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FORMULATION AND EVALUATION OF POLYHERBAL CREAM Meenakshi Bharkatiya and Harsha Siyal BN Girls College of Pharmacy, Udaipur E mail: meenakshibharkatiya@rediffmail.com

Abstract: Herbal cosmetics are the preparations used to enhance the human appearance. The aim of the present research was to formulate and evaluate the Polyherbal cream comprising extracts of natural products such as Aloe vera, Azadirachta indica and Glycyrrhiza glabra to produce multipurpose effect on skin. The use of bioactive ingredients in cosmetic influence biological functions of skins and provide nutrients necessary for the healthy skin. Different types of formulations oil in water (O/W) herbal creams were formulated by incorporating different concentrations of stearic acid and cetyl alcohol. The evaluations of all formulations were done on different parameters like pH, viscosity, spreadibilty and stability. There were no changes in physical properties of polyherbal cream. Formulations showed good spreadibility, good consistency, homogeneity, and appearance, no evidence of phase separation and ease of removal. The cream showed good stability at room temperature with a pH that is suitable for the skin. The formulation shows no redness, edema, inflammation and irritation during irritancy studies. These formulations are safe to use for skin. These studies suggest that composition of extracts and base of cream are more stable and safe, it may produce synergistic action. It is found that viscosity of the cream is Adequate. There is no sign of microbial growth after incubation period of 24hrs at 37°. The preparation were found to be stable with no change in colour during stability study.

Key Words: Azadirachta indica, Glycyrrhiza glabra, edema, inflammation and irritation

1. INTRODUCTION

The use of herbal cosmetics not only developing an attractive external appearance, but towards achieving longevity of good health by reducing skin disorders. Herbal cosmetics are the products in which herbs are used in crude or extract form . Cosmetic products are used to protect against exogenous and endogenous harmful agents, and enhance the beauty and attractiveness of skin¹⁻². Herbal treatments applied topically have gained considerable attention due to their widespread use and illdefined benefit/risk ratio³. There are numerous medicinal plants which are widely used in the treatment of skin diseases and also known to possess antimicrobial activity⁴. Phytoconstituents are increasingly being incorporated into cosmetic formulations due to their ability to safeguard the skin from both internal and external harmful factors, as well as their potential to treat various skin conditions. The topical application of polyherbal creams directly to affected areas provides significant benefits, including faster drug release and targeted action. Cream formulation was semisolid formulations intended for topical application. The cream formulations were prepared by using various herbal extracts, herbal oils, and various excipients. Cosmetic products are used for the protection of skin from various endogenous and exogenous harmful agents along with enhancing the beauty and making skin attractive⁵.

The cosmetics which are meant for skin care nourishes the health, texture and moisturizes the skin⁶. The use of cosmetics not only developing an attractive external appearance, but towards achieving longevity of good health by reducing skin disorders⁷. Natural herbal skin creams are moisturize, hydrate and nourish the skin.

The *Aloe vera* plant has been known and used for centuries for its health, beauty, medicinal and skin care properties. Aloe vera is a natural product that is now a day frequently used in the field of cosmetology. It can be applied topically as an emollient for burns, sunburn and mild abrasion, and for inflammatory skin disorders. It has antibacterial, antifungal, antiviral, antioxidant, and anti inflammatory effects. Aloe vera is used externally for its wound healing properties⁸⁻⁹.

Azadirachta indica is one of the most popular auspicious and well known trees which are more

extensively studied for its pharmaceutical and clinical properties. It has been known to be used traditionally for their various therapeutic properties like antibacterial. antimicrobial. antioxidant, skin disorder, and wound healing activity. Azadirachta indica (Neem), is phytochemically rich in steroids, alkaloids, tannins. triterpenes, flavonoid and anthraguinone glycosides¹⁰⁻¹¹.

Glycyrrhiza Glabra is a medicinal plant with rich natural antioxidants. In traditional medicine, liquorice has been recommended as а prophylactic agent for gastric and duodenal ulcers. It is employed in dyspepsia as an antiinflammatory agent during allergenic reactions. It is used as a contraceptive, laxative, antiasthmatic. emmenagoque, galactagogue. antiviral agent in folk therapy. The best natural antioxidants in extract of Glycyrrhiza glabra are glycyrrhizin (glycyrrhizic acid), triterpene, saponins and flavonoids. Glycyrrhiza glabra extract are with therapeutic effects in skin whitening, skin depigmenting, skin lightening, emollient. antiaging, anti-acne and photoprotection effects. The above properties are reason for selection of these plant extracts in the preparation of polyherbal cosmetic cream to produce multipurpose effect on skin such as fairness, sunscreen, antiaging, antioxidant and antiwrinkle properties¹²⁻¹³.

The present research work was carried out to formulate and evaluate the polyherbal cream containing herbal ingredients with an emphasis

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on safety and efficacy, which avoid the risk of chemical ingredients. A herbal cosmetic cream was developed by mixing the extracts of *Aloe vera*, *Glycyrrhiza glabra* and *Azadirachta indica*, to produce multipurpose effect on skin such as fairness, antiaging and antiacne properties with zero side effects. All these herbal ingredients are highly effective for skin with no allergic reaction.

2. MATERIALS AND METHODS

2.1. Collection and authentication of plant materials: The plant specimens for the proposed study were collected from medicinal garden in Udaipur authentication of was done by HOD of Botany department, Mohan Lal Sukhadia University Udaipur.

2.2. Extractions of plant materials: The Neem and liquorice used in study were dried under shade, powdered coarsely and used for extraction. Neem extract was prepared by macerating 40gm of dry powder of neem with 250 ml of 70% (w/v) ethyl alcohol for a week in a round bottom flask with occasional shaking. The flask was kept in dark to avoid effect of light on the active constituent of the neem. The extract was then filtered through a muslin cloth. The extract was evaporated till dryness. The shade dried and coarsely powdered liquorice powder was extracted using 300ml ethanol and water

[3:7] by maceration for 7 days. The extract was then filtered through a muslin cloth. The extract concentrate till dryness.

Mature, healthy and fresh leaves of *Aloe vera* were washed in the running tap water for 5 min and rinsed with sterile distilled water, then dissected longitudinally and the colourless parenchymatous tissue (aloe gel) was scraped out using a sterile knife without the fibres. The gel was ground using the mortar and pestle.

2.3. FORMULATION OF POLYHERBAL CREAM

The Polyherbal cream was prepared by using primary emulsion method. Oil in water (O/W) emulsion-based cream (semisolid formulation) was formulated. The stearic acid and Cetyl alcohol were dissolved in the oil phase (Part A) and heated to 75°C. The preservatives and other water soluble components (Methyl paraban, Propyl paraban, Triethanolamine, glycerin, hydro-alcoholic extract of Aloe Vera, liquorice (Glycyrrhiza glabra) and Neem (Azadirachta indica) were dissolved in the aqueous phase (Part B) and heated to 75°C. After heating, the aqueous phase was added in small portions to the oil phase with continuous trituration until a smooth cream is formed. Few drop of essential oil were also added to impart aroma to prepared cream. (Table I).

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S:NO		FORMULA %W/W					
		F1	F2	F3	F4	F5	F6
1.	Liquorice extract	0.75	0.75	0.75	0.75	0.75	0.75
2.	Neem extract	0.75	0.75	0.75	0.75	0.75	0.75
3.	Aloe-vera extract	3	3	3	3	3	3
4.	Stearic acid	6	6	5	5	4	4
5.	Cetyl alcohol	1	2	1	2	1	2
6.	Glycerine	3	3	3	3	3	3
7.	methyl paraben	.18	.18	.18	.18	.18	.18
8.	Propyl paraben	.02	.02	.02	.02	.02	.02
9.	Triethanolamine	qs	qs	qs	qs	qs	qs
10.	Water	qs	qs	qs	qs	qs	qs

Table 1: Composition of Cream Formulations

2.4. EVALUATION OF POLYHERBAL CREAM

Organoleptic evaluation: The cream thus obtained was evaluated for its organoleptic properties like color, odour, and state. The appearance of the cream was judged by its color and roughness and graded.

pH of the Cream: About 0.5 g of the cream was weighed and dissolved in 50.0 ml of distilled water and its pH was measured.

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

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 smear formed on the skin were checked.

Removal: The ease of removal of the cream applied was examined by washing the applied part with tap water

Spreadability test: Sample was applied between two glass slides and was compressed to uniform thickness by placing 100gm weight for 5minutes. Weight was added to the pan. The time required to separate the two slides, i.e. the time in which the upper glass slide moved over the lower slide was taken as measure of spreadability.

Spreadability =m*l/t

- m = Weight tied to upper slide
- I = length moved on the glass slide
- t = time taken in sec.

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Viscosity: Viscosity of the formulation was determined by Brookfield Viscometer.

Acid value: Take 10 gm of substance dissolved in accurately weighed, in 50 ml mixture of equal volume of alcohol and solvent ether, the flask was connected to reflux condenser and slowly heated, until sample was dissolved completely, to this 1 ml of phenolphthalein added and titrated with 0.1N NaOH, until faintly pink color appears after shaking for 30 seconds.

Acid Value: n*5.61/w

n = the number of ml of NaOH required.

w = the weight of substance.

Saponification value: Introduce about 2 gm of substance refluxed with 25 ml of 0.5 N alcoholic KOH for 30 minutes, to this 1 ml of phenolphthalein added and titrated immediately, with 0.5 N HCL.

Saponification value = (b-a)*28.05/w The volume in ml of titrant = a The volume in ml of titrate = b The weight of substance in gm = W

Microbial growth test: The formulated cream was inoculated on the plates of agar media by

streak plate method and a control was prepared by omitting the 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.

Irritancy test: The cream was applied on the left hand dorsal surface of mark an area (1sq.cm) and time was noted. The irritancy, erythema, edema was checked for 24 hrs. and reported.

Stability Study: Physical stability test of the formulations were carried out for four weeks at various temperature conditions. The samples were kept at $8 \pm 1^{\circ}$ C (in refrigerator), $25 \pm 1^{\circ}$ C + 60 % RH, $40 \pm 1^{\circ}$ C + 60% RH and $40 \pm 0.1^{\circ}$ C and 75% RH in stability chamber for 28 days. Samples were analyzed for the physical properties and viscosity.

3. RESULT AND DISCUSSION

3.1 Appearance: There is uniformity in colour of all formulations. When formulation were kept for long time, it was found that there is no change in organoleptic properties of cream (Table 2).

S.NO	Specifications	Limits
1	State	Semi-solid
2	Colour	Yellowish brown
3	Odor	Characteristic
4	Texture	Smooth

Table 2: Appearance of Formulation

3.2. pH of the Cream

The pH of the cream was found to be in range of 5.0 to 6.0 which is good for skin pH (Table 3).

Specifications	Limits
F1	5.0
F2	5.1
F3	5.6
F4	5.7
F5	5.9
F6	6.0

Table 3: pH of Cream

3.3. Homogeneity: All formulations produce uniform distribution of extracts in cream. This was confirmed by visual appearance and by touch.

3.4. After feel: Emolliency, slipperiness after the application of fixed amount of cream was found.

3.5. Type of smear: After application of cream, the type of smear formed on the skin were non greasy.

3.6. Removal : The ease of removal of the cream applied was examined by washing the applied

part with tap water. The cream applied on skin was easily removed by washing with tap water.

3.7. Spreadability Studies: When formulation was subjected to spreadability studies, it was found that the cream takes less time to spread. All formulations are easily spreadable by small amounts of shear. But F5 and F6 shows good spreadable property than other formulations (Table 4).

Formulation	Time in seconds	Spreadability (gcm/sec)
F1	12	12.5
F2	11	13.63
F3	11	13.63
F4	10	15
F5	9	16.66
F6	8	18.75

Table 4: Spreadability Studies

3.8 Viscosity: The viscosity of cream was in the range of 27005 – 28167 cps which indicates that the cream is easily spreadable by small amounts of shear. The formulation has the desired viscosity required for semisolid formulation for

proper packaging. It was found that the viscosity decreases as the rotational speed of viscometer increased. (Table 5).

Specifications	Limits (cps)
F1	27005
F2	27134
F3	27569
F4	28004
F5	28125
F6	28167

Table 5: Viscosity of	f Formulations
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3.9 Acid value and Saponification Value: The results of acid and saponification value of all formulation of cream showed satisfactorily values. (Table 6).

Formulation	Acid Value	Saponification Value
F1	6.3	28.5
F2	6.3	27.4
F3	6.1	26.4
F4	5.8	24.6
F5	5.7	23.5
F6	5.7	22.7

lable 6: Aci	d and	Saponification	value
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- **3.10. Microbial growth test:** There were no signs of microbial growth after incubation period of 24 hours at 37°C and it was comparable with the control.
- **3.11. Irritancy test:** All formulation shows no redness, edema, inflammation and irritation during irritancy studies. These formulations are safe to use for skin.
- **3.12. Stability:** The stability of cream is found to be good. There is no change in properties of cream.

4. **DISCUSSION**

Aloe vera, Neem and Liquorice are well known for its medicinal and cosmeceuticals value in Indian traditional system of medicine. In the

present work, it was decided to extract and formulate polyherbal cosmetic cream. Oil in water emulsion based cream was formulated using natural ingredients. The cream was evaluated for various parameters like pH, color, homogeneity, grittiness, viscosity, type of smear, spreadability, irritancy, microbial growth test and stability studies. The viscosity of cream was in the range of 27005 - 28167 cps shows that formulation has the desired viscosity required for semisolid formulation. The spreadability test showed that formulation has good spreadable property. When subjected to irritation test the formulation shows no redness. edema, inflammation and irritation. Thus, these formulations are safe to use for skin. The

formulated cream was tested for the presence of pathogenic microorganisms by culturing it with agar media by streak plate method. There were no signs of microbial growth after incubation period of 24 hours at 37°C and it was comparable with the control. The creams was found to be stable also as there is no significant change in parameters like visual appearance, Nature, pH, odour, viscosity etc. The formulated cream was yellowish brown in color, good in appearance and has characteristic odour. No grittiness was found in formulation and on topical application on hand, no oily smear was left on the skin.

The pH was found to be 5.0 to 6.0 which is suitable for topical application. Combination of extract of Glycyrrhiza glabra, Aloe Vera & Azadirachta indica leaves provide multipurpose effect such as whitening, antiwrinkle, antiaging and sunscreen effect on skin. It is not possible to increase the extent of efficiency of medicinal and cosmetic property of single plant extract, but by combining the different plant extracts it can be possible to increase the efficacy of extracts. Therefore, cream prepared by mixing the extracts of Aloe, Neem and Liquorice showed synergistic effect in comparison to individual extracts. Regular application of this cream will be beneficial in preventing premature aging of skin due to accumulation of free radicals. The prepared poly-herbal face cream was O/W type emulsion, hence can be easily washed with plain water.

5. CONCLUSION

Natural remedies are more acceptable in the belief that they are safer with fewer side effects than the synthetic ones. So, an herbal cream which is non-toxic, safe, effective and improves patient compliance by the utilization of herbal extracts would be highly acceptable. From above discussion it is concluded that the prepared formulation showed good appearance, odour, rangeable pH, no irritation, good spreadability, no evidence of phase separation and good consistency during the study period. The formulations are homogeneous, emollient, non-greasy and easily removed after the application. The polyherbal cream prepared from the different plants are acceptable in view of appearance, spreadability and antimicrobial activity. The polyherbal cream is effective in antiageing, antiacne, skin lightening and uv protection. The stable formulations were safe in respect to skin irritation and allergic sensitization.

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