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Formulation and Evaluation of Polyherbal Facial Gel

Mr. Arun G Krishnan*, Ms. Amritha J R[1], Ms. Muhasina Latheef[2], Ms. Swathy Sunil[3], Ms. Kavya Suresh[4], Ms. Ramsana R[5]

*Associate Professor, Department of Pharmaceutics, B. Pharmacy Students, Department of Pharmaceutics
Dr. Joseph Mar Thoma Institute of Pharmaceutical sciences and Research, Kattanam, Kerala, India

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ABSTRACT

Face gel is a light-weight, hydrating product used for skin care. The current study is based on the formulation and assessment of a polyherbal face gel containing Mango leaf powder (Mangifera indica), Turmeric powder (Curcuma longa), and Aloe vera gel (Aloe barbadensis), along with Carbopol 940 as a gelling agent, Propylene glycol as a humectant, Triethanolamine as a pH regulator, and Lavender oil as a fragrance agent. The face gel was formulated using a simple mixing technique, where the herbal powders were uniformly dispersed in the base. The formulated face gel was tested for physicochemical properties such as pH, viscosity, spreadability, homogeneity, and stability at different conditions. The polyherbal face gel showed good consistency, strong skin adhesion, and stability without separation. The addition of Mango leaf and Turmeric powder provided antioxidant and antimicrobial action, while Aloe vera gel provided soothing and moisturizing effects. The study clearly shows that the formulated polyherbal face gel can be used as a safe, effective,and natural skincare product with immense cosmetic and therapeutic values.

Keywords: Facial gel, Herbal cosmetics, Mango leaf powder, Turmeric power, Aloe vera, Natural skincare.

INTRODUCTION

Facial gels are the best form of topical preparations due to their non-greasy texture, quick absorption, ease of application, and pleasing appearance. Gels are non-greasy, easily spreadable, aesthetically pleasing, and promote faster drug release and absorption as compared to creams and ointments. The cooling sensation, washability, and compatibility with oily and acne-prone skin make them the best vehicle for anti-acne herbal actives.

Herbal cosmetics are used to improve skin health with minimal side effects, as compared to synthetic Polyherbal formulations are used to prepare a combination of various plant extracts to produce synergistic effects. Mangifera indica leaves contain mangiferin and polyphenols, which are antioxidants and antimicrobials. Curcuma longa contains curcuminoids, which are anti-inflammatory and antimicrobial agents. Aloe barbadensis gel is used for its moisturizing, soothing, and wound-healing properties.Taking into consideration the rising incidence of acne and the need for natural skin care products, the main objective of this study was to formulate and evaluate a polyherbal facial gel.

MATERIALS AND METHODS

Materials

Mango leaves, turmeric powder, aloe vera gel, Carbopol 940, triethanolamine, propylene glycol, lavender oil, distilled water. Mango leaf powder (Mangifera indica) was employed as a natural antioxidant and antimicrobial agent to protect the skin from infections and oxidative damage.

Fig no: 1 mango leaf

Turmeric (Curcuma longa) is an evergreen herb, which is a member of the ginger family (Zingiberaceae), and is commonly grown in the tropical parts of Asia. The rhizomes of the plant are the main parts that are used, and these are dried and powdered to make a bright golden yellow to deep orange-colored powder. Turmeric is very well known for its medicinal uses, which include anti-inflammatory, antioxidant, and antimicrobial properties, and is also used as an aid to digestion. Because of its medicinal and functional properties, turmeric has been widely used as a spice, coloring agent, and a key ingredient in many medicinal preparations. Turmeric powder (Curcuma longa) was employed due to its anti-inflammatory and antibacterial properties, which help to reduce acne and skin irritation.

Fig no:2 Turmeric Powder

Aloe barbadensis Miller, also known as Aloe vera, is a succulent perennial plant that is classified under the Asphodelaceae family. The leaves of this plant are the principal parts used, and they are green in color with a clear viscous gel. Aloe vera is very famous for its moisturizing effects and is widely used in the treatment of skin injuries. It also has anti-inflammatory, antimicrobial, and wound-healing properties, making it a very valuable ingredient in pharmaceutical and cosmetic formulations. Aloe vera gel was employed as a moisturizing and soothing agent that hydrates the skin and promotes healing.

Fig no:3 Aloe vera

Carbopol 940 was employed as a gelling agent to give thickness and appropriate consistency to the gel formulation. Propylene glycol was employed as a humectant and penetration enhancer that helps to retain moisture and enhance the absorption of herbal compounds into the skin. Triethanolamine was added to adjust the pH and to neutralize Carbopol for gel preparation. Lavender oil

was employed as a fragrance and also possesses mild antimicrobial properties. Distilled water was employed as a solvent and base material for preparing the gel.

Preparation of Mango Leaf Powder

Fresh and healthy mango leaves (Mangifera indica) were taken from a disease-free plant after proper identification. The leaves were washed with tap water and then with distilled water to eliminate any impurities. The leaves were then shade-dried at room temperature until they were completely dry and brittle. The dried leaves were crushed and ground into a coarse powder using a grinder without heating. The powder was sieved using sieve no. 100 to get a fine powder, and the remaining particles were reground and sieved again. The final powder of mango leaves was stored in an airtight container in a cool, dry place.

Formulation of Gel

Carbopol was dispersed in water and allowed to hydrate. Herbal ingredients and propylene glycol were added. pH adjusted using triethanolamine. Lavender oil was added. Four formulations (F1–F4) were prepared.

Steps in procedure

1. Weigh accurately the required amount of Carbopol 940.

2. Disperse Carbopol 940 in required quantity of distilled water with constant stirring until a uniform dispersion is obtained.

3. Add the calculated amounts of mango leaf powder, turmeric powder, aloe vera, and propylene glycol to the dispersion with constant stirring.

4. Add distilled water to the mixture to make up the final volume to 100 ml.

5. Stir the formulation well to mix all the ingredients uniformly.

6. Adjust the pH of the gel to the desired value by adding triethanolamine slowly with constant stirring.

7. Stir until a smooth gel of desired consistency is obtained.

SL NO	INGREDIENTS	FORMULATIONS			
		F1	F2	F3	F4
1	Carbopol 940	0.5%w/w	0.5%w/w	0.5%w/w	0.5%w/w
2	Mango leaf powder	2.5%w/w	5.0%w/w	7.5%w/w	10.0%w/w
3	Turmeric powder	0.5%w/w	0.5%w/w	0.5%w/w	0.5%w/w
4	Aloevera gel	1.5%w/w	1.5%w/w	1.5%w/w	1.5%w/w
5	Propylene glycol	5.0%v/v	5.0%v/v	5.0%v/v	5.0%v/v
6	Triethanolamine	1.0%v/v	1.0%v/v	1.0%v/v	1.0%v/v
7	Lavender oil	0.5%v/v	0.5%v/v	0.5%v/v	0.5%v/v
8	DM Water	qs	qs	qs	qs

Fig no:4 Different formulations

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Evaluation of polyherbal facial gel

The following are the evaluation criteria used to evaluate formulations tested.

1. Phytochemical Testing: using standard qualitative tests for testing for the presence of alkaloids, flavonoids, tannins, steroids in the extracts.

2.Organoleptic Evaluation: evaluating the appearance of ; colour, clarity, odour and uniformity of the formulation by sight (eyes).

3.pH Measurement: measurement of the pH of the formulations using a digital calibrated pH meter.

SL NO	FORMULATION	pH
1	F1	6.48
2	F2	6.74
3	F3	6.97
4	F4	7.1

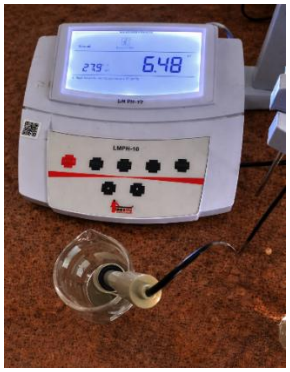

Fig no:5 Result of pH of facial gel

4. Viscosity determination: Viscosity was determined using a Brookfield viscometer.

SL NO	FORMULATION	VISCOSITY
1	F1	1786.3mpscl
2	F2	1821.5mpscl
3	F3	2000.5mpscl
4	F4	2047.4mpscl

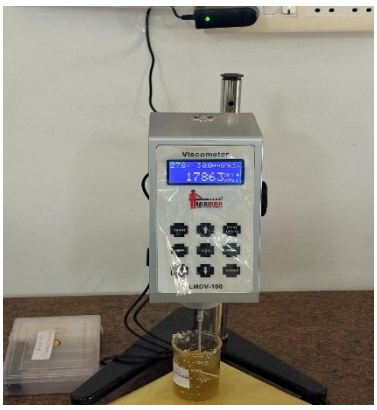

Fig no :6 Result of viscosity of facial gel

5. Spreadability: Application of gel to the skin and assessment of the even spread of gel on skin.

6.Washability: Manual assessment regarding the ease of removal of gel with water.

7.Antibacterial activity:

Antibacterial potential of the gel was determined by agar well diffusion method using Staphylococcus aureus. Nutrient agar plates were inoculated with a fresh culture of bacteria to ensure even growth of the lawn. Wells were created using a cork borer, and the control, standard antibiotic, and test gel were placed inside. The plates were allowed to diffuse at room temperature and then incubated at 37°C for 24 hours. The zones of inhibition were measured in millimeters to determine the antibacterial potential of the gel.

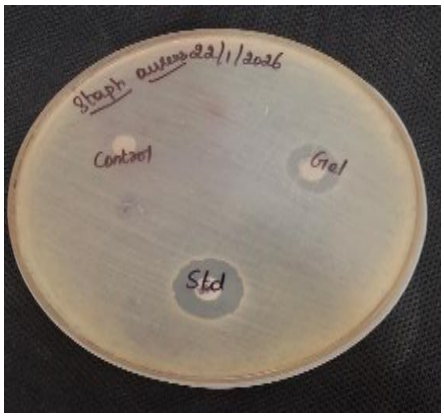

Fig no:7 Antibacterial activity of polyherbal facial gel

Result and discussion

All the formulated facial gels were found to possess an acceptable physical appearance, homogeneity, and skin-friendly pH, thus being suitable for topical application. Among the formulated facial gels, F1 was found to possess optimal viscosity, spreadability, texture, and stability compared to the other formulations. In the antibacterial assay against Staphylococcus aureus, F1 demonstrated the largest zone of inhibition, thus suggesting its enhanced antibacterial activity, which could be attributed to the combined action of mango leaf extract, turmeric, and aloe vera. Based on the overall physicochemical assessment, antibacterial activity, and stability, F1 was found to be the best formulation.

Conclusion

The current research has successfully formulated and tested a polyherbal facial gel formulation using mango leaf powder, turmeric, aloe vera, and appropriate excipients. The developed facial gel was found to have acceptable appearance, homogeneity, skin-friendly pH, spreadability, viscosity, and stability. Among all the formulations, F1 was found to have the best physicochemical properties and performance. Hence, F1 was identified as the best formulation, and it indicates that the polyherbal facial gel is safe and effective for topical use.

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