

# Formulation and Evaluation of Polyherbal Cream in Acne Treatment

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## ABSTRACT:

*Acne vulgaris* is the majorly widespread skin problem of *pilosebaceous* that has an effect on regions with large oil glands, like on face, trunk, and back. Acne commonly has the formation of inflammatory seborrhea, comedones and lesions. *Propionibacterium acnes* and *Staphylococcus epidermidis* cause pus in acne resulting in inflammation. Our research is deliberated to evaluate antimicrobial potential of plants from the claims of folks. Antibacterial activity of poly herbal anti-acne cream containing the plant extracts of *Achyranthesaspera* (leaves), *Catheranthusroseus* (leaves), *Lini semen* (seeds) which were extracted out by maceration process using ethanol solvent. The antibacterial potential of ethanol extract of *Achyranthesaspera*, *Catheranthusroseus*, *Lini semen* was used to prepare an anti-acne cream, to determine its activity using agar cup plate method. The antibacterial activity of the series of dilutions of each plant extract was compared with the standard drug Ampicillin against *propionibacterium*. The result of antibacterial action of the polyherbal cream gave greater zone of inhibition (ZI) in comparison with single plant extract. Therefore, it can be accentuated that the formulated poly herbal anti-acne cream has potential antibacterial effect against *propionibacterium* in the treatment of acne which is the common bacteria in causing acne. The polyherbal antiacne cream prepared also conceded all the pharmaceutical evaluation parameters.

**Keywords:** Antiacne cream, polyherbal extract, *Achyranthesaspera*, *Catheranthusroseus*, *Lini semen*

## INTRODUCTION

Acne vulgaris has become a never-ending inflammatory skin problem of *pilosebaceous* that affects face, back, and trunk<sup>[1]</sup>. It is more or less a universal disorder happening to races and touching 96% of boys and 84% of girls. Acne is a big problem in the teenage and of course affects all the age groups. It decreases the confidence levels in the individuals and also result in physiological problems. Most of the population effects with acne do not go for the treatment, but it show be treated in a right way in the right time and with a right drug. In this study we came up with an indigenous medicine which is very effective in the treatment of acne with very minimal side effects.<sup>[2-5]</sup>

Acne vulgaris results in seborrhea, comedone, inflammatory lesions and presence of bacteria *Propionibacteriuacnes*, *Staphylococcus epidermidis* and *Staphylococcus aureus* in the follicles and in sebum<sup>[2]</sup>. *P. acnes* is an obligate anaerobic bacteria. It concerns the growth of inflammatory acne by its ability to turn on complements and to break down sebaceous triglycerides into fatty acids, which migrate

neutrophils to the site<sup>[3]</sup>. The chemicals from *P. acnes* damage cell structures of skin, resulting in acne. So this skin disorder should be treated.<sup>[4, 5]</sup>

Unwarranted application of antibiotics over a long period results in bacterial resistance<sup>[6-9]</sup>. The antibiotic resistance is complex and multifactorial, together with the precise nature of the association of bacteria with antibiotics, antibacterial usage, host conditions, and environment. To conquer the difficulty of resistance, use of herbs has been broadly studied as alternative treatment for acne.<sup>[10, 11]</sup>

*Achyranthes aspera* is widely used for asthmatic cough, snake bite, hydrophobia, urinary calculate, rabies, influenza, piles, bronchitis, diarrhea, renal dropsy, gonorrhoea and abdominal pain. *Achyranthes aspera* contains triterpenoid saponins which possess oleanolic acid as the aglucone. Ecdysterone, an insect moulting hormone and long chain alcohols are also found.<sup>[9]</sup>

*Catharanthus roseus* roots and shoots are used against several diseases including diabetes, malaria, Hodgkin's lymphoma. About 90 alkaloids have been isolated from vinca from which some like Ajmalicine, serpentine and tetrahydroalstonine are known and are present in other species of Apocynaceae.<sup>[11,12]</sup>

*Lini Semen* seeds are used for the symptomatic relief of slight gastro-intestinal discomfort. It contains Omega-3-fatty acids, alpha-linolenic acid, oleic acid, coumaric acid, stearic acid, palmitic acid, arachidonic acid, cyanogenic glycosides, sitosterol, campesterol, phytosterols and linolenic acid.<sup>[13]</sup>

This study explains the use of three medicinal plants, conventionally used for antimicrobial and anti-inflammatory properties were screened for antimicrobial potential against organism regularly concerned in acne lesions, i.e. *Propionibacterium acnes*.

## MATERIALS AND METHODS

### Plants Material

**Collection and drying of plant material:** For the current work, the selected plant parts of *Achyranthes aspera*, *Catharanthus roseus*, *Lini semen* were collected from the surrounding area of Medchal, Hyderabad. The plants were identified and authenticated by Dr. G. Baba Shanker Rao, Anurag Group of Institutions, Hyderabad.

The leaves of both *Achyranthes aspera* and *Catharanthus roseus* were cleaned with fresh water and air dried for few days and then they were powdered into fine mixture. Then the seeds of linseed were also powdered into fine mixture. The obtained powders were stored in air tight containers at room temperature and preserved. Percentage yield was calculated.<sup>[14-16]</sup>

### Preparation of extract

The powdered material was defatted using petroleum ether and then was macerated till discoloration to get ethanolic extract. The extract was filtered and dried.

### Preparation of cream

Dried extract was used in preparation of W/O Cream. It provides cooling effect by slow evaporation of water. The oily ingredients such as hard paraffin, liquid paraffin and emulsifying wax were taken into a beaker and melted, maintaining a temperature of 75 °C. Remaining ingredients such as water, glycerin, propyl paraben were taken into another beaker and heated up to 75°C. The water soluble components were directly added to the oil phase with constant stirring to get a cream. About 0.5 gm of each plant extract was put to cream and was mixed well. 50g of cream was prepared.<sup>[17]</sup>

## **METHODS**

### **Antibacterial activity testing**

#### **Agar Cup plate method**

The agar was melted, cooled and poured into petri dish. 0.2ml of inoculum was spread on the solidified petri dish. 4 cups were drill with a sterile borer. Three different concentrations 0.5ml, 1ml, 2ml of test extract were poured into cups of agar plate and to the remaining bore standard solution 200mg was added. The petri dish was incubated at 37°C for 24hrs. Antibacterial activity for the ZI was then observed. <sup>[18-20]</sup>

#### **Determination of Minimum Inhibitory Concentrations (MIC)**

The MIC is defined as minimum concentration of an agent to prevent growth of microorganisms. Various concentrations of the extract were prepared. The tests were duplicated and mean was obtained. <sup>[19]</sup>

## **EVALUATION OF CREAM<sup>[21-23]</sup>**

### **Drug content**

The cream (1g) was weighed exactly and placed in 100 ml volumetric flask into that 70 ml of ethanol was added. It was shaken well, volume of 100 ml with ethanol was made. It was filtered. Filtrate of 1ml was diluted and the drug was quantified using UV spectrophotometry at 250nm.

### **Drug release**

The diffusion study of the creams was done by a vertical Franz diffusion cell of area 1.5 cmsquare, using a dialysis membrane. The membrane was placed in phosphate buffer pH 7.5 for 6-8.5 h was fixed in the dialysis cell. 1gm of cream was uniformly spread on the membrane. This experiment was carried out in as described elsewhere earlier.

### **Physical evaluation**

Physical characteristics were examined and noted. Creams were evaluated for colour, appearance, pH, viscosity, spreadability and stability

### **Measurement of pH**

The pH of creams were tested by using Digital pH meter. One gram of cream was mixed in 100 ml of distilled water and kept for 2h.

### **Viscosity**

Viscosity of cream was checked with Brookfield Viscometer It was checked at 100 rpm at 25 °C using Brookfield viscometer.

### **Spreadability**

Spreadability is the ability of the cream to readily spread on application to skin. The bioavailability also depends on its spreadability. It is expressed in terms of time in seconds taken by two slides to slip from the cream, placed between slides, under constant weight.

Spreadability is calculated by:

$$S = M \times L / T$$

S- spreadability

M -weight tied to the upper slide

L- length glass slide

T - time (in sec.) taken to separate the slides.

## RESULTS

### EVALUATION OF EXTRACTS

The plant parts were collected and extracted by using maceration method. The extract obtained were air dried and the percentage yields were calculated. The percentage yield of different extracts was found to be

*Achyranthes aspera* - 71.4%

*Catheranthusroseus*- 79.3%

*Lini semen* - 61.7%

### Physical characteristics

The physical characteristics like color, odor, taste and yield is as follows (Table 1)

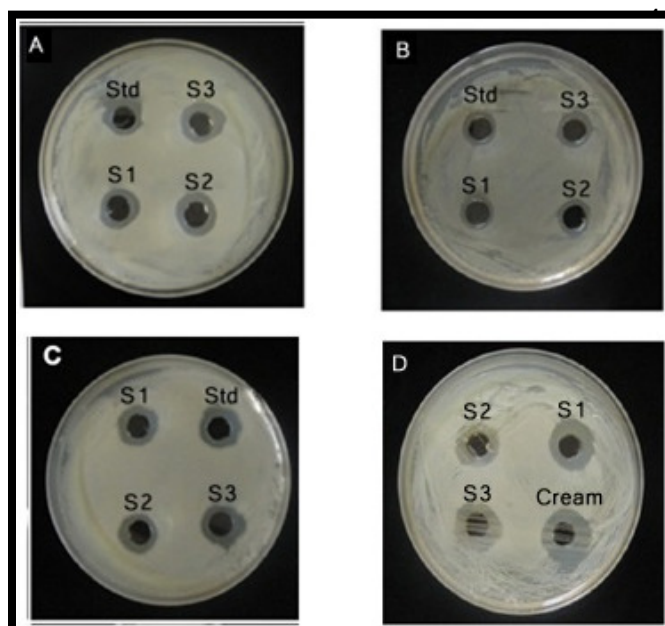
**Table 1: Evaluation parameters of Poly herbal anti acne cream**

PARAMETERS	RESULTS
Homogeneity	Good
Appearance	No change
Odor	Good
Spreadability	Good
After feel	Emollient and slipperiness
Type of smear removal	Non greasy and easy

### Antimicrobial activity of Extracts

The ethanolic extract was screened for antimicrobial potential against *Propionibacterium acnes*.

The Ethanolic extracts of *Achyranthes aspera*, *Catheranthusroseus*, *Lini semen* gave potent antibacterial activity against *propionibacterium* as observed by the ZI ranges from 13.55±0.12 mm to 14.00±0.17mm.(Fig.1)



**Figure.1:** Zone of inhibitions of different extracts of a. *Achyranthes asperab.Catheranthusrosea,c. Linisemen*, d. polyherbal cream

**Physicochemical evaluations of creams:** The prepared polyherbal cream was tested for appearance, pH, viscosity, spreadability, drug content and the results explain that cream 2 showed good pH, viscosity, Spreadability and drug content that cream 1.(Table 2 & Fig.2).

**Table 2: Physicochemical parameters of Poly herbal anti acne cream**

S.No.	Formulation	Appearance	pH	Viscosity (cps)	Spreadability (cm/sec)	Drug content
1.	Cream 1	Brownish	6.6	3900	11.23	94.55%
2.	Cream 2	Brownish	6.7	4000	11.45	95.99%



**Fig.2:** Appearance of the anti acne cream

## DISCUSSION

*Acne vulgaris* is a skin disorder that affects practically every individual at least once in life. Incidence of acne usually occurs at teenage, but still 20-40 years age group also suffers. Herbs are safer than allopathic drugs as they are connected with side effects such as allergy, irritation, scaling of skin, photosensitivity, itching, pruritus, redness, peeling of skin etc.<sup>[19]</sup>

The required plant extracts for preparation of poly herbal Anti-acne cream were collected, dried, powdered and stored in a container. The powdered plant drug was extracted by maceration process by using Ethanol as solvent. The obtained plant extracts were used in the preparation of the cream. The cream was prepared by using W/O type of emulsion and plant extracts were added to it.<sup>[20-23]</sup> The polyherbal cream was evaluated for different parameters and the prepared polyherbal cream passed all the parameters. Further, the antimicrobial activity was determined by using agar cup plate method. Each plant extract was compared with that of standard and the plant extracts were also compared with that of poly herbal cream. The ZI was calculated. It was observed that antibacterial action of the cream gave greater ZI. The ZI was greater with increased concentration of the test extracts. Antibacterial potential of the test extract was comparable to that of standard drug.<sup>[24,25]</sup> Therefore, it can be emphasized that the Anti-acne cream prepared had a potential action in the treatment of acne. More potent such cream can be prepared by isolating the active constituents involved in showing antibacterial activity.

## CONCLUSION

The prepared cream was screened for pH, viscosity, spreadability, stability and drug content. Results from the agar well diffusion explain that the prepared cream inhibited *P. acnes* and the polyherbal cream also gave comparable antimicrobial potential against the bacteria with the marketed preparation antimicrobial agent. Nevertheless, the standard Ampicillin was more potent than that of prepared polyherbal cream. Taken together, our data indicated that *Achyranthes aspera*, *Catheranthus roseus*, *Lini semen* showed inhibitory and synergistic potential against *P. acnes*.

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