

Research Article

FORMULATION AND EVALUATION OF TRICLOSAN CONTAINING ANTI-ACNE CREAM

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ABSTRACT

Pimple, acne, sunburn mark and pigmentation are issues that affected every individual at least once during life time. Consumers have to search for a product that can cure the skin issue and grant them with a good and healthy skin such as anti-acne cream. Nevertheless, most of the anti-acne creams available in the market contain lots of chemicals that may have some kinds of side effects to the consumers. The present study was conducted to formulate and evaluate the anti-acne creams containing Triclosan. The antibacterial activity of the Triclosan and creams in different formulation were investigated using gram-positive bacteria (staphylococcus aureus, bacillus, pseudomonas aeruginosa) and gram-negative bacteria (klebsiella pneumoniae, proteus vulgaris) through disc diffusion method. The antibacterial potential of the Triclosan was studied with three different formulations (F1, F2, and F3). The Triclosan showed significant antibacterial activity against the entire tested organism. This activity was well maintained when the Triclosan was incorporated into the cream formulation. This formulated pastes can be successfully used for skin infection which including acne vulgaris.

Keywords: Acne, antibacterial activity, bacteria, cream.

1. INTRODUCTION

Skin is the most important part of our body. Now a day skin exposure to sun, dust so number of problems such as pimples, acne, sunburn marks and pigmentation. Acne is the most common and chronic skin problem¹. Acne is long-term skin disease that arises when hair sacs are blocked with departed skin cells². Acne vulgaris is a disease of pilosebaceous unit which is characterized inflammatory lesions (papules, nodes, pustules) and non-inflammatory (open and closed comedones). The condition usually starts at the age of 14 to 19 years. The word acne is obtained from "acme" which means "prime of life". A change in keratinisation pattern of hair follicle leads to blockage of sebum secretion. It is hypersensitivity to the stimulation of sebocytes and follicular keratinocytes by androgen leads to hyperplasia of sebaceous glands and seborrhea which characterize acne. The need of quality control for ayurvedic or herbal product is due to the fact that the preparation of drug according to the ancient method has been reduced due to the commercialization of ayurvedic pharmacy³.

Acne is the most common type of skin condition. It is most widespread among older children, teenagers and young adults. Around 80% of 11 to 30 year olds are affected by acne. Most acne cases in girls occur between the ages of 14 to 17 and in boys the condition is most common in

16 to 19 year-olds. Most people will experience repeated episodes, or flare-ups, of acne for several years before finding that their symptoms gradually start to improve as they get older. The symptoms of acne usually disappear when a person is in their twenties. However, in some cases, acne can continue into adult life, with approximately 5% of women and 1% of men over 25 continuing to experience symptoms⁴.

Triclosan block the active site of the enoyl-acyl carrier protein reductase enzyme (ENR), which is an essential enzyme in fatty acid synthesis in bacteria⁵. Triclosan inhibit the enzyme and hence prevent the bacteria from synthesizing fatty acid, which is necessary for building cell membranes and for reproducing. Since human do not have this ENR enzymes, triclosan has long been thought to be fairly harmless to them⁶. Triclosan is a very potent inhibitor and only a small amount is needed for powerful antibacterial action⁷.

Staphylococcus aureus and Propionibacterium bacteria responsible for acne isolated from acne patients⁸. Mostly people now more attracted toward the use of herbal formulation. According to WHO, there are four billion people use herbal medicine as a primary health care and convinced to be safe.

2. MATERIALS AND METHODS

Triclosan and Neem oil were obtained as gift sample from S. G. Phyto Pharma, Kolhapur. All the other excipients were of analytical grade.

2.1. Method of Preparation

The composition of anti-acne cream was shown in Table No.1. The oil phase consists of triclosan containing base and other oil soluble component such as neem oil was dissolved in the oil phase. The oil phase was placed inside the beaker in the water bath. The temperature of water bath was set to 75°C during the heating time. The

water soluble components and preservatives (glycerine, aloe vera, rose water and methyl paraben) were dissolved in the aqueous phase and heated in the same water bath at temperature 75°C. After heating, the aqueous phase was added in portions to the oil phase with continuous stirring until the cooling of emulsifier took place. Different proportion of Triclosan containing base (2.5% and 4.5%) was mixed with the base along with fragrance and named as F1, F2 and F3 respectively⁹.

2.2. Formulation Table (Table 1)

Table 1: Composition of the anti acne cream

S. No.	Ingredients	F1	F2	F3
1	Triclosan containing base	2.5 gm	3.5 gm	4.5 gm
2	Glycerine	2 ml	2 ml	2 ml
3	Aloe vera	1 gm	1 gm	1 gm
4	Neem oil	4 ml	3 ml	2 ml
5	Rose water	q. s.	q. s.	q. s.
6	Methyl paraben	0.1 gm	0.1 gm	0.1 gm

3. EVALUATION OF FORMULATED ANTI-ACNE CREAM¹⁰

The following parameters were checked to evaluate the anti-acne cream:

3.1. Determination of the type of emulsion

A scarlet red dye was mixed with the cream. A drop of the cream was placed on microscopic slide and examined under a microscope. If the disperse globules appear red the continuous phase colourless, the cream is oil in water (o/w) type. The reverse condition is occurs water in oil (w/o) type cream.

3.2. pH of the cream

The pH meter was calibrated using standard buffer solution. About 0.5 g of the cream was weighed and dissolved in 50 ml of distilled water and its pH was measured.

3.3. Homogeneity

The formulation was tested for homogeneity by visual appearance and touch.

3.4. Appearance

The appearance of the cream was judged by its color, pearlescence and roughness and graded.

3.5. After feel

Emolliency, slipperiness and amount of residue left after the application of fixed amount of cream were checked.

3.6. Type of smear

After application of cream, the type of film or smear formed on skin were checked.

3.7. Removal

The ease of removal of the cream applied was examined by washing the applied part with tap water.

3.8. Antibacterial Screening by Disc-diffusion method

A suspension of the tested microorganisms in standard quantity was uniformly swabbed on nutrient agar plates using sterile cotton swabs. Sterile blank discs were individually impregnated to the different concentration of formulated cream (10, 25, 50 and 100 mg/ml) and extracts (5, 10 and 25 mg/ml) were placed onto the inoculated agar plates. The plates were inverted and incubated at 37°C for 24 h for bacteria growth. The antibacterial activity was evaluated by measuring diameter of the resulting zone of inhibition against tested microorganisms. The positive control used was Vancomycin due to its activity against a wider number of bacterial types and distilled water used as negative control. All disc diffusion experiments were performed in two separate experiments and antibacterial activity was expressed as Mean $\pm$ Standard Error Mean¹¹.

4. RESULT AND DISCUSSION

4.1. Physicochemical Evaluation of Formulated Anti-Acne Cream (Table 2)

Table 2: Physicochemical evaluation of the formulated anti-acne cream

Parameter	F1	F2	F3
Homogeneity	Good	Good	Excellent
Appearance	No change in colour	No change in colour	No change in colour
Odour	Good	Good	Excellent
Spreadability	Good	Good	Excellent
After feel	Emollient and slipperiness	Emollient and slipperiness	Emollient and slipperiness
Type of smear	Non-greasy	Non-greasy	Non-greasy
Removal	Easy	Easy	Easy

4.2. Antibacterial Activity of Formulated Anti-Acne Cream (Table 3)

Table 3: Antibacterial Activity of Formulated Anti-Acne Cream

Batches	Staphylococcus aureus	Bacillus	Pseudomonas aeruginosa	Klebsiella pneumoniae	Proteus vulgaris
F1	13mm	15mm	15mm	17mm	16mm
F2	16mm	20mm	19mm	20mm	19mm
F3	25mm	27mm	23mm	20mm	24mm

4.3. Comparison of Antibacterial Activity of Formulated Anti-Acne Cream with Marketed Preparation (Table 4)

Table 4: Comparison of Antibacterial Activity of Formulated Anti-Acne Cream with Marketed Preparation

Formulation	Staphylococcus aureus	Bacillus	Pseudomonas aeruginosa	Klebsiella pneumoniae	Proteus vulgaris
Marketed preparation	17mm	13mm	17mm	15mm	16mm
Batch F3	25mm	27mm	23mm	20mm	24mm

4.4. Antibacterial Activity of Anti-Acne Cream on Different Micro-Organism (Fig. 1)

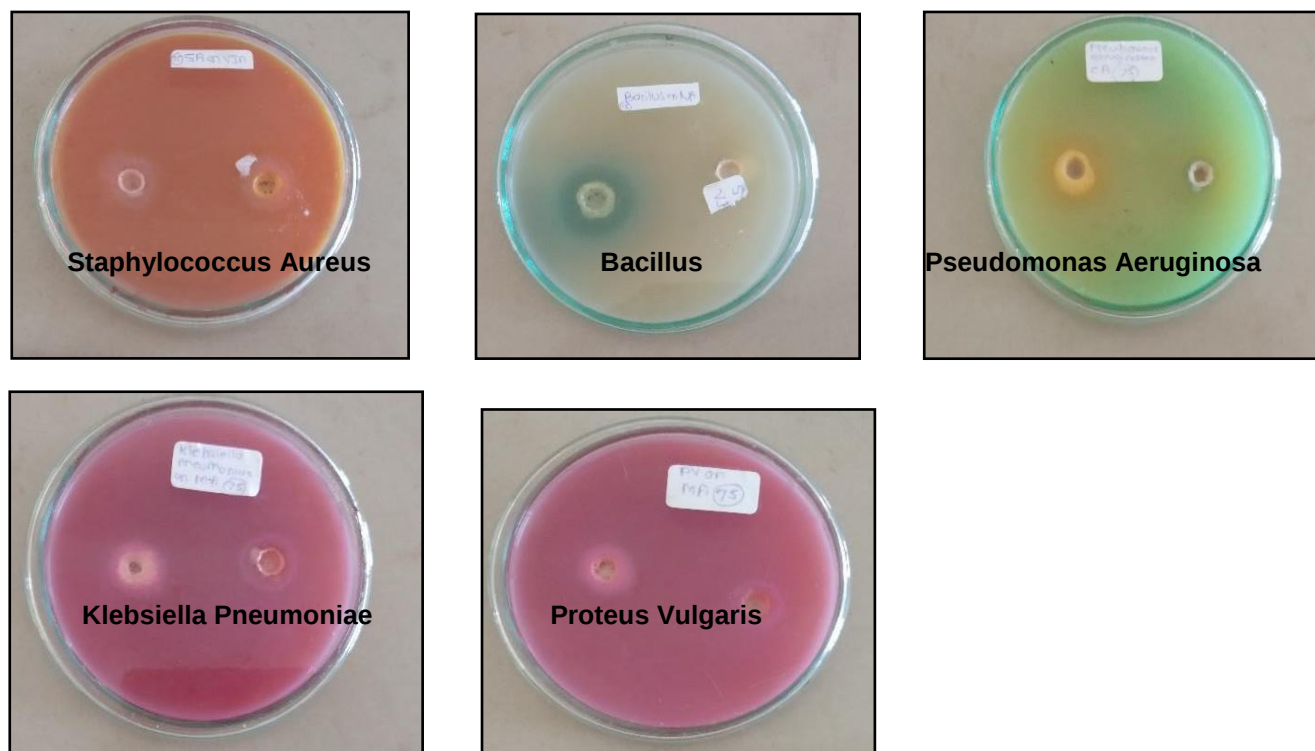


Fig. 1: Antibacterial Activity of Anti-Acne Cream on Different Micro-Organism

5. DISCUSSION

In present study different formulations are prepared to check activity of triclosan on pimple. Antibacterial and other test are carried out and it was conducted that batch F3 shows good activity and inhibit the growth of microorganism (Staphylococcus aureus, Bacillus, Pseudomonas aeruginosa, Klebsiella pneumoniae, Proteus vulgaris) and other ingredient in cream shows additive effect for inhibiting growth of pimple.

6. CONCLUSION

From present study it was concluded that among all batch F3 showed good result. Triclosan showed activity on Staphylococcus aureus, Bacillus, Pseudomonas aeruginosa, Klebsiella pneumoniae and Proteus vulgaris micro-organism with zone of inhibition 25mm, 27mm, 23mm, 20mm and 24mm respectively.

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