

Research Article - Formulation and Evaluation of Herbal Antibacterial, Antifungal Cream.

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ABSTRACT:

Main aim of this study was to evaluate the antibacterial, antifungal activity of Gandhak (sulphur) and Asadofoetida (Hing) Against E. coli. Gandhak (Sulphur) and Asadofoitida (hing) used as antibacterial and antifungal agent. We also formulated antibacterial and antifungal cream with API gundhak and Hing. The prepaered cream was evaluated for their physical, rheological and antifungal and antibacterial properties. The stability studies was also done.

Antibacterial and antifungal cream formulated for study. API is Gundhak and Hing. Characterization studies of herbal cream like Physical properties, pH determination, Emulsion type identification, Irritancy test, Spread ability, Microbial test and Stability studies.

Formulated cream passed all the stability and characterization parameter and antibacterial and antifungal activity of gundhak and Hing confirmed. The formulated cream was acidic in nature, color was yellowish white, appearance –semisolid, and O/W type of emulsion.

KEYWORD: Herbal antibacterial and antifungal cream, stability studies, formulation of herbal cream, API- Gandhak and Hing.

I. INTRODUCTION:

The aim of the present study to formulate a natural, safe, potent Antifungal and Antibacterial

cream and to evaluate its physicochemical properties and study of stability parameter. Use of herbal drugs in treatment of infections and skin disorder is an old tradition.

If we talk about skin infections such as Gandhakmalahar, the Herbal drug Gandhak is used. Gandhakis Keetnashak, Keetaghna, Krumighna, Pamari, Kushtari, Dadrugnas. Gandhak is more effective on Staphylococcus aureus, E.coli, aspergillosis candidiasis which aremai pathogens that causes skin infection.

The word Gandhak is derived from the Sanskrit term “gandhaka”, which means :foul smelling” due the characteristic odor of burning sulphur. Sulpher is an essential element for the life. It is a building block for many vital molecules such as proteins and vitamins. Sulphur compounds are also present in certain foods, contributing to their distinct flavors and aromas.

II. MATERIALS AND METHOD:

• Chemicals and solvents:

Gandhak(Sulphur), Hing (asadofeoida), Jatyadi oil, Cetostearylalcohol, stearic acid, Sodium lauryl ethyl sulphate (SLES), Water, Nutrient Broth, Nutrient agar.

• Test Strains:

Escherchiacoli

Table:1 Cream formulation

Sr.No	Formula	30m
1	Gandhak (sulphur)	0.1gm
2	Hing (asadofeotida)	0.05gm
3	Jatyadi oil	0ml
4	Karanji oil	15ml
5	Stearic acid	1gm
6	Cetostearyl alcohol	0.6gm
7	SLES	0.05m
8	Water	10ml

Table:2 Development of cream formulation

Sr.No	Ingredients	SampleA	SampleB	SampleC
1	Gandhak (sulphur)	0.1gm	0.1gm	0.1gm
2	Hing (asadofetida)	0.05ml	0.05ml	0.05m
3	Jatyadi oil	0ml	0ml	0ml
4	Karanji oil	151	151	151
5	Stearic acid	2gm	2gm	2gm
6	Cetostearyl alcohol	0.6gm	0.6gm	0.6gm
7	SLES	0.05m	0.05m	0.05m

Procedure

1. Take two beakers A and B, wash and clean properly.
2. In beaker A take karanj oil and in beaker B Jatyadi oil, sulphur (gandhak), Asadofetida (Hing)
3. Simultaneously, boil both the beaker A and B on water bath.
4. Mix beaker A and B together with constant mechanical stirring.
5. Melt cetostearyl alcohol and stearic acid and add to the above formulation.
6. Again with mechanical stirring, add sodium lauryl ethyl sulphate.
7. Add slowly in cool water with constant mechanical stirring.
8. Milky, white appearance is seen.
9. Then the formulation cool in ice bath with stirring.

Characterization of herbal antibacterial, antifungal cream:

Physical evaluation:

Physical parameters such as colour, odour and appearance were evaluated.

pH determination:

The pH of various gel formulations were determined by using digital pH meter. 2.0gm of cream was accurately weighed and dispersed in 20 ml of distilled water and stored for two hours. The measurement of pH was carried out. The pH values are represented. The pH of dispersions was measured using pH meter.

Type of emulsion under dye test:

Scarlet red dye mixed with cream. Take drop into cream-dye mixture and placed on microscopic slide and covered with cover slip. Examined under microscope which type of emulsion.

Irritancy test :

An area (1cm²) on the dorsal left hand surface was marked. The cream was applied on this

marked surface. Then irritancy, erythema, edema were checked for regular time interval up to 24 hrs and the time was noted and reported.

Spread ability :

Formulation placed between two glass slides and 100gm weight was placed on the upper glass slide for 5 min to compress the formulation to uniform thickness. Weight 50gm was added to the pan. The time in seconds require to separate the two slides was taken as measure of spreadability.

Viscosity measurement :

Viscosity of cream was determined by using Brookfield rotational viscometer at 5,10,20,30 and50 rpm. Each reading was taken after equilibrium of the sample at the end of two minutes. The samples were repeated three times.

Microbial test :

Nutrient agar, nutrient broth media was used in microbial growth study. In this method the blank and sample petriplates were used and cream sample were aseptically transferred on to the sample plates in a cross pattern, the microbial growth was observed. Antimicrobial activity was assessed against staphylococcus aureus, E. coli strain after 24hrs, 48hrs and 72hrs, found to exhibit significant antimicrobial activity.

Stability study :

For in vitro evaluation of herbal antibacterial, antifungal cream was placed at different temperatures i.e., at 8, 25 and 40°C and 40°C at 75% RH (relative humidity) in stability chambers for 28 days. Any change in color, liquefaction, phase separation, conductivity and pH was observe and record.

III. RESULT AND DISCUSSION:

Physical evaluation :

Colour, Odour and appearance of the cream is checked and is as mentioned below in Table 3.

pH determination:

The pH of cream formulations was determined by using digital pH meter. 2.5gm of gel was accurately weighed and dispersed in 25ml of distilled water and stored for two hours. The measurement of pH was carried out. The pH values are represented in Table 3.

Type of emulsion :

Scarlet red dye mixed with cream. Take drop into cream-dye mixture and placed on microscopic slide and covered with cover slip. Examined under microscope which type of emulsion and the result was noted and reported in table 3.

Irritancy :

An area (1cm²) on the dorsal left hand surface was marked. The cream was applied on this marked surface. Then irritancy, erythema, edema were checked for regular time interval up to 24hrs and the result was noted and reported in table 3.

Spreadability:

Formulation placed between two glass slides and 100gm weight was placed on the upper glass slide for 5 min to compress the formulation to uniform thickness. Weight 50 gm was added to the pan. The time in seconds required to separate the two slides was taken as measure of spreadability (Table 3.)

Table:3 Characterization of herbal antibacterial, antifungal cream

Sr.no	Test	Result
1	Physical evaluation	
	Color	Yellowish white
	Odour	characteristics
	Appearance	Semisolid
2	pH determination	5.6
3	Type of emulsion	O/W
4	Irritancy	No irritation on skin
5	Spreadability test	17.21gm/cm/sec

Stability study :

For in vitro evaluation of herbal antibacterial, antifungal cream was placed at different temperatures i.e., at 8, 25 and 40°C and 40°C at 75% RH (relative humidity) in stability chambers for 28 days (Table 5). No change in color, liquefaction and phase separation was observed; furthermore, the electrical conductivity test was also negative for each sample of

creams and the pH of herbal antibacterial, antifungal cream at different storage conditions of temperature and humidity were in the range of normal skin pH. The pH of freshly prepared formulation was 5.6, respectively. The samples of formulation showed gradual decrease in pH from after 3rd day to 28th day study period. At the end of study (on 28th day) pH of base samples decreased, respectively.

Table:5. Stability characteristics of herbal antibacterial, antifungal cream

		Fresh	After 24h	After 3 days	After 7 days	After 14 days	After 21 days	After 28 days
Color	A	WY	WY	WY	WY	WY	WY	WY
	B	WY	WY	WY	WY	WY	WY	WY
	C	WY	WY	WY	WY	WY	WY	WY
	D	WY	WY	WY	WY	WY	WY	WY
Liquefaction	A	-ve	-ve	-ve	-ve	-ve	-ve	-ve
	B	-ve	-ve	-ve	-ve	-ve	-ve	-ve
	C	-ve	-ve	-ve	-ve	-ve	-ve	+ve
	D	-ve	-ve	-ve	-ve	-ve	+ve	+ve
Phase separation	A	-ve	-ve	-ve	-ve	-ve	-ve	-ve
	B	-ve	-ve	-ve	-ve	-ve	-ve	-ve
	C	-ve	-ve	-ve	-ve	-ve	-ve	-ve
	D	-ve	-ve	-ve	-ve	-ve	-ve	-ve
	A	N	N	N	N	N	N	N

Conduc tivity	B	N	N	N	N	N	N	N
	C	N	N	N	N	N	N	N
	D	N	N	N	N	N	N	N
pH	A	5.7	5.7	5.7	5.59	5.46	5.20	5.10
	B	5.7	5.7	5.65	5.64	5.37	5.23	5.08
	C	5.7	5.7	5.55	5.42	5.05	5.17	4.93
	D	5.7	5.7	5.55	5.46	5.02	5.27	4.99

Microbial test :

Nutrient agar media was used in microbial growth study. In this method the blank and sample petriplates were used and gel sample were

aseptically transferred on to the sample plates in a cross pattern, the microbial growth was observed (Table 4. And Fig.2).



Fig 1. Spreadability test

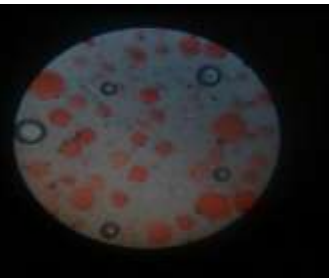








Fig 2. Type of emulsion

Table:4. Microbial test

Sr.No	Test strain	24hr	48hr	72hr
1	Nutrient agar media + Cream	No growth	No growth	No growth
2	Nutrient agar media + E. coli + cream	No growth	No growth	No growth

	24hr	48hr	72hr
Nutrient agar media + Cream			
Nutrient agar media + E. coli+ cream			

IV. CONCLUSIONS

Further study proved that the cream prepared from Gandhak, Jatyadi oil, Karanji oil and hing reduces skin infections. Stability and clinical studies are needed to validate therapeutic potential of this herbal antibacterial, antifungal cream against all skin infections.

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