IJNRD.ORG ISSN : 2456-4184
INTERNATIONAL JOURNAL OF NOVEL RESEARCH AND DEVELOPMENT (IJNRD) | IJNRD.ORG
An International Open Access, Peer-reviewed, Refereed Journal

Formulation and Evaluation of Herbal Cream

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Abstract

Herbal cosmetic products are considered to be the best solution in the present scenario as people are giving more importance to external beauty and healthy skin for increasing confidence, young, delightful and attraction. Herbal cosmetics have demand in the world market and is estimable in the nature. The function of skin cream is to protect the skin against different environment condition and bacterial skin infection and also to maintain healthy skin which gives soothing effect to the skin.

The main Aim of our work is to develop an herbal cream which can moisturize skin, reduce skin irritation, antimicrobial, provide nourishment to the skin. We formulated safe and effective herbal skin cream which protect and nourish the skin by mixing the natural extract of Amaranthus Spinosus leaf, Nigella Sativa seed oil, as main natural extract ingredient and then cream was developed and performed evaluation study. Amaranthus Spinosus Leaf have been demonstrated to antioxidant and anti-microbial properties. Nigella sativa having antiacne, anti-inflammatory and moisturizing properties. The prepared formulation was evaluated for various parameters like color, odor, appearance, pH, phase separation, spread ability, viscosity, stability, antimicrobial of the herbal formulation.

We have formulated four batches of herbal cream F1, F2, F3, F4 with different quantities of ingredients compositions and evaluated. Evaluation of formulation with various parameters like pH, viscosity, stability, zone of inhibition, the assessment of all formulation(F1, F2, F3, F4) were performed and from our study F2 formulation showed good consistency, appearance, pH, no signs of phase separation, and simple removal. In irritancy test, the formulation F2 show no inflammation, edema, redness, irritation. The formulations secure to use for skin application. These studies indicate that the extract and base cream composition of F2 is more stable and effective.

Keywords: Amaranthus Spinosus leaf, Nigella Sativa seed, Herbal cream formulation, natural extracts, Herbal cosmetics.

INTRODUCTION

Creams are different types of emulsion which are oil in water (o/w) or water in oil(w/o) type and these semisolid emulsions are intended for external application. The present study was aimed to formulated a stable o/w herbal cream. Oil in Water (o/w) type is most commonly used cosmetic delivery system which supply moisture to skin and improve the skin condition by forming the occlusive barrier on the skin. It is applied on outer part or superficial part of skin and its main ability is to remain for longer period of time at the site of application.

The skin is the largest organ of the body. It is made of water, proteins, fats and minerals with total area of about 20 square feet and is flexible, self-repairable. Skin protects the body from germs and the elements. Skin helps to feel sensation like hot and cold and regulated the temperature of the body. Skin requires moisture to stay smooth and perform its physiological function effectively. The epidermis is outermost later of the skin, provide a water resistant and creates our skin tone. The dermis is the second layer of skin contains tough connective tissue, hair follicle and sweat glands. The hypodermis is deeper layer of skin and known as subcutaneous tissue. It is made up of fat and connective tissue.

The main purpose of this study was to formulate herbal cream containing Amaranthus Spinosus leaf extract, Nigella Sativa seed oil, to emphasize the importance of involving natural ingredients in pharmaceutical products instead of synthetic ingredients. The significance of this study can be clearly seen due to the fact that now a days there are lots of creams available in the market with synthetic chemical ingredients which can cause harmful effects. Herbal extract that has good effects on the skin and in addition, it was reported that antimicrobial, anti-inflammatory, anti-oxidant, anti-acne activity.[1]

Ideal characteristics of Herbal Cream

1. It should have Good Appearance
2. It should spread easily on the skin
3. Nonirritant to the skin
4. They should remove oil, sebum, dirt, dead cells from skin
5. They should form emollient film which should remain on skin after application
6. They should also provide softening, lubricating and protecting the skin apart from cleaning
7. They should non-greasy and non-staining
8. They should not change membrane and skin functions

Materials and Methods

Collection and Authentication of Plants:

Amaranthus Spinosus leaf and Nigella Sativa seeds were collected from the market. These items were purchased from the authentified shop Indimart. Aloe vera gel was extracted in lab and other materials like bees wax, steric acid, cetyl alcohol, mineral oil, glycerine, rose water was collected from institute Pharmaceutics lab. Those items were checked by Dr. Kodati Devender Rao, HOD Pharmacology, St. peter's Institute of Pharmaceutical Sciences, Vidhya Nagar, Hanamkonda, Telangana, India.

Extraction Process of Aloe vera gel:

Fresh Aloe vera leaves was taken and washed with purified water and then with a sharp knife outer part of aloe vera leaf was dissected and gel was taken out by placing in cotton cloth the gel was squeezed and pure form of Aloe vera gel extracted.

Method

Herbal cream was prepared in a fix proportion containing all the materials Amaranthus Spinosus leaf extract, Nigella sativa seed oil. The beeswax used was melted in a water bath. The emulsifier which is stearic acid and cetyl alcohol added to oil phase and Nigella sativa seed oil, mineral oil was dissolved within the oil phase and heated to 75^0C. The Amaranthus Spinosus leaf extract, glycerine, rose water, aloe vera gel dissolved in the aqueous phase and heated to 75^0C. After heating the oil phase and aqueous phase are mixed with continuous stirring until the cream was formed and then cooled.

Fig 1: Prepared herbal cream

The formulation was divided in four compositions of different quantities of ingredients and mentioned them as F1, F2, F3, F4 and evaluated which are listed in table 1.

Ingredients	Role	F1	F2	F3	F4
Nigella sativa seed oil	Moisturizer, Soothing	4ml	3.5ml	3ml	3ml
Amaranthus Spinosus leaf powder	Antibacterial, nourish	3.7g	3.5g	3g	3g
Aloe vera gel	Emollient	3g	1.5g	2.5g	1g
Bees wax	Base	2.5g	7g	7g	5g
Mineral oil	Emulsifier	5ml	6ml	8ml	7ml
Stearic acid	Emulsifier	3g	2.3g	2.5g	2g
Cetyl alcohol	Emulsifier	3g	2.3g	2.5g	2g
Glycerin	Humectant	5ml	6ml	8ml	7ml
Rose water	Fragrance	Quantity sufficient	Quantity sufficient	Quantity sufficient	Quantity sufficient
Distilled water	Vehicle	Quantity sufficient	Quantity sufficient	Quantity sufficient	Quantity sufficient

Table 1: Plant extracts and their role and composition of chemicals in Herbal Cream

Evaluation of Cream

Physical Evaluation

Formulated herbal creams was further evaluated by using the following physical parameters like color, odor, consistency and state of the formulation.

Color:

The color of the cream was observed by visual examination. The results were shown in table 2.

Odor:

The odor of cream was found to be characteristics. The result was shown in table 2.

State:

The state of cream was examined visually. The cream was semisolid in state and results was shown in table 2.

Consistency:

The formulation was examined by rubbing cream on hand manually. The cream having smooth consistency.

P^H

Prepared herbal cream was measured by using digital p^Hmeter. The solution of cream was prepared by using 100ml of distilled water and set aside for 2hours. P^H was determined three times and average value was calculated. Results were shown in table 7 .

Spreadability:

Spreadability of formulated cream was measured by placing sample in between two slides then compressed to uniform thickness by placing a definite weight for definite time. The specified time required to separate

the two slides was measured as spread ability. Lesser the time taken for separation of two slides results showed better Spreadability in table 4.

Viscosity:

Viscosity was determined by using Brookfield viscometer using spindle no. 63. The speed taken 10, 20, 100 RPM. The formulated cream was directly immersed into the cream and viscosity was measured and values was recorded in centipoise. The result was shown in table 6.

Washability:

A portion of cream was applied over the skin of the hand and allowed to slow under the force of flowing tap water for 10mon. The time when the cream completely removed was noted in table 4.

Homogeneity:

Homogeneity and texture were tested by pressing a small quantity of the formulated cream between the thumb and index finger. The consistency of the formulation and presence of coarse particles were used to evaluate the texture and homogeneity of the formulation. Result noted in table 3 .

After feel:

Emollience, amount of residue left after the application of fixed amount and slipperiness of cream was checked. Result found of every formulation of specific in table 4.

Irritancy test:

Label an area on the dorsal surface of left hand. For the defined area, the cream was applied and time was noted. Irritants, erythema, eczema were tested and reported at regular intervals of time up to 24 hours, if any. Result noted in table 3.

Antimicrobial test

Nutrient agar was prepared and inoculated with test organism we have taken *E.coli, lactobacillus,* with a depth of -mm and then allow it to solidify. Divide the plate into four equal portions. Then with the help of sterile borer make four cavities one in each portion. Then fill cavities with antibiotic solution. Slowly incubate the plated at 37 ºC for 24hours. After incubation measure the zone of inhibition.

Stability studies

During storage and handling cosmetic formulations thermal stability are prime parameters which affect the formulations acceptability. Among all the formulation F1, F2, F3, F4 which formulation showed better thermal stability at 20 ºC, 30 ºC, 40 ºC. Baes on accelerated stability studies shown in table 3 and 3, less thermal stability formulation result in phase separation, cracking of emulsion which is determined by accelerated stability studies.

Determination of Moisture Content

Weigh 5g of sample into a porcelain dish containing 6-8cm in diameter and 2-4cm depth. Dry the sample in oven at 150 ºC and calculate

$$\% \text{ by mass} = 100\ M1/M$$

M1 is loss of mass(in grams) on frying; M is mass (in grams) of material taken for test

Results and Discussions

Physicochemical properties of cream have a significant impact on its efficacy and application on skin. Physicochemical properties of herbal cream which was prepared are listed in table 3.

Physical properties	F1	F2	F3	F4
Color	brown	brown	brown	brown
Odor	Characteristics	Characteristics	Characteristics	Characteristics
Appearance	Semi solid	Semi solid	Semi solid	Semi solid

Table 2: Physicochemical properties

Evaluation	F1	F2	F3	F4
Phase separation	No	No	No	No
Irritancy	No	No	No	No
Washability	Yes	Yes	Yes	Yes
After feel	Emollient	Emollient	Emollient	Emollient
Homogeneity	Yes	Yes	Yes	Yes

Table 3: Phase separation, Irritancy, Washability, after feel, Homogeneity results

Fig 2: Irritancy test

The consistency and texture of cream determine its feel and Spreadability on the skin. A cream with smooth and easily spreadable texture enhances appealing for use on skin. Spreadability results noted in table 4.

Formulation	Spreadability(gm.com/sec)
F1	4.5
F2	2.5
F3	3.0
F4	5

Table 4: Spreadability

Moisture content in cream make the skin hydrate and more effective in preventing dry skin. Moisture content evaluated and mentioned in table 6.

Formulation	Moisture content
F1	15%
F2	20%
F3	18%
F4	12%

Table 5: Moisture content

Brook field viscometer DV-II + Pro model. The cream sample 50g was placed on the sample holder of the viscometer and allowed to settle for min and the viscosity measured at a rotation speed of 10, 20, 100RPM at room temperature. An average of three triplicated was computed. Results noted in table 7.

Formulation	10rmp	20rpm	100rpm
F1	1201 centipoise	1247 centipoise	4125centipoise
F2	1254 centipoise	3368 centipoises	3266 centipoises
F3	1277 centipoise	3322 centipoises	3623 centipoises
F4	1385 centipoise	2013 centipoise	2418 centipoise

Table 6: Viscosity

Fig 3: Viscometer

The p^H of the developed cream base was measured on a standardized digital p^H meter at room temperature by taking an adequate amount in 50ml beaker. Results notes in table 8.

F1	5.6
F2	5.8
F3	5.7
F4	5.4

Table 7: p^H

Fig 4: p^H meter and p^H paper

The herbal cream shall not show not show any physical sign of deterioration during normal condition of storage and use. Herbal cream was subjected to a temperature of 20-40 ºC for a period of 14days. Results noted in table 9.

Evaluation	**F1**		**F2**		**F3**		**F4**	
Stability studies	initial	After 14 days	initial	After 14 days	initial	After 14 days	initial	After 14 days
Physical appearance	Semisolid	semisolid	Semisolid	Semisolid	Semisolid	Semisolid	Semisolid	semisolid
Texture	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth
Color	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown
Degradation of product	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

Table 8: Accelerated Stability studies

Formulation	**20°C**	**30°C**	**40°C**
F1	Stable	Stable	Stable
F2	Stable	Stable	Stable
F3	Stable	Stable	Stable
F4	Stable	stable	Stable

Table 9: Thermal Stability Studies

The invitro antimicrobial study was performed by measuring and comparing the zone of inhibition. The zone of inhibition is defined as the clear region around the well that contains an antimicrobial agent. The larger the zone of inhibition the more active agent. The zone of inhibition for different batches given in table 11.

Formulation	**E.coli**	**Lactobacillus**
F1	18mm	14mm
F2	20mm	18mm
F3	14mm	12mm
F4	13mm	16mm

Table 10: Zone of inhibition

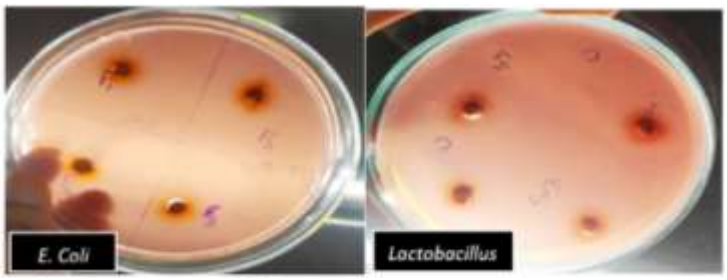

Fig 5: Antimicrobial test

Conclusion

The above studies show that herbal creams containing a Nigella sativa seed oil, Amaranthus Spinosus leaf extract formulated with cream base and emulsifiers. Rising appetite for herbal creams and that they are gifts from nature. We attempted to formulate an herbal cream. In terms of dermal irritation and allergic sensitization, the stable formulation was safe. The goal of this study was to formulate an herbal cream that doesn't cause side effects or adverse reaction. By adding different concentration of Nigella sativa seed oil, Amaranthus Spinosus leaf extract, stearic acid, cetyl alcohol, and other chemicals listed in table 1 of formulation namely F1, F2, F3, F4 were formulated. Evaluation of formulation with various parameters like pH, viscosity, stability, zone of inhibition, the assessment of all formulation(F1, F2, F3, F4) were performed. The F2 formulation showed good consistency, appearance, pH, no signs of phase separation, and simple removal. In irritancy test, the formulation F1, F2, F3, F4 show no inflammation, edema, redness, irritation. The formulations secure to use for skin application. These studies indicate that the extract and base cream composition of F2 is more stable and effective.

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