Formulation and Evaluation of Polyherbal Face cream

Patil Rajvardhan Dipak[1], Mulla Simran Aslam[2], Mehta Kruti Chetan[3], Sutar Pournima Krishnadatt[4], Kumbhar Roshani Arjun[5], Dange Vidya Namdeo[6], Shid Shubhangi Jagannath.[7]
[1,2,3,4,5]Under Graduate Student, Rajarambapu College of Pharmacy, Kasegaon
[6,7]Assistant Professor Pharmacy Department, Rajarambapu College of Pharmacy, Kasegaon

Abstract- **The aim of the present study was to formulate and evaluate polyherbal face cream using ethanolic extracts of Aloe vera, Amla and Cucumber peel renowned for their antibacterial, antioxidant, and moisturising properties. The maceration process is used for the extraction of herbal ingredients used in the formulation. Herbal face cream was evaluated by considering various parameters which includes organoleptic characters such as colour, odour, texture, consistancy and appearance and physicochemical properties like pH, spreadability and washability. Antimicrobial test was performed to assess the antibacterial activity of Aloe vera by using staphylococcus aureus through agar well plate diffusion method. The formulation has shown good antibacterial activity and has successfully met all the required parameters, demonstrating excellent physical, chemical properties.**

Key Words: **Herbal face cream, Aloe vera, Amla, Maceration, Anti-bacterial Activity**.

INTRODUCTION

Creams are defined as semisolid emulsions consisting of either the oil-in-water or water-in-oil type. The thickness of this dosage forms it varies by oil and water. Creams can be herbal, ayurvedic, or allopathic which can be used by the peoples according to their needs. Also, creams are used for numerous purposes similar as defensive, cleansing, perfecting appearance, beautifying, or for therapeutic activity. Cream contains one or more drug substances dispersed in a suitable base. Creams may be classified in two types on the basis of phases that are: o/w or w/o type of emulsion. “Creams” are the semisolid dosage form formulated as either water-in-oil or oil-in-water.[1]

This polyherbal cream consists of crude drugs including Aloe Vera, Amla and cucumber. The aim of present research work was to formulate and evaluate polyherbal cream containing hydroalcoholic extracts of Aloe Vera, Amla and cucumber, which can give effects like moisturizer, reduce bacterial infection and skin irritation, dry skin and also adding glow to the face.[2]

SKIN: It is the outermost part of the body and the largest organ which represents 8% of body weight. It is a complex structure that has different cells and fibers that comprise the multi-layered structure of the skin.

The outermost layer of our skin, called the epidermis, acts like a protective shield. It's made up of layers of tough, scale-like cells filled with a protein called keratin. This layer varies in thickness across the body, being thickest on the palms and soles. The dermis lies beneath the epidermis and is made of strong, flexible connective tissue. It's likethe skin's support system, with collagen and elastic fibers woven throughout. If the skin is stretched too much, the elastic fibers can tear, leading to stretch marks. Collagen is crucial for maintaining the skin's strength, but its production decreases with age, resulting in wrinkles. Skin is not just about appearances; it's our body's first line of defense against infections, harmful UV rays, and injury. Keeping it healthy through proper care and protection is essential for overall well-being.[3]

MATERIAL AND METHOD

Collection of plant material:

The plant material Cucumber, Amla and fresh leaves of Aloe vera were procured from a Medicinal garden or Ayurvedic Medical Shop. The plant material was left to dry in the sun for 4 to 5 days. After it dried, it was crushed and sifted to get a nearly fine, powdery substance.

Extraction of Herbal Ingredients:

For this study the maceration process is used for the extraction of herbal constituent used in the formulation. Maceration is the simple technique used for extraction of plant drug. In maceration process

powdered or coarse plant material is socked in suitable solvents such as ethanol. It is Most commonly used inexpensive technique used for the extraction of different bioactive compounds

Fig.1 Maceration

from plant material Then this mixture of plant material and solvent is kept for longer time (2-3days), agitated at different intervals and filtered through a filtration medium. The efficiency of extraction is also influenced by how polar the solvent. Due to maceration ruptures the cell structure and chemical constituents expose to react with solvent and helps in removal of active constituents from different plant materials.[4]

Fig.2 Filtration

INGREDIENTS WITH MONOGRAPH

Drug Profile :

Synonym : Aloe Barbadensis

Biological Source : The biological source of aloe is dried latex of leaves of it. It is also known as curacao aloe, cape aloe and socotrine aloe.

Family: Liliaceae.[5]

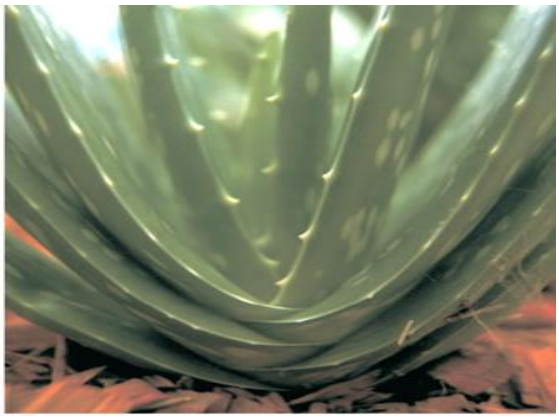

Fig.3 Aloe Vera

Kingdom	Plantae
Order	Asparagales
Family	Asphodelaceae
Genus	Aloe
Species	A. vera

Table No 1 : Scientific Classification of Aloe vera

Uses :

Remove acne: Aloe vera's anti-phlogistics qualities help reduce redness and scarring from acne. It also reduces itching, blistering and working of the wound. Use an aloe vera cleanser to reduce blemishes and shrink pimples.

Sunburn: The nourishing and antioxidant properties of aloe vera make it ideal for treating sunburn. In addition to replacing lost moisture, it also protects the skin from sun damage.[6]

Amla

Fig.4 Amla

Synonym : Emblica Officinalisis

Biological Source: This is consists of dried, as well

as fresh fruits pericarp of the plant Emblica officinalis
Family : Euphorbiaceae.[7]

Kingdom	Plantae
Order	Malpighiales
Family	Phyllanthaceae
Genus	Phyllanthus
Species	P. emblica

Table No 2 : Scientific Classification of Amla

Uses :
1. Reducing fine lines and wrinkles
2. Reducing inflammation and redness.[8]

Cucumber

Fig.5 Cucumber

Synonym :- Cucumis sativus
Biological Source:-The cucumber(Cucumis sativus) is widely- cultivated creeping vine plant.
Family:- Cucurbitaceae.[9]

Kingdom	Plantae
Order	Cucurbitales
Family	Cucurbitaceae
Genus	Cucumis
Species	C. sativus

Table No 3: Scientific Classification of Cucumber
Uses :
1. Hydration
2. Brightening
3. Cooling

CREAM FORMULATION
Beeswax, propylene glycol was taken in first beaker. Then heat on a water bath for uniform mixing. After few minutes oil phase was formed. T h e n Aloe vera, Amla, cucumber peel dried powder extract, distilled water, glycerine, zinc oxide, Sodium benzoate and white soft paraffin was taken in second beaker. Mixing all the ingredients by continuous stirring on a water bath, the aqueous phase was formed. Then Oil phase was added into aqueous phase and continuous stirring was done until semisolid mass was formed.[10]

FORMULATION TABLE

Sr. No	INGREDIENT	QUANTITY Taken	ROLE OF INGREDIENT
1	Aloevera	1.5 gm	Antibacterial
2	Amla	1 gm	Antioxident
3	Cucumber peels	0.8 gm	Anti-inflametry
4	Bees wax	3.2 gm	Base
5	White soft parafin	9 ml	Base
6	Methyl Paraben	0.3ml	Preservative
7	Menthol	0.2ml	Counter irritant
8	Glycerin	1 ml	Humectant
9	Propylene Glycol	1ml	Emollient
10	Zinc Oxide	0.7 gm	UV absorber
11	Sodium Benzoate	0.1 gm	Preservative
12	Distilled Water	q.s	Vehical

Table No 4 : Formulation table for cream

EVALUATION TEST

Physical Evaluation :
Formulated herbal creams was further evaluated by using the following physical parameter colour, odour, and state of the formulation.
a) Colour: The colour of the prepared cream was observed by visual examination.
b) Odour: The odour of prepared cream was evaluated.
c) State: The state of prepared cream was examined visually.
d) Consistency: The consistency of cream was tested by manually rubbing it on hand.
e) Ph: ph of prepared herbal cream was checked with digital ph meter. First calibrate the pH meter using neutral and acidic buffers. Take 1gm of accurately weighed quantity of cream and dissolve it in 100 ml of distilled water and store it in for two hours.
f) Spredability: Spread ability of formulated cream

was measured by placing sample in between two slides then compressed to uniform thickness by placing a definite weight for defined time. Lower the time taken for sepration of two slides results showed good Spredability. Spredability was calculated by the following formula.

Spredability(s) =

$$\frac{\text{weight tide to upper slide (w) x length of glass slide(L)}}{\text{Time taken to separate slide (T)}}$$

g) Washability: Prepared cream was applied to the skin, and its ease of washing off with water was tested.

h) Non- irritancy test: Prepared cream formulation was evaluated for the non-irritancy test. Preparation shown no redness and irritancy. Observation of the state was done for 24h.

i) Phase separation- The prepared cream was transferred in a suitable wide mouth container. Set aside for 24h storage the aqueous phase and oil phase separation were visualized.

j) After feel : Observations indicated that the cream provided good slipperiness and left a satisfactory amount of residue after application.[11]

IN VITRO STUDY

Antibacterial test: Aloe vera extracts are commonly found in many over-the-counter and skin care products. Research shows that applying aloe vera to the skin can effectively treat burns, sunburns, skin inflammation, and wounds. Additionally, aloe vera has antibacterial properties, which help prevent infections by inhibiting the growth of bacteria on the skin.[12] For this evaluation of antibacterial test the micro-organisms Staphylococcus aureus were selected to test the anti-bacterial activity i.e. ability to inhibit the growth of microbes in the formulated face cream. Staphylococcus aureus is actually a causative agent in the pathogenesis of acne. Based on microbiological data of both healthy and acne-affected persons, we propose that contribution of Staphylococcus aureus in acne pathogenesis is controversial.[13] Prior to testing, bacterial strain was cultured in nutrient agar plates and incubated for 18 to 24 hrs at 37ºC to obtain colonies. The Agar well plate diffusion method is used for this study. Using a sterile cork borer, wells were drilled then they are filled with concentration of standard and test. Finally, the plate is incubated at 37ºC for 24 hrs. By measuring zones of inhibition the antibacterial activity is evaluated.[14

RESULT AND DISCUSSION

A. EVALUATION TEST RESULT

1. Colour: Colour of prepared cream was found to be Brownish White.

2.Odour: The odour of prepared cream was found to be characteristics.

3. State: The result was found to be semi solid

Fig.6 Formulated Cream

4. Consistency: The consistency of cream was found to be smooth.

5. Ph: ph of prepared herbal cream was found to be 5.5.

Fig.7 Ph Meter

6. Spredability: Spredability of prepared polyherbal face cream was found to be good spredable.
7. Washability: It was discovered that it could be washed off easily.
8. Non-irritancy test: Result was found to be non-irritant.


Fig.8 Before Application Fig.9 After Application

9. Phase separation- There was no phase separation.
10. After feel: Result was found to be pleasant emollient effec

SR.NO	PARAMETER	OBSERVATION
1	Colour	Brownish White
2	Odour	Characterstic
3	State	Semisolied
4	Consistency	Smooth
5	Ph	5.5
6	Spredability	11g.cm/s
7	Washability	Easy Washable
8	Non- irritancy	Non irritant
9	Phase separation	No Phase separation
10	After feel	Emollient

Table No 5 : Evaluation table of cream

B. **Antibacterial Study**

For this study the gram positive bacteria Staphylococcus aureus were selected and zone of inhibition should be measured.

Fig.10 Antibacterial activity

Sr. No	Drug Used	Micro-organism	Concentration	Zone of inhibition
1	Control	S. Aureus	-	-
2	Formulated cream	S. Aureus	1 mg/ml	14 mm
3	Standard	S. Aureus	1 mg/ml	16.2 mm

Table No 6 : Antibacterial test

CONCLUSION

The study found that the polyherbal face cream formulation met all the tested evaluation parameters, confirming its successful preparation. The pH of the cream was found to be 5.5. The cream has shown spreadability 11g.cm/s and washability. The odour of the cream is pleasant and colour is brownish white and no irritation persists when applied to skin. The prepared formulation has shown no phase separation that proves the formulation has good stability. The above studies proves that the prepared formulation has good antibacterial activity by showing the zone of inhibition 14mm against staphylococcus aureus. It can be concluded that the use of herbal products over synthetic are advantageous due to their less side effects and more beneficial.

REFERANCES

[1] B, A. S., A, P. D., S, J. S., R, S. J., & D, G. S. Formulation and evaluation of polyherbal face cream. *Int J Adv Res Sci Commun Technol*. 2022;7(4):234–239. https://doi.org/10.48175/ijarsct-4803.

[2] Shivathaya N, Surve R, Sawant R, Khot S, Biradar K, Verma R, Gorav A. Formulation and in vitro evaluation of ethanolic extract of polyherbal face cream. *Int J Curr Pharm Res.* 2022;14(2):41-47. Available from: https://doi.org/10.22159/ijcpr.2022v14i2.1950.

[3] Patel AH, Tamboli AH, Tamboli SS, Kate P. a review: formulation and evaluation of herbal face cream. *Int Res J Modern Eng Technol Sci.* 2024;6(3):5861.

[4] Chesson A. Maceration in relation to the post-harvest handling and processing of plant material. *J Appl Bacteriol.* 1980;48(1):1-45.

[5] Sharrif Moghaddasi M, M. Res. Aloe vera their chemicals composition and applications: A review. *Int J Biol Med Res*. 2011;2(1):466-71.

[6] Nagansurkar SB, Bais SK, Mujawar MB. A review: aloe vera is miracle plant. *Int J Pharm.* 2024;2(1):367-78.

[7] Talreja S, Kumari S, Srivastava P, Pandey S. A complete pharmacognostic review on amla. *World. J. Pharm. Pharm. Sci*. 2021;8(4):622-37.
[8] Mishra A, Sharma D. Multiple health benefits of Amla in our day-to-day life. *International Journal of Pharmacognosy and Life Science* 2023; 4(2): 60-68
[9] Rajvanshi A, Sharma S, Khokra SL, Sahu RK, Jangde R. Formulation and evaluation of Cyperus rotundus and Cucumis sativus based herbal face cream. *Pharmacologyonline*. 2011;2(1):1238-44.
[10] Badwaik CB, Lade UB, Agarwal T, Barsagade P, Nandgave M, Gaddamwar N. Formulation and Evaluation of Herbal Face Cream. *International Journal of Pharmaceutical Research and Applications*. 2022 Jan;7(1):955-60.
[11] Ansari RA, Jain S, Aditya Institute Of Pharmaceuticals, Dr. Babasaheb Ambedkar Technological University. Formulation and evaluation of herbal face cream. *Int J Creative Res Thoughts (IJCRT)*. 2023;11(6):268–269. Available from: https://ijcrt.org/papers/IJCRT2306141.pdf
[12] Arbab S, Ullah H, Weiwei W, Wei X, Ahmad SU, Wu L, et al. Comparative study of antimicrobial action of aloe vera and antibiotics against different bacterial isolates from skin infection. *Vet Med Sci*. 2021;7(5):2061-2067.
[13] Khorvash F, Abdi F, Kashani HH, Naeini FF, Narimani T. Staphylococcus aureus in acne pathogenesis: a case-control study. *N Am J Med Sci*. 2012 Nov;4(11):573-576.
[14] Mamillapalli V, Katamaneni M, Tiyyagura VM, Kanajam P, Namagiri AP, Thondepu H, Appikatla B, Devangam B, Khantamneni P. Formulation, phytochemical, physical, biological evaluation of polyherbal vanishing cream, and facewash. *Research Journal of Pharmaceutical Dosage Forms and Technology*. 2020;12(3):139-49.