IARJSET

ISSN (Online) 2393-8021
ISSN (Print) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Vol. 8, Issue 5, May 2021

DOI: 10.17148/IARJSET.2021.8569

Formulation and Evaluation of Herbal Cream of the Flowers of *Calendula Officinalis* with Anti-Bacterial Activity

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Abstract: The aim of this present research work is formulation and evaluation of herbal cream of the flowers of *Calendula officinalis* with antibacterial activity. Antibacterial activity is the process of killing or inhibit the disease causing by microbes. The study is to prepare the herbal cream for the use of anthelmintic activity, anti-inflammatory activity, wound healing activity, analgesic activity, antibacterial activity and recovery various disease of the skin. Method of prepare herbal cream is very simple. At first oil phase prepared stearic acid, cetyl alcohol, potassium hydroxide ware melted at 70℃. After that aqueous phase is papered, lanolin, drug (ethanolic extract of *Calendula officinalis*), ethanol, glycerin, distilled water, methyl paraben, perfume heated at 70℃.Than aqueous phase is added in to the oil phase with continuous stirring. After that the mixture is put in room temperature with continuous stirring and added perfume and preservatives and transfer the cream in a suitable container. The evaluation parameter is determined such as pH, thermal stability, homogeneity, irritancy test, patch test, spreadability studies, accelerated stability testing etc. The further studies formulation, evaluation & antibacterial activity will be carried out bellow.

Keywords: *Calendula officinalis*, herbal cream, antibacterial activity.

I. INTRODUCTION

Now a day, the demand of the cosmetics is increasing quickly day by day. On the basic of dosage from herbal cosmetics are classified into different group like emulsion, powders, cakes, mucilage, jellies, suspensions, pastes, soaps, solutions. Being creams are semisolid doges from they are applied on mucous membrane[1]. This preparation contained oil part and binary compound part (o/w). And also contained crude drug (ethanolic extract of *calendula officinalis*). The flowers are collected from the *calendula officinalis* plant. The flowers are contained Sesquiterpene and flavonol glycosides, Tritripenoid saponins, Triterpene alcohols, Flavonoids, crotenoides, xanthophylls, Phenolic acids and Other like sterols, mucilage, tocophrrols, calendulin, bitters, phytosterols, resin, volatile oil. The flowers are use as analgesic, anthelmintic, anti-bacterial, anti-emetic, anti-fungal, anti-inflammatory, anti-pyretic, antiseptic, anti-spasmodic, anti-viral, astringent, bitter, candidicide, cardiotonic, carminative, cholagogue, dermagenic, diaphoretic, diuretic, hemostatic, immunostimulant, lymphatic, uterotonic, and as vasodilator[2,3,4].

II. METERIALS AND METHOD

- **Collection of plant material;**

The flowers are collected from the market of Kolaghat, Purba Medinipur, West Bengal, India.

- **Chemicals;**

Petroleum ether, Ethanol is collected from the New chemical lab, Rajarhat, Kolkata, West Bengal, India.

- **Microorganisms;**

The stains are obtained from Bharat Technology, the stock culture is maintained on nutrient agar media at 37℃. After 24 hours culture the microorganism is used for study, these organisms are preserved at 4℃ and re cultured once in a week Gram Positive Bacteria (*Staphylococcus aureus*) and Gram Negative Bacteria (*Escherichia coli*)

- **Preparation of Ethanolic Extract of the flowers of *Calendula officinalis*;**

Shaded dried and coarsely powdered (600gm) of the flowers of *Calendula officinalis* is placed Soxhlet's apparatus separately, using petroleum ether and then successively with ethanol. The extract is concentrated to dryness in a rotary evaporator under reduced pressure at the constant temperature40℃. The dried mass is stored in a refrigerator and considered as extract[5,6].

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- **Preparation of Agar media;**

Nutrient Agar media is prepared by sterilized flask and cooled to 45-50℃ and was distributed by the pipette (25ml) in each pre sterilized petri dishes, previously inoculated with 0.01ml of the nutrient both cultures. Disks injected with extract (350µl/ml) are placed on the solid agar medium by pressing slightly. The treated petri plates are placed 4℃ for one hour and incubated at 37±0.1℃ for 24 hours. The medium is measured with a ruler in millimeters[7,8].

- **Preparation of herbal cream;**

The cream is prepared by dissolving the glycerin in hot water, separately melt all waxy materials and oil are added to it. Heat the molten mass as about 70°C. Pour the glycerin solution at same temperature and add the ethanolic extract with constant stirring until cold. The temperature id born to about regrading.

Table 1: Formulation chart for Herbal cream:

Sl.no	Ingredient	Quality taken				
		F1	F2	F3	F4	F5
1.	Stearic acid (gm)	20	20	20	20	20
2.	Cetyl alcohol (gm)	8	9	10	11	12
3.	Potassium hydroxide(gm)	12	11	10	9	8
4.	Lanolin (gm)	2	2	2	2	2
5.	Extract drug (gm)	28	28	28	28	28
6.	Glycerin (ml)	6	6	6	6	6
7.	Distilled water (ml)	qs	qs	qs	qs	qs
8.	Ethanol (ml)	5	5	5	5	5
9.	Methyl paraben (gm)	qs	qs	qs	qs	qs
10	Perfume (gm)	qs	qs	qs	qs	qs

III. EVALUATION PARAMETERS OF HERBAL CREAM

- **pH of the cream;**

Calibrating the pH meter with buffer solution, 2.5gm of cream are dissolved in 100ml of ethanol and its pH is measured.

- **Viscosity;**

Viscosity of the formulation set by measuring device at one hundred rpm.

- **Test for thermal stability;**

In humidity chamber at temperature 39±1℃ the thermal stability is determined.

- **Homogeneity;**

By visual look and bit the homogeneity is determined.

- **Appearance;**

The appearance of the cream is judged by its colour, pleasant, and roughness and graded.

- **Irritancy test;**

Mark a section (Isq.cm) on the mitt dorsal surface. The cream is applied to the desired space and time is noted. Allergic or deadly reaction is discovered regular intervals up to twenty-four hour according.

- **Patch test;**

The creams square measure applied to the patches that is placed within the skin and allergic or deadly reaction is observed regular intervals up to twenty-four hour and according.

- **Spreadability studies;**

Spreadability studies delineate the extant space where ever the cream promptly spreads on application to the skin or different impact half, hard formula for spreadability studies; S = ml/t m = weight of the upper slide. l = length of the glass slide. t = time taken (second).

- **Accelerated stability testing**;

In accelerated stability testing the cream is keep at elevated stress conditions for 7days, & the cream is keep room temperature for 7days, and therefore the formulation ascertained on 0th, 3th, 5th ,7th day of the evaluation parameter.

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IV. RESULT AND DISCUSSION

Table 2: Evaluation of herbal cream

Sl.no	Name of the experiment	Result of the experiment				
		F1	F2	F3	F4	F5
1.	pH	6.7	6.9	7.0	7.2	7.3
2.	Viscosity	1.253mm^2/s	1.356mm^2/s	1.411mm^2/s	1.572mm^2/s	1.854mm^2/s
3.	Thermal Stability	No oil separation	No oil separation	No oil separation	No oil separation	No oil separation
4.	Homogeneity	Visual appearance by touch	Visual appearance by touch	Visual appearance by touch	Visual appearance by touch	Visual appearance by touch
5	Appearance	Brownish colour and pleasant odour	Brownish colour and pleasant odour	Brownish colour and pleasant odour	Brownish colour and pleasant odour	Brownish colour and pleasant odour

Table 3: Physical properties of herbal cream

Sl.no	Physical properties	Herbal cream				
		F1	F2	F3	F4	F5
1.	Colour	Brownish	Brownish	Brownish	Brownish	Brownish
2.	Odour	Characteristics	Characteristics	Characteristics	Characteristics	Characteristics
3.	Appearance	Semi-solid	Semi-solid	Semi-solid	Semi-solid	Semi-solid

Table 4: Spreadability test

Sl.no	Time (see)	Spreadability				
		F1	F2	F3	F4	F5
1.	15	14.7	14.5	14.3	14.1	13.9
2.	20	14.2	13.9	13.7	13.5	13.3
3.	25	13.9	13.6	13.4	13.2	13.0

Table 5: Accelerated stability testing

Stability studies	F1		F2		F3		F4		F5	
	Initial	After 7days	Initial	After 7days	Initial	After 7days	Initial	After 7days	Initial	After 7days
Physical appearance	Semi solid	Semi solid	Semi solid	Semi solid	Semi solid	Semi solid	Semi solid	Semi solid	Semi solid	Semi solid
Texture	Ok	Ok	Ok	Ok	Ok	Ok	Ok	Ok	Ok	Ok
Colour	Brownish	Brownish	Brownish	Brownish	Brownish	Brownish	Brownish	Brownish	Brownish	Brownish
pH value	6.7	6.7	6.9	6.9	7.0	7.0	7.2	7.2	7.3	7.3
Thermal stability	Ok	Ok	Ok	Ok	Ok	Ok	Ok	Ok	Ok	Ok
Degradation of the product	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

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Table 6: Antibacterial activity [Zone of inhibition (millimeter)]

Samples	***Staphylococcus aureus***	***Escherichia coli***
F1	6	7
F2	7	5
F3	7	6
F4	6	5
F5	5	7

Discussion

The evaluation parameter of the herbal cream is shown above. From the experiment it is cleared that herbal cream shows good creaming property and homogeneity. The cream pH with in normal range of the skin. Increasing the viscosity formulations spreadability decrease and vice versa. The cream formulation has all desirable properties that must be present in ideal cream formulation.

V. CONCLUSION

The herbal cream contained less chemical and natural value. The cream preparing in simple method. It is use as a prevention of a barrier to protect skin. The herbal cream showed good significant in antibacterial studies.

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