



FORMULATION AND EVALUATION OF *PIPER BETLE L* CONTAINING HERBAL CREAM

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ABSTRACT

Herbal cosmetics are the preparations used to enhance the human appearance. The aim of the present research was to formulate the herbal Cream for Treatment of various diseases of the skin. The main aim of the research work is to prepare the herbal creams using different polymers and the prepared herbal cream are evaluated for the efficacy. The herbs used in the preparations are Fresh Piper betle L powder is prepared by ethanolic extraction methods. The formulated moisturizing creams are evaluated for the various irritancy, wash ability, pH, viscosity, phase separation, spread ability, compatibility test. The results shown that all formulation gave satisfied results. Thus herbal cosmetics formulation is safe to use was proved and it can be used as the provision of a barrier to protect skin.

KEYWORD: Herbal Cream, Piper Betle L.

1. INTRODUCTION

The word 'Cosmetic' derived from a Greek word – 'kosmesticos' that means to adorn. From that time any materials used to beautification or promoting appearance is known as cosmetic. The word "cosmetics" actually stems from its use in Ancient Rome. They were typically produced by female slaves known as "cosmetae" which is where the word "cosmetics" stemmed from. The concept of beauty and cosmetics is as ancient as mankind and civilization. Indian herbs and its significance are popular worldwide. An herbal cosmetic have growing demand within the world market and is a useful gift of nature. Now-a-days herbal extracts are used in the cosmetic preparations for medicinal purpose. Herbal cosmetics are classified on the basis of dosage form like-cream, powder, soaps, solutions, etc. and according to part or organ of the body to be applied for like; cosmetics for skin, hair, nail, teeth and mouth etc., The basic idea of skin care cosmetic lies deep in the Rigveda, Yajurveda, Ayurveda, Unani and Homeopathic system of medicine. These are the products in which herbs are used in crude or extract form. These herbs should have varieties of properties like antioxidant, anti-inflammatory, antiseptic, emollient, anti seborrhetic, antikerolytic activity and antibacterial etc.

1.1 TYPES OF SKIN CREAMS

They are divided into two types

Oil-in-Water (O/W): creams which are composed of small droplets of oil dispersed in a continuous phase, and

an emulsion in which the oil is dispersed as droplets throughout the aqueous phase is termed an oil-in water (O/W) emulsion.

Water-in-Oil (W/O): creams which are composed of small droplets of water dispersed in a continuous oily phase. When water is the dispersed phase and an oil the dispersion medium, the emulsion is of the water-in oil (W/O) type.

2. PLANT PROFILE

Piper betle is glorified as evergreen and perennial plant that God designed and have given the shape of his own heart. The heart shaped of Piper betle leaves are initiate in ancient Sanskrit texts, include Charaka, Sushruta Samhita and Astanga Hridayam. Piper betle L. has been use in Chinese, Indian traditional medicine for centuries. The purpose of it is to reveal the possible effect of this plant in the development of therapeutically active herbal drugs.

2.1 SCIENTIFIC CLASSIFICATION

✚ **Synonyms:** Chavica Beta. Artanthe Hixagona

✚ **Fingdom:** Plantae

✚ **Order:** Piperales

✚ **Family:** Piperaceae

✚ **Genus:** Piper

✚ **Species:** P.Petle

✚ **Test:** Pungent tasting and warming.

✚ **Division:** Magnoliphyta



Figures No: 1 Piper Betle L.

3. MATERIALS AND METHODS

3.1 AUTHENTICATION CERTIFICATE FOR 404-03122201

The plant material collected was identified and authenticated by Dr. KN Sunil kumar Research officer HOD Department of pharmacognosy, Dr. P.Elankani Research officer (Siddha), Sci III-Incharge, SIDDHA CENTRAL RESEARCH INSTITUTE (Central Council for Research in Siddha, Chennai, Ministry of AYUSH, Government of India) Anna Govt. Hospital Campus, Arumbakkam, Chennai – 600106.

Certified that the sample submitted by K. Nanthagopal, R. Naveen, K. Nivetha and S. Pavithra, B.Pharm - Final year, Aadhibhagavan College of Pharmacy, Thiruvannamalai district - 604407 was identified as:

Form No: PCOG002-ACF

Code: P03122201B

Botanical Name: Piper betle L.

Part: Leaf

Date: 20.12.2022

3.2 CHEMICAL

List of chemical used in Methyl Cellulose, Ethyl Cellulose, CMC, HPMC, Aerosil, Liquid Paraffin, Stearyl Alcohol, Tween – 80, Methyl Paraben, Sorbitol, Potassium Hydroxide, Stearic Acid, Bees Wax.

3.3 PREPARATION OF ALCOHOLIC EXTRACT OF CRUDE DRUGS

Soxhlet extraction or hot continuous extraction In this method, finely ground sample was placed in a porous

bag or “thimble” made from a strong filter paper or cellulose. Extraction solvent i.e. ethanol 90% was heated in the bottom flask, vaporizes into the sample Piper betle L, condenses in the condenser and drip back. When the liquid content reaches the siphon arm, the liquid contents emptied into the bottom flask again and the process was continued. The final ethanolic extract is collected.

3.4 FORMULATION OF PIPER BETLE L HERBAL CREAM

PROCEDURE

The formulation were done as per formula given in table No.1. The formulation containing Piper betle L extract was formulated. The aqueous and oil phases were taken into beakers and heated to 75°C over a water bath. The oil phase was comprised of extracts of Piper betle L, liquid paraffin, bees wax, stearyl alcohol, Tween-80 and stearic acid while the aqueous phase was composed of Polymers, methyl parabens, sorbitol solution and potassium hydroxide. Drop wise addition of the aqueous phase to the oil phase was done with constant stirring at 2000 rpm in a homogenizer for a period of 15 min. The homogenizer speed was then reduced to 1000 rpm and homogenization was continued for another 5 min. The speed was further reduced to 500 rpm and the homogenization extended for 5 min. Herbal skin cream containing Piper betle L extract was formulated.

Table No. 1: Formulation of Herbal Cream.

S.NO	INGREDIENT	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11
1	Extract	5	5	5	5	5	5	5	5	5	5	5
2	Methyl Cellulose	2	3	-	-	-	-	-	-	-	-	-
3	Ethyl Cellulose	-	-	2	2.5	-	-	-	-	-	-	-
4	CMC	-	-	-	-	2.5	3	-	-	-	-	-
5	HPMC	-	-	-	-	-	-	3	4	-	-	-
6	Aerosil	-	-	-	-	-	-	-	-	2	1.5	-
7	Liquid Paraffin	5	5	5	5	5	5	5	5	5	5	5
8	Stearic Acid	3	3	4	4	5	5	6	6	7	7	8
9	Bees Wax	5	5	6	6	5	5	6	6	5	5	7
10	Stearyl Alcohol	10	10	10	10	10	10	10	10	10	10	10
11	Tween – 80	8	8	7	7	6	6	5	5	4	4	3

12	Methyl Paraben	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
13	Sorbitol	5	5	5	5	6	6	6	6	7	7	7
14	Potassium Hydroxide	5	5	5	5	5	5	5	5	5	5	5
15	Coloring Agent	Q.S										
16	Water	52	51	51	50	51	50	50	49	50	49	49



F1



F2



F3



F4



F5



F6



F7



F8



F9



F10



F11

Figures No: 2 Herbal Creams.

4. EVALUATION OF HERBAL CREAM

4.1 PHYSICAL EVALUATION OF THE FORMULATION

The formulations were inspected visually for their appearance, colour and odour.

4.2 MEASUREMENT OF PH

The pH was measured using a pH meter, which was calibrated before each use with standard buffer solutions at pH 4, 7, 9. The electrode was inserted into the sample

10 minutes prior to taking the reading at room temperature.

4.3 VISCOSITY

The viscosity of the formulations was checked using a Brookfield Viscometer. The gels were rotated at 0.3, 0.6, 1.5 rotations per minute. The viscosity of the gel was obtained by multiplying the corresponding dial reading with the factor given in the Brookfield Viscometer catalogue.

4.4 TEST FOR THERMAL STABILITY

Thermal stability of the formulation was determined by the humidity chamber controlled at 60- 70% RH and 37 ± 1°C.

4.5 SPREADABILITY

Spreadability is measured in terms of time in seconds taken by two slides to slip off from the gel when placed in between the slides under the direction of a certain load. The excess amount of sample was placed between the two glass slides and a definite amount of weight was placed on these glass slides to compress the glass slides of uniform thickness. A weight of 70 g was added and the time required to separate the two slides was noted. Spreadability was calculated using the formula

$$S = M.L / T$$

4.6 TEST FOR MICROBIAL GROWTH IN FORMULATED CREAMS

Anti-Fungal Activity

The formulated creams were inoculated on the plates of agar media by streak plate method and a control ketoconazole was prepared by cream. The plates were placed in to the incubator and are incubated at 37 °C for 24 hours. After the incubation period, plates were taken out and check the microbial growth by comparing it with the control.

Anti-Bacterial Activity

The bacterial strains were sub cultured to get fresh cultures of bacteria for this purpose, a single colony from bacterial strain was inoculated on nutrient broth. The broth was incubated for 24 h at 37 °C. 14 gm of nutrient agar media was dissolved in 1 L of distilled water at PH 7 and autoclaved for 20 min at 121°C.

The media were allowed to cool down to 45°C and poured to petri plates for preparing 75 ml of solid media. using sterile cork borer 7 wells per plate were made in the solidified media. Agar diffusion method was used for antibacterial activity. Bacterial culture was inoculated on the surface of solid media. The crude extract of Piper betle L and fractions were dissolved in dimethylsulfoxide (DMSO) at the same concentration of 2 mg/ml to prepare stock solutions. from the stock solution, 1000 µl was poured into respective wells. Ciprofloxacin was used as a positive control and DMSO was used as a negative control. The zone of inhibition of crude extract and fractions were measured in mm after 24 h of incubation

at 37 °C and compared with the zone of inhibition of standard drug Ciprofloxacin.

Anti-Inflammatory Activity

Inhibition of albumin denaturation, anti-proteinase activity, human red blood cell membrane stabilization method and heat induced hemolysis assay were done according to standard positive control diclofenac sodium & negative control triton-x 100, with minor modifications.

4.7 IRRITANCY

Mark 1cm² area on left hand dorsal. Cream was applied on that area and note that time. After interval up to 24 hours it is checked for irritant effect, erythema and edema if any then reported.

4.8 WASHABILITY

Apply small amount of cream on hand and wash it under running tap water.

4.9 PHASE SEPARATION

Prepared cream is kept in tightly closed container at room temperature away from sunlight and observed for 24 hours for 30 days for phase separation.

4.10 GREASINESS

The cream is applied in the form of smear on the surface of skin and observed if smear was oily or grease like. According to result, we can say that all 11 formulations.

4.11 HOMOGENEITY

It was found that the cream was homogeneous and smooth and consistent in nature.

4.12 DETERMINATION OF TYPE OF EMULSION

Dilution Test

In this test the emulsion is diluted either with oil or water. If the emulsion is o/w type and it is diluted with water, it will remain stable as water is the dispersion medium" but if it is diluted with oil, the emulsion will break as oil and water are not miscible with each other. Oil in water emulsion can easily be diluted with an aqueous solvent, whereas water in oil emulsion can be diluted with an oily liquid.

Dye Solubility Test

In this test an emulsion is mixed with a water soluble dye (amaranth) and observed under the microscope. If the continuous phase appears red, it means that the emulsion is o/w type as the water is in the external phase and the dye will dissolve in it to give color. If the scattered globules appear red and continuous phase colorless, then it is w/o type. Similarly, if an oil soluble dye (Scarlet red C or Sudan III) is added to an emulsion and the continuous phase appears red, then it is w/o emulsion.

5. RESULTS AND DISCUSSION

5.1 PHYSICAL PROPERTIES OF HERBAL CREAM

Table No: 2 Physical Properties.

S.NO	F	COLOR	ODOUR	APPEARANCE	pH	THERMAL STABILITY	PHASE SEPARATION	GREASINESS
1	F1	Dark Red	Characteristic	Semi-solid	6.5	Stable, No Separation	No phase separation	Non-greasy
2	F2	Light Red	Characteristic	Semi-solid	6.1	Stable, No Separation	No phase separation	Non-greasy
3	F3	Brown	Characteristic	Semi-solid	6.2	Stable, No Separation	No phase separation	Non-greasy
4	F4	Golden Brown	Characteristic	Semi-solid	6.4	Stable, No Separation	No phase separation	Non-greasy
5	F5	Pink	Characteristic	Semi-solid	5.8	Stable, No Separation	No phase separation	Non-greasy
6	F6	Pale Pink	Characteristic	Semi-solid	5.9	Stable, No Separation	No phase separation	Non-greasy
7	F7	Dark Green	Characteristic	Semi-solid	5.9	Stable, No Separation	No phase separation	Non-greasy
8	F8	Light Green	Characteristic	Semi-solid	6.3	Stable, No Separation	No phase separation	Non-greasy
9	F9	Lemon Yellow	Characteristic	Semi-solid	6.4	Stable, No Separation	No phase separation	Non-greasy
10	F10	Yellow	Characteristic	Semi-solid	5.8	Stable, No Separation	No phase separation	Non-greasy
11	F11	Sky Blue	Characteristic	Semi-solid	6.7	Stable, No Separation	No phase separation	Non-greasy

Table No: 3 Physical Properties.

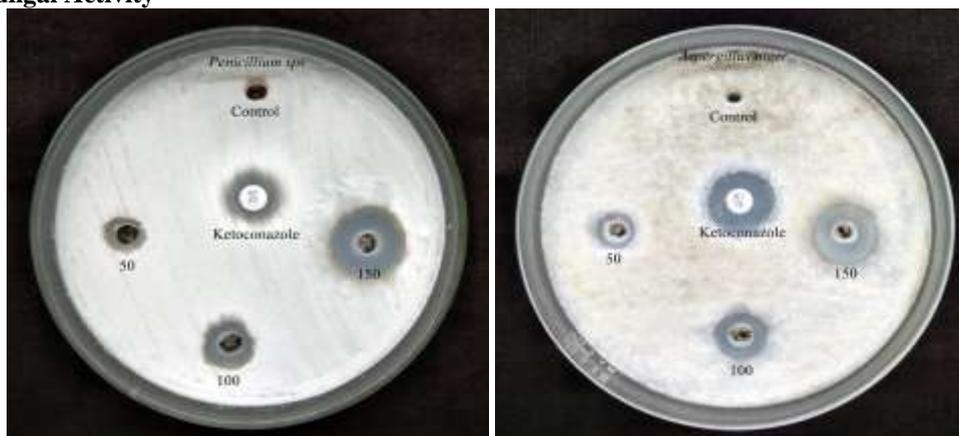
F	HOMOGENEITY	WASHABILITY	DILUTION TEST	DYE TEST	TIME (Sec)	SPREADABILITY (g cm / sec)
F1	Homogeneous	Easily Washable	No Separation	O / W Type	15	13.3
F2	Homogeneous	Easily Washable	No Separation	O / W Type	14	13.5
F3	Homogeneous	Easily Washable	No Separation	O / W Type	15	13.8
F4	Homogeneous	Easily Washable	No Separation	O / W Type	15	14.6
F5	Homogeneous	Easily Washable	No Separation	O / W Type	7	10.3
F6	Homogeneous	Easily Washable	No Separation	O / W Type	15	14.4
F7	Homogeneous	Easily Washable	No Separation	O / W Type	15	14.1
F8	Homogeneous	Easily Washable	No Separation	O / W Type	13	13.7
F9	Homogeneous	Easily Washable	No Separation	O / W Type	14	12.8
F10	Homogeneous	Easily Washable	No Separation	O / W Type	6	9.5
F11	Homogeneous	Easily Washable	No Separation	O / W Type	7	10.5

Table No: 4 Viscosity & Skin Irritation.

S.NO	F	VISCOSITY			SKIN IRRITATION STUDY		
		RPM			IRRITANT EFFECT	EDEMA	ERYTHYMA
		0.3	0.6	1.5			
1	F1	7442	3976	1976	Nil	Nil	Nil
2	F2	7337	3853	1786	Nil	Nil	Nil
3	F3	7313	3906	1993	Nil	Nil	Nil
4	F4	7531	3991	1885	Nil	Nil	Nil
5	F5	6832	2893	1634	Nil	Nil	Nil
6	F6	7241	3456	1784	Nil	Nil	Nil
7	F7	7187	3187	1863	Nil	Nil	Nil
8	F8	7216	3296	1816	Nil	Nil	Nil
9	F9	7213	3489	1797	Nil	Nil	Nil
10	F10	6321	2642	1327	Nil	Nil	Nil
11	F11	7166	3193	1456	Nil	Nil	Nil

5.2 TEST FOR MICROBIAL GROWTH IN FORMULATED CREAMS

5.2.1 Anti-Fungal Activity

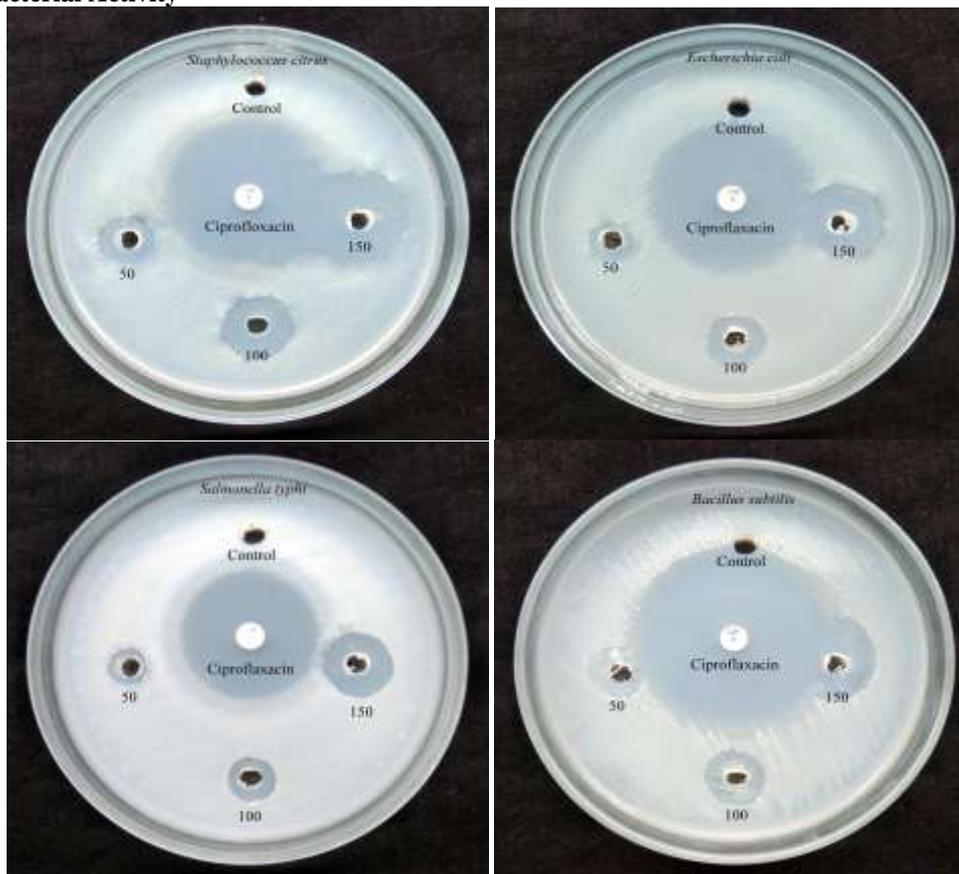


Figures No: 3 Anti-Fungal.

Table No: 5 Zone Of Inhibition Anti-Fungal.

S.NO	Sample Name Microorganisms	Herbal cream				
		Control	50	100	150	Ketoconazole
		Zone of inhibition in mm				
1.	<i>Aspergillus niger</i>	-	09	13	16	16
2.	<i>Penicillium sp.</i>	-	09	12	18	11

5.2.2 Anti-Bacterial Activity



Figures No. 4: Anti-Bacterial.

Table No. 6: Zone Of Inhibition Anti-Bacterial.

Sample Name		Herbal cream				
S.NO	Microorganisms	Control	50	100	150	Ciprofloxacin
Zone of inhibition in mm						
1.	<i>Salmonella typhi</i>	-	09	12	19	39
2.	<i>Escherichia coli</i>	-	10	14	16	39
3.	<i>Bacillus subtilis</i>	-	10	13	20	47
4.	<i>Staphylococcus citrus</i>	-	12	16	22	40

5.2.3 Anti-Inflammatory Activity

Table No. 7: Anti-Inflammatory Activity.

ANTI-INFLAMMATORY ACTIVITY

% Stabilization on HRBC (Human RBC) membrane of

Concentration	Compound	Positive Control (Diclofenac sodium)	Negative Control Triton X-100
25µg/mL	53.65	22.40	8.30
250µg/mL	66.15	33.07	5.02
500µg/mL	82.03	51.56	2.52



Figures No. 5: Anti-Inflammatory.

6. CONCLUSION

Formulation of Herbal Skin Cream was successfully developed that met the relevant pharmaceutical characteristics. The prepared formulations are then evaluated for parameters like physical properties, pH, viscosity, spreadability and stability of the formulated cream. The evaluations of all formulations (F1 to F11) were done on different parameters were examined. Formulations showed good consistency, homogeneity, appearance, spread ability, no evidence of phase separation and ease of removal. F4 showing good. hus cream formulation is safe to use was proved and it can be used as the provision of a barrier to protect skin. Stability parameters like visual appearance, nature and

fragrance of the formulations showed that there was no significant variation during the study period.

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