Prakashan; 2008.
12. Trease GE, Evans WC. Pharmacognosy. 16th ed. Saunders Elsevier; 2009.
13. Harborne JB. Phytochemical Methods. Chapman and Hall; 1998.
14. Mukherjee PK. Quality Control of Herbal Drugs. Business Horizons Pharmaceutical Publishers; 2002.

15. Sharma PP. Cosmetics Formulation, Manufacturing and Quality Control. Vandana Publications; 2014.
16. Barel AO, Paye M, Maibach HI. Handbook of Cosmetic Science and Technology. CRC Press; 2014.
17. Lachman L, Lieberman HA, Kanig JL. Theory and Practice of Industrial Pharmacy. CBS Publishers; 2013.
18. Aulton ME. Aulton's Pharmaceutics: The Design and Manufacture of Medicines. Elsevier; 2018.
19. Remington. The Science and Practice of Pharmacy. Pharmaceutical Press; 2012.
20. Allen LV. Ansel's Pharmaceutical Dosage Forms and Drug Delivery Systems. LWW; 2013.
21. Banker GS, Rhodes CT. Modern Pharmaceutics. Marcel Dekker; 2002.
22. Sinko PJ. Martin's Physical Pharmacy and Pharmaceutical Sciences. Lippincott Williams & Wilkins; 2011.
23. Tripathi KD. Essentials of Medical Pharmacology. Jaypee Brothers; 2019.
24. Rang HP, Dale MM. Pharmacology. Elsevier Churchill Livingstone; 2016.
25. Harsh Mohan. Textbook of Pathology. Jaypee Brothers; 2015.
26. Kumar V, Abbas AK, Aster JC. Robbins Basic Pathology. Elsevier; 2017.
27. Jain NK. Controlled and Novel Drug Delivery. CBS Publishers; 2005.
28. Benson HAE. Transdermal drug delivery. Curr Drug Deliv. 2005.
29. Williams AC, Barry BW. Penetration enhancers. Adv Drug Deliv Rev. 2012.
30. Cooper and Gunn's. Dispensing for Pharmaceutical Students. CBS Publishers; 2000.
31. Indian Pharmacopoeia. Government of India; latest edition.
32. British Pharmacopoeia. London: The Stationery Office; latest edition.
33. United States Pharmacopoeia (USP). USP Convention; latest edition.
34. Indian Herbal Pharmacopoeia. Indian Drug Manufacturers Association; 2002.
35. The Ayurvedic Pharmacopoeia of India. Government of India; latest edition.
36. Sharma RK, Dash B. Charaka Samhita. Chowkhamba Sanskrit Series Office; 2010.
37. Sharma PV. Dravyaguna Vijnana. Chaukhamba Bharati Academy; 2006.
38. Nadkarni KM. Indian Materia Medica. Popular Prakashan; 2009.
39. Kirtikar KR, Basu BD. Indian Medicinal Plants. International Book Distributors; 2005.
40. Warrier PK. Indian Medicinal Plants: A Compendium of 500 Species. Orient Longman; 1996.
41. Jain SK. Medicinal Plants. National Book Trust, India; 2003.
42. Ali J. Herbal Drugs and Phytopharmaceuticals. Springer; 2008.
43. Pulok K Mukherjee. Phytopharmacology and Herbal Drug Technology. Business Horizons; 2019.
44. Satoskar RS, Bhandarkar SD, Ainapure SS. Pharmacology and Pharmacotherapeutics. Popular Prakashan; 2017.
45. Mehta RM. Pharmaceutics-I. Vallabh Prakashan; 2015.
46. Gupta PK. Pharmaceutical Engineering. CBS Publishers; 2010.
47. Choudhary N, Sekhon BS. An overview of advances in herbal cosmetics. J Pharm Educ Res. 2011.
48. Pandey S, Meshya N, Viral D. Herbs play an important role in the field of cosmetics. Int J Pharm Tech Res. 2010.
49. Kapoor VP. Herbal cosmetics for skin and hair care. Nat Prod Radiance. 2005.
50. Wallis TE. Textbook of Pharmacognosy. CBS Publishers; 2005.
51. Evans WC. Trease and Evans Pharmacognosy. Saunders Elsevier; 2009.
52. Dwivedi S. Terminalia arjuna Wight & Arn.—A useful drug for cardiovascular disorders. J Ethnopharmacol. 2007.
53. Uddin Q, Samiulla L, Singh VK, Jamil SS. Phytochemical and pharmacological profile of Terminalia arjuna. Pharmacogn Rev. 2010.
54. Mukhtar HM, Ansari SH, Ali M, et al. New compounds from Terminalia arjuna. J Asian Nat Prod Res. 2004.

55. Sen T, Samanta SK. Medicinal plants, human health and biodiversity: A broad review. Springer; 2014.
56. Pawar RS, Bhutani KK. Effect of Terminalia arjuna on inflammation and oxidative stress. Phytomedicine. 2005.
57. Ali A, et al. Anti-inflammatory properties of Terminalia arjuna. Pharmazie. 2003.
58. Gupta R, Singhal S. Herbal formulations and their evaluation parameters. Int J Pharm Sci Res. 2012.
59. Sharma OP. Plant Taxonomy. McGraw Hill Education; 2012.
60. Gennaro AR. Remington: The Science and Practice of Pharmacy. Lippincott Williams & Wilkins; 2000.