ejpmr, 2024, 11(2), 361-365

SJIF Impact Factor 6.222

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

Research Article

ISSN 2394-3211

EJPMR

FORMULATION AND EVALUATION OF HERBAL TOPICAL CREAM FOR ACNE TREATMENT

Leemol Varghese*[1], Pasupula Sri Varsha*[2], Azmeera Jyothi[3], Pinkey Devi Choudhary[4], R. Meghana[4] and B. Bhavishya[4]

[1,2]Assistant Professor, Department of Pharmacognosy Sarojini Naidu Vanita Pharmacy Maha Vidyalaya, Osmania University, Secunderabad, Telangana, India.

[3]Assistant Professor, Department of Pharmaceutics Sarojini Naidu Vanita Pharmacy Maha Vidyalaya, Osmania University, Secunderabad, Telangana, India.

[4]Research Student, Sarojini Naidu Vanita Pharmacy Maha Vidyalaya, Osmania University, Secunderabad, Telangana, India.

***Corresponding Author: Leemol Varghese**

Assistant Professor, Department of Pharmacognosy Sarojini Naidu Vanita Pharmacy Maha Vidyalaya, Osmania University, Secunderabad, Telangana, India.

Article Received on 08/12/2023 **Article Revised on 29/12/2023** **Article Accepted on 18/01/2024**

ABSTRACT

The main objective of our Research work is to explore the Anti-Acne properties of natural compounds found in herbal remedies. Acne is a significant health concern today, and traditional acne creams often found to have undesirable side effects due to addition of chemicals. To address this issue, scientists and doctors are increasingly focusing on herbal treatments. In the current study we have formulated a cream containing Anti-allergy supplements like quercetin, glycyrrhetinic acid (from liquorice), and curcumin (from turmeric) to combat the root causes of acne, targeting excess oil production, inflammation, and to kill the bacteria which causes acne. Clinical trials indicate that quercetin is highly effective in reducing acne, while glycyrrhetinic acid is widely used for skin diseases and has a remarkable impact on skin improvement. Turmeric, commonly used in India, is effective in addressing both bacterial and inflammatory aspects of acne when used as a cream. The research suggests that 5 to 10% turmeric extract in ointment form is useful for reducing acne. Future research will explore herbal medicines for treating various skin conditions. Additionally, the prepared creams underwent physical characterization tests to ensure safety and efficacy, assessing factors like appearance, pH, wash ability, consistency, lather quality, color, and irritation.

KEYWORDS: Acne, Quercetin, Glycyrrhetinic acid, Curcumin.

INTRODUCTION

Natural or plant-based cosmetics, commonly referred to as herbal cosmetics, are beauty and skincare items that contain substances obtained from plants, herbs, and other natural sources. These are prepared by using herbal ingredients, plant-based oils, essential oils, and botanical extracts. The demand of herbal medicines is increasing rapidly due to their skin friendliness and lack of side effects. Herbal cosmetics are the modern trend in the field of beauty and fashion. These agents are gaining popularity as nowadays most women prefer natural products over chemicals for their personal care to enhance their beauty as these products supply the body with nutrients and enhance health and provide satisfaction as these are free from synthetic chemicals and have relatively less side-effects compared to the synthetic cosmetics. WHO states that it is essential to use controlled techniques and appropriate standards in order to guarantee the products purity by gathering, identifying, preparing, and assessing herbal goods.[1,3]

In the current study the following drugs were used.

Turmeric is the common ingredient in Indian spice, Curcumin is a yellow colored pigment chemically it is 1,6 heptadiene 3, 5-dione (1E,6E)-1,7 bis (4-hydroxy-3-methoxy phenyl) that belongs to Zingiberaceae family. It includes two curcuminoids, curcumin desmethoxy ester and bis desmethoxy curcumin, because of which turmeric has a yellow color. Curcumin is used as Anti inflammatory agent. It is also used to promote a healthy circulation. Curcumin appears to have significant anti-inflammatory defenses by influencing the metabolism of cyclooxygenase or prostaglandins and leukotrienes.[2-5]

Quercetin is also known as 2- (3,4-dihydroxy phenyl)-3,5,7-trihydroxy 4H chromen-4one. Quercetin is the flavonoid found in fruits, vegetables, leaves, roots and grains. They are ingested in the form of foods, beverages or food additives. Quercetin is used to treat Atherosclerosis, high cholesterol, treating chronic

infections of the prostate, Eczema, Pancreatitis and other inflammatory disorders.

Glycyrrhetinic acid is known as 10-hydroxy-2,4a,6a,6b,9,9,12a-heptamethyl-13-oxo-3,4,5,6,6a,7,8,8a,10,11,12,14b-dodecahydro-1H-2-carboxylic acid. It can also be found in liquorice root (*Glycyrrhiza glabra*) belonging to the family Leguminosae. Glycyrrhetinic acid has different pharmacological properties like Antioxidant, Hepatoprotective activity, Anti-inflammatory, Antitumor and antibacterial etc.[4]

MATERIAL AND METHODS

Chemicals

Ethanol was purchased from Avantor Performance Materials, Pvt. Ltd., di-Sodium hydrogen orthophosphate anhydrous and Sodium dihydrogen orthophosphate dehydrate used for phosphate buffer was purchased from Lab Elite, Borax & stearic acid was purchased from Molychem, Glycyrrhetinic acid, Quercetin were purchased from Yucca Enterprises, Turmeric was purchased from Aashiravaad turmeric powder Nutrient agar: Beef extract were purchased from Himedia & peptone were purchased from Titan Biotech, ltd.

Composition of cream: Table.1.

S.No.	Ingredients	Quantity (for 20gms)
1.	Borax	1gm
2.	Glycyrrhetinic acid	2gms
3.	Liquid paraffin	45ml
4.	Quercetin	0.2gm
5.	Stearic acid	15gms
6.	Turmeric	2-4gms
7.	Distilled water	100ml

FORMULATION OF HERBAL CREAM

a) **Oil phase preparation:** To prepare the oil phase, mentioned quantities of stearic acid, liquid paraffin and Glycyrrhetinic acid was taken into a beaker and melted by heating maintaining 75°C temp.

b) **Aqueous phase preparation:** In another beaker, mentioned quantities of Borax, distilled water, Turmeric, and Quercetin was mixed and stirred well.

c) **Aqueous phase addition to oil phase:** Aqueous phase was added to the oil phase by continuous stirring at 70°C. The mixture was allowed to cool at room temperature. The final product is transferred to an appropriate container. Finally the cream was tested for various physical characteristics.

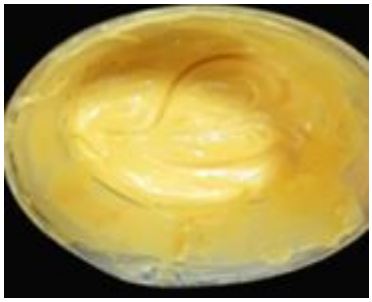

Fig. 1: Formulated Herbal Cream.

EVALUATION OF HERBAL CREAM: The physicochemical properties of the cream, including stability, color change, wash ability, and texture, were assessed.

1. **Organoleptic Properties:** The cream's organoleptic properties, such as color, pearly odor, and roughness, were examined and rated.
2. **pH Measurement:** The pH of the cream was determined using a pH meter. The pH meter was calibrated using a standard buffer solution. A measured amount (0.5g) of the formulated Vesicular emulsion Cream was dissolved in a suitable solvent in a beaker. The pH of the cream was then measured using the pH meter at room temperature.
3. **Homogeneity and Appearance:** The homogeneity of the cream's was evaluated by visual inspection and physical examination. Appearance was assessed based on various parameters, including color and opacity etc.
4. **Irritancy Test:** A square cm of the cream was applied on the dorsal side of the left hand and checked periodically for any signs of irritation, such as redness or swelling, for up to twenty-four hours.
5. **Viscosity:** The viscosity of the Vesicular emulsion cream was measured using a Brookfield viscometer. A specific solution was prepared for testing purposes. To check the cream's viscosity, we filled the viscometer's adaptor tube completely with the cream and set the desired velocity and temperature on the Brookfield viscometer.
6. **Dye test:** Dye test was conducted by using Projection microscope. A small amount of the cream was placed on a microscope slide and covered with a cover slip and examined under the microscope.
7. **Type of Smear:** The type of film or cream appeared on the skin after applying the cream was tested.
8. **Removal of Cream:** This test is to check the ease of removal of the applied cream and was investigated by washing the applied part with tap water.
9. **Grittiness:** The compound microscope was used to examine the preparation in order to identify any particles that resemble sugar crystals, un dried material, or insoluble drug particles.
10. **Antibacterial activity of formulated herbal cream:** Various organisms like *Klebsiella*, *Bacillus*, *E.coli*, *Staphylococcus aureus* cultures was used on nutrient agar media and incubation time was set up to 24hrs.

Method: Agar bore well diffusion method.

Preparation of Media: Beef extract (0.3g), Peptone (0.5g), Sodium Chloride (0.5g), Nutrient agar (1.5g) was weighed and dissolved in 100ml of water in a conical flask and the media was sterilized in Autoclave at 121°C for 20min 15psi.

Procedure: Sterilized Petri Plates were taken to the laminar air flow cabinet. After sterilization the nutrient agar media was poured into each sterilized plates. Loop full of Microorganisms were added to the plates. The plates were carefully agitated to achieve homogeneous mixing. The plates were left on flat solid surface until agar was solidified. The agar plates was bored using cork borer (10mm diameter). The discs of agar was removed by sterilized dissecting needle while being careful not to damage the cups. In each cup 50 to 60µl or equal amount of cream formulated of same strength was placed and packed carefully without any leakage. The plates were kept in incubator maintaining 37^{o}C±2^{o}C for 24hrs for further observation. The entire operation was carried out under aseptic condition and finally zone of inhibition was recorded. Zone of inhibition for prepared formulation was recorded and shown in the above figures.

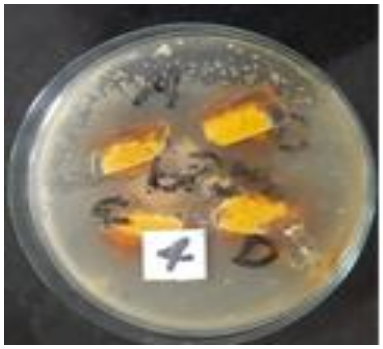

Fig: 2 Bacillus

Fig: 3 E.coli

Fig. 4: Staphylococcus aureus.

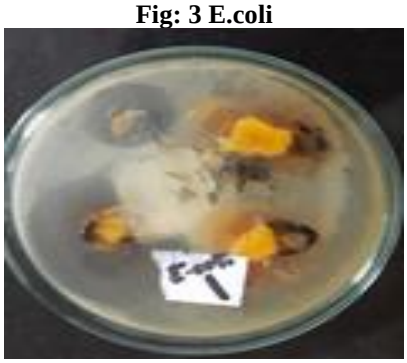

Fig: 5 Klebsiella.

RESULTS AND DISCUSSION

1. **pH testing:** The pH of the Cream was found to be 5.6 using and this value falls within the typical range of skin pH, which usually ranges from 4 to 6.
2. **Homogeneity and Appearance:** The cream is homogeneous, exhibiting no phase separation, and has a smooth, opaque, glossy and non-greasy in appearance.
3. **Irritancy Test:** There is no irritation, redness, or swelling on the skin's dorsal surface which was observed after 24hrs.

4. Dye test

The dye test revealed that the spheres in the formulated herbal cream had no color, while the earth or background had color. Based on this observation, we can conclude that the formulated herbal cream is of the water-in-oil type.

Fig: 6 Dye Test.

5. Removal of Cream: The washa bility test indicates that the cream can be effortlessly cleansed using water and detergent.

6. Microbial growth: The antimicrobial study of the cream formulation showed that all four batches of herbal cream had a significant zone of inhibition.

Table 2: Result of microbial growth.

S.No.	Sample	Quantity of sample	Zone of inhibition Diameter(cm)
1.	***Klebsiella***		
	BATCH A	0.5gm	0.6
	BATCH B	0.5gm	0.9
	BATCH C	0.5gm	0.5
	BATCH D	0.5gm	0.5
2.	***Stephylococcus aureus***		
	BATCH A	0.5gm	0.9
	BATCH B	0.5gm	0.6
	BATCH C	0.5gm	0.6
	BATCH D	0.5gm	0.8
3.	***E.coli***		
	BATCH A	0.5gm	0.3
	BATCH B	0.5gm	0.4
	BATCH C	0.5gm	0.4
	BATCH D	0.5gm	0.6
4.	***Bacillus***		
	BATCH A	0.5gm	0.4
	BATCH B	0.5gm	0.6
	BATCH C	0.5gm	0.4
	BATCH D	0.5gm	0.5

DISCUSSION

A cream was developed using curcumin, glycyrrhetinic acid and Quercetin. This was uniform in consistency, had a vibrant yellow color and was visually appealing. There were no signs of phase separation. The pH of the cream formulation was found to be 5.6 at room temperature, which is similar to the usual pH range of the skin (4 to 6). Stability testing was conducted for a month at various temperatures and the results revealed no significant changes in pH value, physical characteristics, or drug content of the cream.

CONCLUSION

This study aimed to Formulate and evaluate Herbal cream through various physiochemical tests and compare the results with the expected value. The herbal cream proved to be a great alternative to synthetic creams. However, further rigorous stability investigations are needed to enhance the overall quality of the product.

REFERENCES

1. Vijay R Salunkhe, Snehal J Patil UV Spectrophotometric and HPLC Method Development of Quercetin and Curcumin in Polyherbal hurna and Its Validation. International Journal of Pharmaceutical and Phytopharmacological Research, 2014; 4(1): 8-12.
2. Bibi Marjan Razavi, Mahboobeh Ghasemzadeh Rahbardar, Hossein Hosseinzadeh: A review of therapeutic potentials of turmeric (*Curcuma longa*) and its active constituent, curcumin, on inflammatory disorders, pain, and their related patents. Phytotherapy Research, 2021; 1-25.
3. Patil Snehal J, Salunkhe Vijay R: Simultaneous Estimation of curcumin and quercetin in ayurvedic proprietary medicine by U.V. Spectrophotometry. Internal Journal of Research in Ayurveda & Pharmacy, 2012; 3(2).
4. Hidayat Hussain, Iftikhar Ali, Daijie Wang, Faruck L. Hakkim, Bernhard Westermann, Ishitiaq Ahmed, Ahmed M. Ashour, Amjad Khan, Amjad Hussain, Ivan R. Green & Syed Tasadauque Ali Shah. Glycyrrhetinic acid: a promising scaffold for the discovery of anticancer agents, Expert Opinion on Drug Discovery, 2021; 16: 12, 1497-1516.
5. Shital. V. Sirsat; Rupali B. Dhore; Samiksha B. Tembhare; Dipali G. Kale; Sanjivani S. Sarkate: Formulation and Evaluation of Herbal Cosmetics International Journal of Novel Research and Development, 2022; 7(5). May 2022 ISSN: 2456-4184.
6. Melak Mohammed Al-Busaid, Md.Sohail Akhtar, Tanveer Alam, Wegdan Aly Shehata Development and evaluation of herbal cream containing Curcumin from *Curcuma longa*. Pharmacy & Pharmacology International Journal, 2020; 8(5): 285-289.
7. Ashish Aswal, Mohini Kalra and Abhiram Rout: Preparation and evaluation of polyherbal cosmetic cream Der Pharmacia Lettre, 2013; 5(1): 83-88.
8. Parastoo Karimi Alavijeh, Parisa Karimi Alavijeh and Devindra Sharma: A study of antimicrobial activity of few medicinal herbs by Asian Journal of

Plant Science and Research, 2012, 2(4): 496-502 ISSN: 2249-7412.

9. Abhay Prakash Mishra, Sarla Saklani, Luigi Milella, Priyanka Tiwari. Formulation and evaluation of herbal antioxidant face cream of *Nardostachys jatamansi* collected from the Indian Himalayan region. Asian Pacific Journal of Tropical Biomedicine, 2014; 4(2): S679-S682.
10. A. Kowalska and U. Kalinowska-Lis. 18B-Glycyrrhetinic acid: it's core biological properties and dermatological applications International Journal of Cosmetic Science, 2019; 41: 325-331.
11. M Saeedi, K Morteza-Semnani, and M-R Ghoreishi: The treatment of atopic dermatitis with licorice gel Journal of Dermatological Treatment, 2003; 14: 153-157.