

Comparison of Anti-acne Property of Carbopol Gels

Shiva Kumar K*, Jagadeeshwari S, Soujanya H, Purushothaman M

Department of Pharmaceutics, Scient Institute of Pharmacy, Ibrahimpatnam, Hyderabad-501506, Telangana, India



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ABSTRACT

Skin is the body is the largest organ and is the protective covering of the body. It is responsible for the normal functions like protection of the organs, healthy maintenance of the body and shaping and stretching. The skin is exposed to various types of stress like allergy-causing agents, disease-causing microorganisms etc. Medicinal plants are valuable resources that are known to the man from many generations that promote beauty and health. They are called as cosmeceuticals. These have various chemical constituents that promote beauty by reducing the acnes and killing the bacteria that causes and grow in the acnes. Anti-acne gels were prepared using the ethanol extracts of the plant Tulsi and Need incorporating the tea tree oil as a standard antioxidant. These were prepared, and the pH of the formulations was almost neutral to the skin and are stable in a stress test too. The anti-bacterial property of the gels was investigated in two methods, disc diffusion and turbidity method. The results showed a better activity of the formulations compared with tulsi and the standard antibiotic drug.

*Corresponding Author

Name: Shiva Kumar K
Phone: 9640370478
Email: kothashivakumar21@gmail.com

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INTRODUCTION

Skin is the body is the largest organ and is the protective covering of the body. It is responsible for the normal functions like protection of the organs, healthy maintenance of the body and shaping and stretching. The skin is exposed to various types of stress like allergy-causing agents, disease-causing microorganisms etc. the microbes consume the human body secretions like sweat and sebum in the skin and convert them into toxins which gives the bad smell and texture [1]. The skin on the face is the most cared part out of all the parts in the body.

This is the most affected part due to bacteria and leading to the accumulation of the skin secretions and causing acne. The skin on the face is to be kept healthy with some medicines and antibiotics which kill harmful microorganisms.

Medicinal plants are valuable resources that are known to the man from many generations that promote beauty and health. They are called as cosmeceuticals. These have various chemical constituents that promote beauty by reducing the acnes and killing the bacteria that causes and grow in the acnes. They have various chemical constituents that act on the microbes like flavonoids, phenols, alkaloids and other resins which exhibit excellent potential for the bacterial [2]. Medicinal plants and cosmeceuticals like aloe vera, Turmeric, Henna, Sandalwood etc. had been proven for their anti-bacterial properties and antifungal properties [3-5]. There are other drugs in the herbal origin, that act best upon the bacteria and acne. They are the classes of essential oil and the volatile oil like tea tree oil, lemongrass, which are rich in the antioxidant principles [6].

In this research, anti-acne gels were prepared using

the extracts of Neem, Tea tree oil and Tulsi. These gels were used to investigate the anti-acne properties of the gels.

PREPARATION OF GELS

Extracts

Leaves of the neem plant were collected and dried under shade for about four days and then dried properly. The dried leaves were powdered, and the powder was used for extraction of the chemical constituents. The maceration method was used to extract. The powder was macerated using solvent ethanol for about two days, and then the macerate was filtered using filter paper, and the filtrate was evaporated using a rotary evaporator and dried and the solution with known concentration was prepared using the extract and ethanol. The final concentration of the solution that is prepared is 200mg/ml.

Tulsi was also extracted similarly, and the extract solution was prepared and stored in the same concentration. Tea tree oil was bought from the store that is of analytical grade standard.

Formulation of Gels

Accurately measured volumes of the extracts of neem and tulsi were mixed with the gel base, and the tea tree oil was also incorporated into the gels. The contents and the containers used were sterile, and the flavours and colouring agents used were of natural origin. The volumes were made up to 1litre and then used for investigation of the activity.

Evaluation of gel formulations

Evaluation of Physical parameters

The acne gels were prepared, and the investigations were made for physical constants like colour, flavour and the feel on the face skin. The pH was calculated using the digital pH meter, and the stability testing was done using the thawing and freezing cycles. The temperature variations were induced at 4, 45 and 25°C for about two weeks. The values were noted in the starting of the experiments and seven days and 14 days. The pH values and other parameters like sedimentation, instabilities were estimated.

Investigation of the bacterial parameters

The anti-bacterial property of the gels was investigated in two methods, 1. Turbidimetry method using test tubes and 2. Disc diffusion method using filter paper discs.

In Disc diffusion method, the agar medium Petri plates were made ready using a freshly prepared

agar culture medium solution and poured into the plates. And let to harden. The bacterial cultures of staphylococcus, acne vulgaris and streptococcus were inoculated into the Petri plates. 1cm discs were cut out from the filter paper, and then they are dipped in the gel formulations. These discs, when saturated with the gel, are placed in the Petri plates and incubated for about one day in an oven at a controlled temperature. The zone of inhibition was calculated using a scale [7].

In the second method of turbidity, the nutrient broth medium was used to investigate the bacterial growth in the test tubes in broth medium. Test tubes were sterilized in an oven, and the nutrient broth was poured in the test tubes. A face of a human volunteer was swabbed with a sterile cotton swab and was inoculated in the test tube containing the medium. The solution was incubated in the oven. The face was washed with the prepared gel, and the cotton swabbing was performed again and inoculated in the second test tube. The blank test tube was just the culture medium without any inoculation of the culture. These are all measured for absorbance at 600 nanometers, and the absorbance values were noted [8]. Serial dilutions were made to get the cultures media into the absorbance range in the UV spectrophotometry.

RESULTS & DISCUSSION

The Anti-acne gels were prepared using the herbal extracts of neem, tulsi and tea tree oil. The gels were given names like AAG-neem, AAG-tulsi. The tea tree oil was made a compulsory element in both the formulations, which was known for its antioxidant properties. Both the formulations were clear and greenish. The odour was also pleasant and flavoured well. The pH values of the formulations and the stability of the formulations were tabulated, and the gels were found to be stable and continued for the investigation of the activity. Tables 1 and 2

In the disc diffusion methods, there was a significant activity that is displayed by the formulated anti-acne gels. The zone of inhibition was calculated for all the gels, and the gels are compared to the standard drug that is clindamycin. This showed a significantly better activity compared to the standard drug. Table 3

In the second method, the formulations showed a better activity compared to the tulsi extract formulation and the standard drug. In this method, low absorbance of the solution indicated the higher anti-bacterial activity and the prepared formulations showed the best activity compared to the standard drug that is clindamycin. Table 4

Table 1: Preparation of the Anti-acne gel-AAG.

S.No	Ingredients	AAG-Neem	AAG-Tulsi
1	Neem Extract	10ml	-
3	Tulsi Extract	-	10 ml
4	Tea tree Oil	5 ml	5ml
5	Alcohol	10 ml	10ml
6	Spearmint oil	0.5 ml	0.5 ml
7	SLS	10 mg	10mg
8	Carbopol gel	2g	2g
9	Natural colour	qs	qs

Table 2: Physical parameters of AAG's

Formulation	Day	Temperature 0c	pH
AAG-neem	1	40c	7.45
		250c	7.46
		450c	7.41
	7	40c	7.46
		250c	7.42
		450c	7.44
	14	40c	7.45
		250c	7.42
		450c	7.43
AAG-Tulsi	1	40c	7.47
		250c	7.48
		450c	7.49
	7	40c	7.47
		250c	7.45
		450c	7.46
	14	40c	7.47
		250c	7.49
		450c	7.50

Table 3: Zone of inhibition of AAG's

Organism	Zone of inhibition (mm)		
	AAG-neem	AAG-tulsi	Clindamycin
<i>Acne Vulgaris</i>	32± 0.6	26±0.34	19 ± 0.8
Streptococcus	27 ± 0.19	25±0.07	14 ± 0.21
Staphylococcus	19± 0.17	18±0.13	10 ± 0.15

Table 4: Evaluated Absorbances of AAG's

Formulation	Absorbance
AAG-neem	0.1632±0.05
AAG-tulsi	0.1791±0.06
Clindamycin	0.2253±0.07
Nutrient broth	0.946±0.06

CONCLUSION

Anti-acne gels were prepared using the ethanol extracts of the plant Tulsi and Need incorporating the tea tree oil as a standard antioxidant. These were prepared, and the pH of the formulations was almost neutral to the skin and are stable in a stress test too. The anti-bacterial property of the gels was investigated in two methods, disc diffusion and turbidity method. The results showed a better activity of the

formulations compared with tulsi and the standard antibiotic drug.

Conflict of Interest

The authors declare that they have no conflict of interest for this study.

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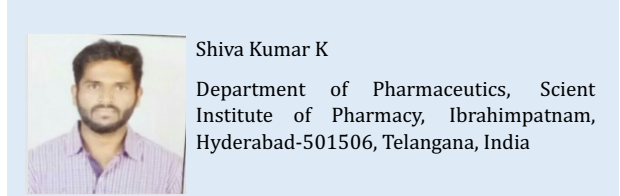
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Shiva Kumar K

Department of Pharmaceutics, Scientist
Institute of Pharmacy, Ibrahimpatnam,
Hyderabad-501506, Telangana, India

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