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Formulation and Evaluation of Herbal Cream

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ABSTRACT: The aim of present study is formulation and evaluation of herbal cream. By using Aloe Vera gel, Neem and Tulsi the cream showed a multipurpose effect and all these herbal ingredients showed significant different activities. Based on results and discussion, the formulations were stable at room temperature and can be safely used on the skin. This cream formulation was o/w type of emulsion; hence this formulation was easily washed with plane water after application. The prepared formulation was good Spreadability. Viscosity and PH of the cream was good. Cream does not show any type of phase separation during storage. The cream was nongrassy in nature and easily removable after application. The formulation was Nonirritant and not harm to the skin. Formulation of cream was done by slab method and further evaluated by various evaluation parameters such as physical properties, PH, Spreadability, Washability, non- irritancy test, viscosity and phase separation of cream and gives good results.

KEYWORDS: Dosage form, emulsion, soothing effect, healing property, drug release

I. INTRODUCTION:

Cream is defined as semisolid emulsions which are oil in water (o/w) or water in oil (w/o) type and these semisolid emulsions are intended for external application . Cream is classified as oil in water and water in oil emulsion. It is applied on outer part or superficial part of the skin and its main ability is to remain for a longer period of time at the site of application. The function of a skin cream is to protect the skin against different environmental condition, weather and gives soothing effect to the skin. There are different types of creams like cleansing, cold, foundation, vanishing, night, massage, hand and body creams. The main aim of our work is to develop a herbal cream which can give multipurpose effect, like moisturizer, reduce acne and skin irritation, reduce skin diseases like eczema, psoriasis, dry skin, wrinkles, rashes etc. and also adding glow to the face. We have used three herbal ingredients in our preparation which are Aloe Vera gel, Neem, Tulsi. Aloe Vera gel is used as a moisturizer, to reduce pimples and acne and also used for treatment of burn wounds . Neem is used as an antifungal and anti-inflammatory and it is also used to reduce scar, pigmentation, redness and itching of the skin . Tulsi is used to add glow to the skin and to promote wound healing .

It is a well-known fact that an over exposure of human skin to ultraviolet light may lead to sunburn cells, premature skin aging and an increased risk for skin cancers . Numbers of conventional and novel herbal cosmetics are useful to treat damaged skin. The steady increase in the incidence of melanoma, non-melanoma cutaneous neoplasia and preneoplasic disorders has contributed to the demand for more effective protection from the sun . Although modern sunscreen containing UV-filters are highly efficient to protect the skin from the deleterious effects of the sun , but herbal sunscreens are rapidly replacing them due to associated side effects with UV filters. Number of herbs like G.glabra, C.longa, P.corlifolia, C.tora, A.catechu, P. granatum, E. officinale, C.asiatica, C.zeylanicum, A. vera etc were already exploredscientifically for their sun protecting efficacy in literatures. So many herbal sunscreens are available in market in form of creams, lotion and gel having labelled sun protection factor [SPF]. Most commonly used herbs are aloe vera, basil, green tea, almond, olive, jojoba, and cucumber etc, incorporated in herbal sunscreens . Scientifically these plants are already explored for multipurpose biological activities like antioxidative, anti-aging and anti-scavenging properties etc.

II. MATERIALS AND METHODS:

MATERIALS:

Aloe Vera, Neem, Tulsi leaves and amla were collected from the local botanical garden in Bhopal. Bees wax, liquid paraffin, borax, methylparaben and rose oil collected from NRI

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chemical store, Bhopal, M.P. All chemicals used were of laboratory grade.

METHODS:

Extraction processes

i] **Aloe Vera gel:** Mature, healthy and fresh aloe Vera leaves were collected and washed with distilled water. Then after proper drying of leaves in hot air oven, the outer part of the leaf was dissected longitudinally using a sterile knife. Then the aloe Vera gel that is the colorless parenchymatous tissue was removed using the sterile knife. Then it is filtered using muslin cloth to remove the fibers and impurities. Then the filtrate or the filter product which is a clear aloe Vera gel was used in the preparation.

ii] **Extraction of neem leaves:** Neem leaves were collected and washed with distilled water and dried in hot air oven. After proper drying, leaves were powdered. Then 5g Neem leaves powder, 80 to 100 degree Celsius. dimethyl sulfoxide was taken in a volumetric flask and shaken for 3 days on mechanical shaker. Then the solution was heated on a water bath at 80-100 ℃ and concentrated up to 20 ml and then filtered using muslin cloth to remove impurities. Then the filtrate or filter product obtained, which is a clear solution or clear extract of Neem leaves, was used in the preparation.

iii] **Extraction of tulsi leaves:** Tulsi leaves were collected and washed with distilled water and dried in hot air oven. Then after proper drying, the leaves were powdered. Then 1g Tulsi leaf powder+10 ml dimethyl sulfoxide was taken in a volumetric flask and then shaken for 3 d on REMI RSB-12 mechanical shaker. Then the solution was heated on water bath at 80 to 100 degree Celsius. for few minutes and then concentrated up to 5 ml and filtered using a muslin cloth to remove impurities. Then the filtrate or the filter product in which a clear solution or clear extract of Tulsi leaves was used in the preparation.

Formulation of cream: Heat liquid paraffin and beeswax in a borosilicate glass beaker at 75 ℃ and maintain that heating temperature (Oil phase). In another beaker, dissolve borax, methylparaben indistilled water and heat this beaker to 75 ℃ to dissolve borax and methylparaben and to get a clear solution. (Aqueous phase). Then slowly add this aqueous phase to heated oily phase . Then add ameasured amount of aloe Vera gel, Neem extract, and Tulsi extract and stir vigorously until it forms a smooth cream. Then add few drops of rose oil as a fragrance. Put this cream on the slab and add few drops of distilled water if necessary and mix the cream in a geometric manner on the slab to give a smooth texture to the cream and to mix all the ingredients properly. This method is called as slab technique or extemporaneous method of preparation of cream.

III. RESULT AND DISCUSSION:

Table 1: Formulation of herbal cream

Ingredients	Formulation F1H	Formulation F2H	Formulation F3H
Aloe Vera gel	1.5 ml	1 ml	1 ml
Neem extract	0.5 ml	0.2 ml	0.4 ml
Amla	1.5g	1g	0.5g
Tulsi extract	1.5 ml	1 ml	1 ml
Liquid paraffin	10 ml	15 ml	12 ml
Borax	0.2 g	0.4 g	0.3 g
Methylparaben	0.02 g	0.04 g	0.03 g
Distilled Water	Q. S	Q. S	Q. S
Rose oil	Q. S	Q. S	Q. S

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Evaluation of cream Physical evaluation: In this test, the cream was observed for color, odor, texture,state.

Irritancy: Mark the area (1 cm^2) on the left-hand dorsal surface. Then the cream was applied to that area and the time was noted. Then it is checked for irritancy, erythema, and edemaif any for an interval up to 24 h and reported**.**

Wash ability: A small amount of cream was applied on the hand and it is then washed with tap water.

P^H: 0.5 g cream was taken and dispersed in 50 ml distilled water and then P^H was measured by using digital P^H meter**.**

Viscosity: Viscosity of cream was done by using Brooke field viscometer at a temperature of 25 ℃ using spindle No. 63 at 2.5 RPM.

Phase separation: Prepared cream was kept in a closed container at a temperature of 25-100 ℃away from light. Then phase separation was checked for 24 h for 30 d. Any change in the phase separation was observed/checked.

Spread ability: The spreadability was expressed in terms of time in seconds taken by two slides to slip off from the cream, placed in between the slides, under certain load. The time taken by the upper slide to slip off was noted.

Spreadability= m × l/t
Where, m= Standard weight which is tied to or placed over the upper slide (30g)
l= length of a glass slide (5 cm)
t= time taken in seconds.

Greasiness: Here the cream was applied on the skin surface in the form of smear and checked if the smear was oily or grease-like .

Compatibility study: Compatibility study of the herbal APIs was done by using IR spectroscopy and the IR spectrum was measured in there solid state. The region in which the IR spectrum was measured falls in between 4000.12 to 525.03. The sensitivity was 75. The characteristics peaks which are observed in the IR spectra of the mixture of herbal APIs are 1026.79, 1368.24, 1438.73, 1604.78, 1728.45, 3289.05 cm^{-1}. The same peaks were also observed in the IR spectra of individual herbal APIs.

Table 1: Composition of cream base

Ingredients	Formula % w/w					
	F1	F2	F3	F4	F5	F6
Stearic acid	13	10	11	12	18	16
Cetyl alcohol	2	3	4	4	3	4
Almond oil	4	4	4	4	4	4
Glycerol	3	3	3	3	3	3
Methyl paraban	0.02	0.02	0.02	0.02	0.02	0.02
Triethanolamine	qs	qs	qs	qs	qs	qs
Water, qs, 100	qs	qs	qs	qs	qs	qs

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Evaluation of cream

pH of the Cream: The pH meter was calibrated using standard buffer solution. About 0.5g of the cream was weighed and dissolved in 50.0 ml of distilled water and its pH was measured.

Viscosity: Viscosity of the formulation was determined by Brookfield Viscometer at 100 rpm, using spindle no. 7.

Dye test: The scarlet red dye is mixed with the cream. Place a drop of the cream on a microscopic slide covers it with a cover slip, and examines it under a microscope. If the disperse globules appear red the ground colourless. The cream is o/w type. The reverse condition occurs in w/o type cream i.e. the disperse globules appear colourless in the red ground.

Homogeneity: The formulations were tested for the homogeneity by visual appearance and by touch.

Appearance: The appearance of the cream was judged by its color, pearlscence and roughness and graded.

After feel: Emolliency, slipperiness and amount of residue left after the application of fixed amount of cream was checked.

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

Removal: The ease of removal of the cream applied was examined by washing the applied part with tapwater.

Irritancy test: Mark an area (1sq.cm) on the left hand dorsal surface. The cream was applied to the specified area and time was noted. Irritancy, erythema, edema, was checked if any for regular intervals up to 24 hrs and reported.

Accelerated stability testing: Accelerated stability testing of prepared formulations was conducted for 2 most stable formulations at room temperature, studied for 7 days. They were formulation number 4 and 5 at 40 ^{o}C ± 1 ^{o}C for 20 days. The formulations were kept both at room and elevated temperature and observed on 0th, 5th, 10th, 15th and 20th day for the following parameters.

Evaluation of base

pH of the Cream: The pH of the cream base was found to be in range of 6.2-6.9 which is good for skin pH. All the formulations of cream base were shown pH nearer to skin required.

Table 2: Determination of pH of prepared cream base

Formulation	pH
F1	6.4±1.15
F2	6.2±0.98
F3	6.9±1.65
F4	6.6±1.42
F5	6.8±2.05
F6	6.7±1.74

Values are mean ± S.D (n=3)

Viscosity: The viscosity of was cream was in the range of 27021-27053 cps which indicates spreadibilty of cream. In our study F_2, F_3 and F_4 depicted easily spreadable by small amounts of shear, while F_1, F_5 and F_6 were not easily spreadable on skin. But F3 shows good spreadable property than other formulations.

Irritancy test: The formulation F3 shows no redness, edema, Inflammation and irritation during irritancy studies. These formulations are safe to use for skin**.**

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Table 4: Type of Adverse effect of cream base

Formulation	Irritant	Erythema	Edema
F1	NIL	NIL	NIL
F2	NIL	NIL	NIL
F3	NIL	NIL	NIL
F4	NIL	NIL	NIL
F5	NIL	NIL	NIL
F6	NIL	NIL	NIL

Dye test: This dye confirms that all formulations were o/w type emulsion cream. But formulation (F3) shows more stable in o/w type emulsion. So here we select F3cream base for further study.
Homogeneity: All formulations of base produce uniform distribution in cream. This was confirmed by visualappearance and by touch.
Appearance: When formulation were kept for long time, it found that no change in colour of cream base.
After feel: Emolliency, slipperiness and amount of residue left after the application of fixed amount of cream base was found.
Type of smear: After application of cream base, the type of smear formed on the skin were non greasy.
Removal: The cream applied on skin was easily removed by washing with tap water.
Evaluation of cream: From above study, the F3 base was selected for the preparation of herbal cream. The three different cream namely HF1, HF2 and HF3 comprising of different concentration of the extracts.

IV. SUMMARY AND CONLUSION:

By using Aloe Vera gel, Neem and Tulsi the cream showed a multipurpose effect and all these herbal ingredients showed significant different activities. Based on results and discussion, the formulations were stable at room temperature and can be safely used on the skin.The present work was the formulation and evaluation of herbal cream. This cream formulation was o/w type of emulsion; hence this formulation was easily washed with plane water after application. The prepared formulation was good Spreadability. Viscosity and PH of the cream was good.

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