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FORMULATION AND EVALUATION OF POLYHERBAL ANTIACNE CREAM

Suryam Gugulothu*[1], G. Shravani[2], Md. Ayazuddin[3], M. Sneha[4], N. Pravalika[5], P. Saikumar[6], Sridivya Chandragiri[7] and Rajitha E.[8]

[1]Assistant Professor, Department of Pharmaceutics, Vishnu Institute of Pharmaceutical Education and Research, Narsapur, Medak, Telangana, India-502313.
[2]Assistant Professor, Department of Pharmaceutical Chemistry, Vishnu Institute of Pharmaceutical Education and Research, Narsapur, Medak, Telangana, India-502313.
[3,4,5,6]Vishnu Institute of Pharmaceutical Education and Research, Narsapur, Medak, Telangana, India-502313.
[7]Assistant Professor, Department of Pharmacognacy, JNTUH.
[8]Assistant Professor, Department of Pharmacology, Vishnu Institute of Pharmaceutical Education and Research, Narsapur, Medak, Telangana, India-502313.

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***Corresponding Author**
Suryam Gugulothu
Assistant Professor, Department of Pharmaceutics, Vishnu Institute of Pharmaceutical Education and Research, Narsapur, Medak, Telangana, India-502313.

ABSTRACT

Acne by definition is multifactorial chronic inflammatory disease of pilosebaceous units. Propionibacterium acnes and staphylococcus epidermidis are considered as the major skin bacteria that cause the formation of acne. Although acne does not pose serious threat to general health, it is one of the most socially distressing conditions especially for adolescents. In the present study, poly herbal anti acne cream was prepared using extracts of the plants Tulsi, aloe vera along with base materials. The plants have been reported in the literature having good anti- microbial, anti- oxidant and anti-inflammatory activity. Five formulations of the cream were prepared by varying the proportions of polymers and evaluated for their physicochemical property like pH, Spreadability, viscosity, homogeneity, appearance, after feel and spreadability like tests. Among the 5 formulations the formulations 3 and 4 shows better results in evaluation. The main objective is to prepare a cream with natural herbal extracts and minimize the side effects of the chemical cosmetics. Acne vulgaris is a common skin disorder which affects containing the most extensive oil glands, including the face, back and trunk. Propionibacterium acne, an anaerobic pathogen, plays an important Part

in the pathogenesis of acne. It has also participated in the production of inflammatory acne by its ability to activate Antioxidants and metabolize sebaceous triglycerides into fatty acids, which draw neutrophils chemotactically. Acne is one of the most socially distressing skin disorders, particularly for teens, who have to cope with a disfiguring disease that erupts just When sexual maturity makes them maximum sensitive about their Appearance. Moreover, permanent scarring of the skin due to severe Acne leads to social distress throughout the entirely of adulthood. The modification and progress of acne is due to abnormal keratinocyte Proliferation and desquamation leading to ductal obstruction. Androgen driven sebum production enhances proliferation of P. acne. Excessive production of sebum block the pores and resulted in Inflammation. For many years, the use of antibiotics has shown Against vulgaris. Nevertheless, the prevalence of antibiotic resistance Within the dermatological setting has been increased. The progress of Antibiotic resistance is multi-factorial, including the specific nature of the relationship of the bacteria to antibiotics, how the antibacterial is used, host characteristics and environmental factors]. To avoid the problem of antibiotic resistance, researches on medicinal plants have been done as alternative treatment for the disease.

INTRODUCTION

The word ‘Cosmetic’ derived from a Greek word – ‘kosmesticos’ that means to adorn. From that time any materials used to beautification or promoting appearance is known as cosmetic. The word “cosmetics” actually stems from its use in Ancient Rome. They were typically produced by female slaves known as “cosmetae” which is where the word “cosmetics” stemmed from. Cosmetics are used to enhance appearance. Makeup has been around for many centuries.

The first known people who used cosmetics to enhance their beauty were the Egyptians. Makeup those days was just simple eye coloring or some material for the body. Now-a-days makeup plays an important role for both men and women. The importance of cosmetics has increased as many people want to stay young and attractive. Cosmetics are readily available today in the form of creams, lipstick, perfumes, eye shadows, nail polishes, hair sprays etc. Other cosmetics like face powder give glow to the skin after applying the base cream. Then we have lipsticks, which are applied by many women of all ages. They are made from wax and cocoa butter in the desired amount. Cosmetics like creams, gels, and colognes are used on a daily basis by both women and men. Creams act as a cleanser for the face in many

circumstances. More recently anti-ageing creams have been manufactured which can retain younger looking skin for many years.

The best cleansing agents are cleansing cream, soap and water. Cosmetic creams serve as a skin food for hard, dry and chapped skin. It mainly lubricates, softens and removes unwanted dirt from the skin. Some popular fat creams that are used include Vaseline and Lanolin. Dry 7 creams are used in the manufacture of soap and gelatin which is used as a base for the skin. Hair has become one of the fastest developing markets in the beauty industry. Many young men turn to oils and gels to maintain and style their hair. Products like hair gels, oils, and lotions have been introduced in the market to help protect hair fall and dandruff. Some professions, like the show business industry, focus on the importance of the outer appearance. Many personalities and artists have utilized makeup to beat the harsh lights and the glare of camera flashes. They very well know the importance of their looks and maintain them by using a variety of cosmetics. Recent research has shown that makeup helps in protection from harmful rays of the sun. Many beauty products manufacturers have utilized the needs of people to protect themselves and their skin from the rays of the sun. Many beauty products manufacturers have utilized the needs of people to protect themselves and their skin from the rays of the sun. The Importance of Cosmetics Today Cosmetics help to enhance our appearance and make us feel more confident. With more cosmetics on the market today than ever before, it becomes obvious to us that they play a great role in our everyday life.

MATERIALS AND METHODOLOGY

INGREDENTS	USES
Azardirachta indica	Anti bacterial agent & anti inflammatory
Citrus sinensis	Antioxidant & anti tanning property
Curcuma longa	Anti bacterial & anti oxidant property
Aloe barbadensis	Moisturizing agent
Lycopersicon esculentum seeds	Anti bacterial & Anti fungal agent
Vitamin E	Anti bacterial & Anti fungal agent

FORMULATION TABLE

INGREDIENTS	F1	F2	F3	F4
Azardirachta indica	1gm	1.2gm	1.5gm	1.8gm
Curcuma longa	0.4gm	0.4gm	0.5gm	0.6gm
Lycopersicon esculentum	0.5gm	0.5gm	0.5gm	0.5gm
Citrus sinesis	1gm	1gm	1.5gm	2gm
Aloevera	1.5gm	1.5gm	1.5gm	2gm
Vitamin E	1ml	0.1ml	0.1ml	0.1ml
Stearic acid	1gm	1gm	1gm	1gm
Salicylic acid	1gm	1gm	1gm	1gm
Mineral oil	1ml	1ml	1ml	1ml
Triethanol amine	0.26ml	0.2ml	0.2ml	0.2ml
Propylene glycol	0.8ml	0.5ml	0.5ml	0.5ml
Sodium meta bisulphate	0.04gm	0.04gm	0.04gm	0.04gm
Cetyl alcohol	0.04gm	0.4gm	0.5gm	0.4gm

Preparation of o/w emulsion cream

The oil soluble components and the emulsifier are taken in one beaker and melted in a water bath at 75°C. And in other beaker water, preservatives and water-soluble components are taken and melted at 75°C. After heating, the oil phase was taken in a mortar and pestle and slowly the water phase was added and triturated till clicking sound was heard. Finally, when the temperature cools down, perfuming agents and/or preservatives are added. In this preparation, water content will be more than the oil.

Preparation of w/o emulsion creams

The oil soluble components and the emulsifier are taken in one beaker and melted at 75°C. And in another beaker water and water soluble components are taken and melted at 75°C. After melting, water phase are taken in mortar and pestle and slowly oil phase was added and triturated till clicking sound was heard. And when the temperature of the cream will get cooled, then the perfuming agent are added. In this preparation, water phase will be less and oil phase will be more.

METHOD OF EXTRACTION

Extraction of Azardirachta indica

Fresh seeds were collected, washed and kept for drying. Paste the dried seeds are collected and grinded into fine powder.

Cold maceration of dried neem seeds: About 25 g of coarsely grounded seeds were steeped in 250 ml methanol for one week at ambient temperature and then filtered. Then filtered product

is taken in a Petri plate kept for drying in air, extracted Azardirachta indica is isolated by scrapping with spatula.

Extraction of Citrus sinesis

Citrus sinensis peels were collected from an orange juice manufacturer. The peels were then washed and fully dried in an oven at 60℃ for 72 hrs. Using Mortar and pestle the dried peels were powdered and socked in methanol with mass to volume 20gm in 200 ml for 7 days. It was then filtered through Whatman No.1 filter paper and collected into glass Petri plates and kept for drying in air, extracted Citrus sinesis is isolated by scrapping with spatula.

Extraction of leaves of Aloevera: Aloe Vera leaves collected from the medicinal garden. The leaves washed with water and rinds were removed. The inner gel scrapped and cut into pieces, solar-dried at 30-45℃ for 3 weeks and dry gel particles were collected.

Extraction of curcuma longa

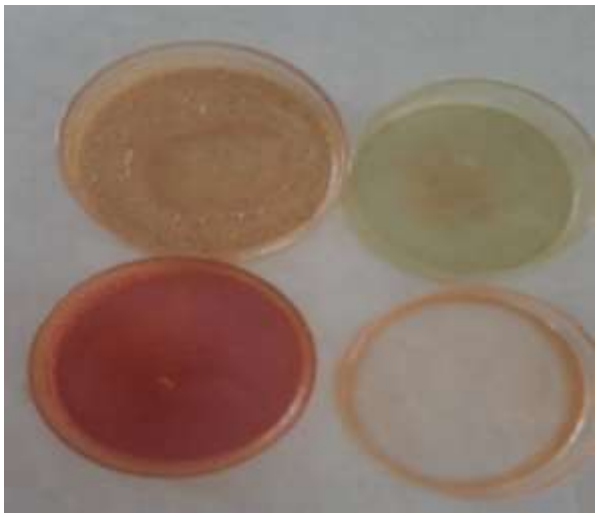
Take 15gm of Curcuma longa powder and socked in 150 ml of methanol and kept aside for 7days. Then the solution was filtered. The solution was filtered again and the filtrate was dried in air, the extracted curcumin was isolated by scrapping using a spatula.

Extraction of Lycopersicon esculentum

Gather ripe tomatoes and separate the seeds from the pulp by cutting the tomatoes and extracting the seeds. Thoroughly rinse the seeds to eliminate any remaining pulp or debris, utilizing a fine mesh strainer. Arrange the cleaned seeds evenly on a clean cloth or paper towel to air dry them. Alternatively, expedite the drying process by using a dehydrator or setting an oven to a low temperature (around 100-120°F or 40-50°C). Ensure the seeds are completely dry before proceeding. Transfer the dried seeds to a grinder or food processor, and grind them into a fine powder. Grinding in batches may be necessary to achieve uniform consistency. After grinding, pass the powder through a fine mesh sieve to eliminate any larger particles or chunks, ensuring a smooth texture. Place the tomato seed powder in an airtight container and store it in a cool, dry location away from direct sunlight.

Maceration process of Lycopersicon esculentum

Take 10 gm of tomato seed powder and socked in 100 ml of methanol and kept for 7days, then solution is filtered by using filter paper an collected in petri plates and dried in air and, extracted product should be isolated by scrapping using spatula.



PREPARATION

- Heat Stearic acid, Cetylalcohol, Mineral oil in a borosilicate glass beaker at 75 ℃ and maintain that temperature(oil phase)
- In another beaker salicylic acid, triethanolamine, propylene glycol, sodium meta phosphate and undistilled water 75℃(aqueous phase)
- Then slowly add aqueous phase to heated oil phase
- Then add requried quantity of aloevera gel, neemseed extract, tomato seed powder, vitamin e, turmeric and stir vigorously until it forms as a smooth cream.
- Then add a few drops of rose oil.

EVALUATION PARAMETERS

Uniformity of weight

This test measures the consistency of the weight of the cream in each container. It ensures that the cream is evenly distributed and meets the label claim. Ensuring the uniformity of weight in cream is essential for product consistency and quality control. Here's a procedure to test the uniformity of weight in cream.

Sterility

- Ensure that all sampling tools and containers are sterilized before use.
- Wear sterile gloves and a mask to minimize the risk of contamination.
- Open the cream container in a clean area, avoiding any contact between the container's rim and external surfaces.
- Using a sterile swab or sampling tool, collect a representative sample of cream from different areas of the container.
- Transfer the cream sample into a sterile container for testing.

- **Determination of pH**
- Rinse the pH electrode with distilled water and gently blot it dry with a clean tissue or cloth, Place the electrode into the cream sample, ensuring it's fully immersed and not touching the container.

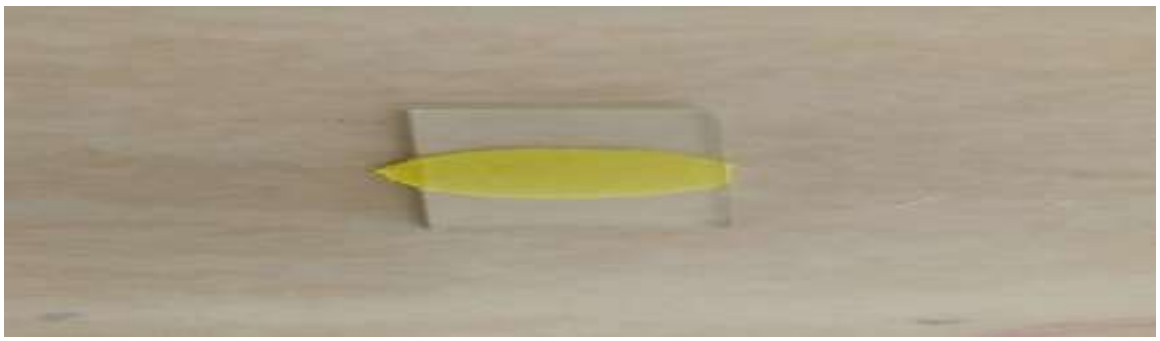
Allow the pH reading to stabilize, usually within a few seconds to a minute, depending on the meter, Record the pH reading. If using pH strips, compare the color of the strip to the provided chart and determine the pH value.

Spreadability

This test measures the ease of application and distribution of the cream on the skin. It involves placing a certain amount of cream between two glass slides and applying a weight on them. The Spreadability is calculated by the formula: S = ml/t, where m is the weight, l is the length, and t is the time.

- Take a representative sample of the cream to be tested. Ensure the sample is well-mixed and free from any visible lumps or clumps. Place the clean, flat surface on a level workspace.

Optionally, warm the cream sample to room temperature if it's stored in a cold environment, as temperature can affect Spreadability.



Viscosity: Measuring the viscosity of cream involves assessing its resistance to flow. Here's a procedure to determine the viscosity:

Take a representative sample of the cream to be tested. Ensure the sample is well-mixed and free from any visible lumps or air bubbles.

- Ensure the cream sample is at the desired temperature before testing, as viscosity can be temperature-dependent. If using a rotational viscometer, ensure that the spindle or rotor size is appropriate for the viscosity range of the cream being tested. Take care to avoid introducing air bubbles into the cream sample, as this can affect viscosity measurements. Clean the viscometer thoroughly between measurements to prevent cross-contamination.

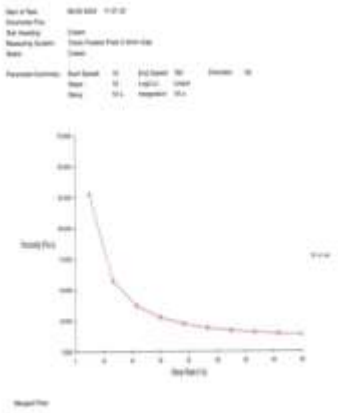
Adjust the measurement parameters (e.g., speed of rotation, temperature) based on the specific requirements of your evaluation.

Rheosys Data Printer Printed on: 06-05-2024 12:00:19

Start of Test: 06-05-2024 11:57:25
Parameter File:
Test Heading: Cream
Measuring System: 15mm Parallel Plate 0.5mm Gap
Notes: Cream

Parameter Summary: Start Speed: 10 End Speed: 160 Direction: Up
Steps : 10 Log/Lin: Linear
Delay : 10 s Integration: 10 s

Time (s)	Torque (uNm)	Shear Stress (Pa)	Shear Rate (1/s)	Viscosity (Pa.s)	RPM
20.0	1132.90	1282.18	10.014	128.03675	8.5
40.0	1356.070	1534.762	26.743	57.38930	22.7
60.0	1425.09	1612.826	43.354	37.20132	36.8
80.0	1452.070	1643.412	59.965	27.40919	50.9
100.0	1065.75	1704.16	76.694	22.22325	65.1
120.0	1573.725	1777.696	93.305	19.05253	79.2
140.0	1639.775	1855.845	110.034	16.86810	93.4
160.0	1735.975	1964.721	126.845	15.51361	107.5
180.0	1765.30	2031.863	143.257	14.18334	121.6
200.0	1860.40	2105.541	159.966	13.18078	135.8

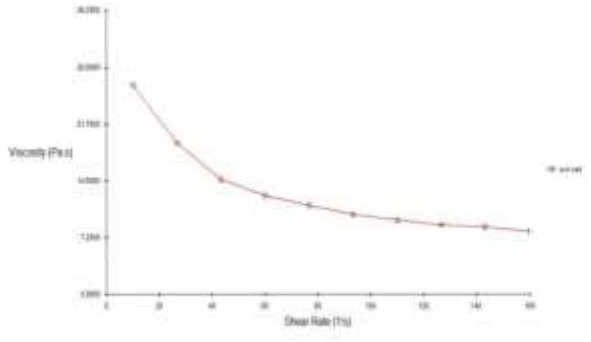


Rheosys Data Printer Printed on: 06-05-2024 12:22:32

Start of Test: 06-05-2024 12:19:41
Parameter File:
Test Heading: Cream
Measuring System: 15mm Parallel Plate 0.5mm Gap
Notes: Cream

Parameter Summary: Start Speed: 10 End Speed: 160 Direction: Up
Steps : 10 Log/Lin: Linear
Delay : 10 s Integration: 10 s

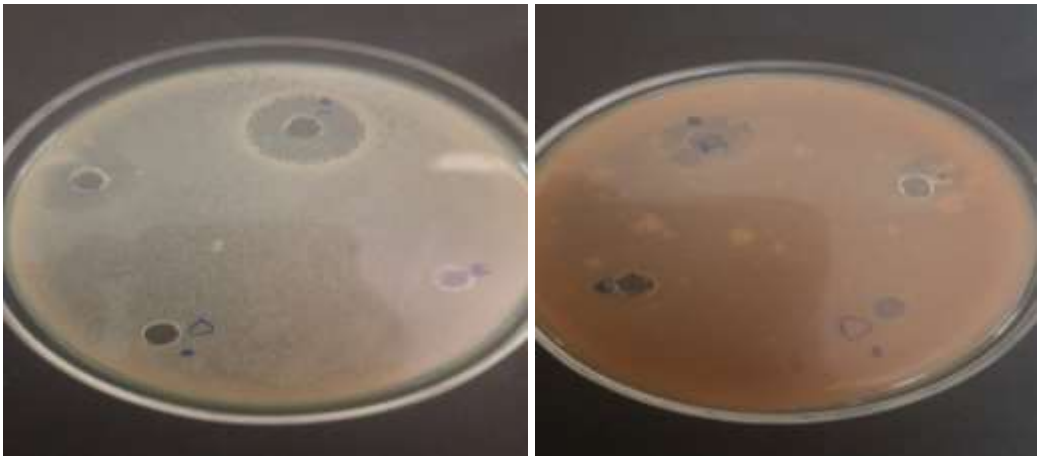
Time (s)	Torque (uNm)	Shear Stress (Pa)	Shear Rate (1/s)	Viscosity (Pa.s)	RPM
20.0	236.625	267.805	10.014	26.74306	8.5
40.0	456.10	516.199	26.743	19.30221	22.7
60.0	562.125	636.195	43.354	14.67442	36.8
80.0	667.65	755.625	59.965	12.60110	50.9
100.0	770.025	871.49	76.694	11.36321	65.1
120.0	838.625	949.129	93.305	10.17233	79.2
140.0	924.325	1046.121	110.034	9.50725	93.4
160.0	990.325	1120.818	126.845	8.85008	107.5
180.0	1089.275	1232.807	143.257	8.60556	121.6
200.0	1130.625	1279.632	159.966	7.99965	135.8

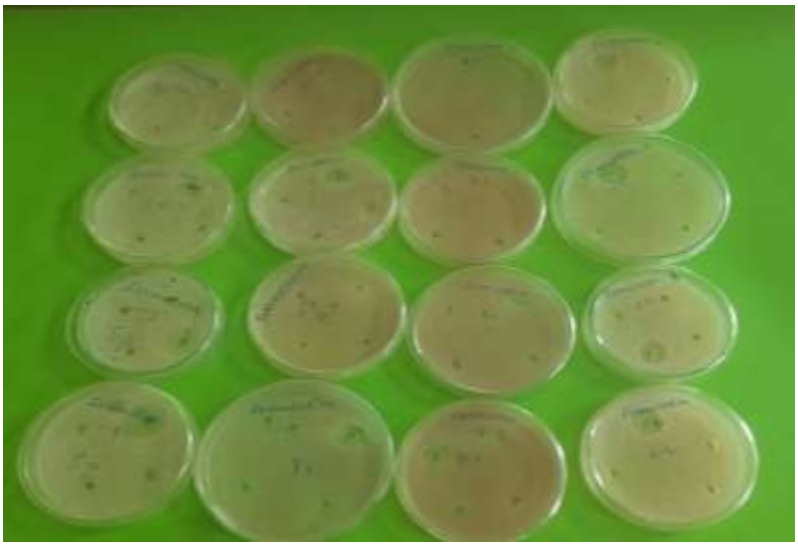


Merged Files

Antimicrobial activity

- In-vitro anti-microbial study of formulated paste was performed by agar cup plate technique. The gram positive bacteria *Staphylococcus aureus* and the gram negative bacteria *Escherichia coli* both were taking for evaluating the anti-microbial efficiency of the formulated Toothpaste. All the techniques and complete procedure should be performed under Aseptic conditions. The Nutrient agar medium is prepared by diluting and melting the Agar of 28 grams in 1000ml of distilled water until a clear suspension of agar is formed which is further transferred in boiling tubes of 20ml(Note:- the Nutrient agar medium prepared should be free from lumps and should not solidify before it is being placed in hot air oven)





RESULTS

The aim of this study to develop anti acne cream by using neem seed extract, citrus cinesis extract, turmeric extract, tomato seed extract used treat acne and does not produce any side effects by using different active concentrations and excipients.

S.NO	Formulations	F1	F2	F3	F4
1.	Colour	Cream	Cream	Yellowish cream	Yellowish cream
2.	Odour	Bitter	Bitter	Bitter	Bitter
3.	Appearance	Glossy	Glossy	Glossy	Glossy
4.	Consistency	Excellent	Excellent	Excellent	Excellent
5.	pH	6.2	6.5	6.8	7
6.	Viscosity	34.8	17.6	17.5	13.2
7.	Spreadability	3.3	3.6	3.8	4.4

CONCLUSION

As the poly herbal formulation of neem seed extract, tomato seed extract, citrus sinesis extract, turmeric extract, had shown antiacne activity against F3 of E.coli shown better when compared to F4 of Bacillus subtilis and doesn't activity against S.A.

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