



Formulation and Evaluation of Anti Aging Poly Herbal Cream

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ABSTRACT

In this study creams were formulated based on the anti-oxidant potential of herbal extracts and its evaluation. *Punica granatum* leaves were shade dried and extracted by using soxhlet method with different solvents such as n-hexane, Benzene, alcohol and consistency of different metabolites. In this study creams were formulated based the antioxidant potential of herbal extract and its evaluation. The creams were formulated with neem oil, jamul powder, carrot powder with different concentrations namely F₁ to F₄. The creams were to be stable during stability studies accordingly ICH guidelines 30± 2°C / 50±5% RH and 40±2°C / 75±5% RH for 2 months. The real time stability studies were also conducted for 12 months. It can be concluded that herbal creams without side effects having antioxidant property can be used as provision of a barrier to protect the skin and avoid aging of the skin.

Keywords: Herbal Cream, Anti Aging, Punica, Anti Oxidant, Poly Herbal.

INTRODUCTION

Skin aging is the result of continual deterioration process because of damage of cellular DNA and protein. Aging process is classified into two distinct types, i.e. "sequential skin aging" and "photo-aging". Both types have distinct clinical and historical features. Sequential skin aging is universal and predictable process characterized by physiological alteration in skin function. In the aging process keratinocytes are unable to form a functional stratum corneum and rate of formation from neutral lipids slows down, resulting in dry pale skin with wrinkle. In contrast, photo aging is caused by over exposure to UV rays from sunlight. It is characterized by dry, pale and shallow skin, displaying fine wrinkles as well as deep furrows caused by the disorganization of epidermal and dermal components associated with elastosis and heliodermatitis. Herbs and plants have already proved useful as a tool in complementary medicine^{1,2}.

Cosmetic products are used to protect skin against exogenous and endogenous harmful agents and enhance the beauty and attractiveness of skin³. The use of cosmetics not only developing an attractive external appearance, but towards achieving longevity of good health by reducing skin disorders⁴. The synthetic or natural ingredients present in skin care formulation that supports the health, texture and integrity of skin, moisturizing, maintaining elasticity of skin by reduction of type I collagen and photo protection etc This property of cosmetic is due to presence of ingredients in skin care formulation, because it helps to reduce the production of free radicals in skin and manage the skin properties for long time. The cosmetic products are the best choice to reduce skin disorders such as hyper pigmentation, skin aging, skin wrinkling and rough skin texture etc. The demand of herbal cosmetic is rapidly expanding. *Daucus carota* have the highest β-carotene, a precursor of

vitamin A, and also contain abundant amount of Vitamin C. Vitamin A also acts as a very good anti-oxidant which slows down the process of aging. Vitamin C produces collagen in the body which is an essential protein for making our skin elastic. It also prevents wrinkles on the skin.^{5,6}

The literature shows that antioxidant substances of the living organism always act as a "protection chain", that is, different antioxidant substances possess a synergic effect and protect each other from direct destruction in the reactions of neutralization of the free radicals and other reactive species^{7,8}.

MATERIALS AND METHODS

Preparation of Punica leaf extract

Punica granatum leaves were collected locally from surrounding area of Guntur. Air dried leaves were grinded to a fine powder in a suitable grinder mixture. Shade dried powder was extracted using soxhlet extractor with distilled water, alcohol, hexane separately to get semisolid extract. The organic solvents were recovered by steam distillation. The extracts were then concentrated to dryness under reduced pressure and controlled temperature, respectively and they were preserved in a refrigerator.

Determination of Total Antioxidant Capacity

The total antioxidant capacities of the aqueous and ethanolic extracts were determined by the phosphomolybdenum assay⁹, based on the reduction of Mo (VI) to Mo (V) by the extract and subsequent formation of a green phosphate-Mo (V) complex in acidic condition. 0.1 ml of each extract was combined with 1 ml of reagent solution (0.6 M sulphuric acid, 28 mM sodium phosphate and 4 mM ammonium molybdate). The reaction mixture was incubated at 95°C for 90 min. After cooling to room temperature, the absorbance of the

solution was measured at 695 nm using a UV-visible spectrophotometer, 0.1 ml methanol was used as the blank. The total antioxidant capacity was expressed as the number of gram equivalents of ascorbic acid per ml of the extract.

Cream formulation

The formula for the cream is given in Table 1. Binder or polymer material is added to the glycerin water to form liquid dispersion and show slightly swelling property. This liquid dispersion is added to the Punica leaf extract. To this mixture base and oils are added. Finally other ingredients like skin whitener and preservatives were added with continuous mixing.

Table 1: Formulation table

Ingredients	Category	F ₁	F ₂	F ₃	F ₄
Punica extract	A.P.I	2 ml	2 ml	2 ml	2 ml
Neem oil	A.P.I	1 ml	1 ml	1 ml	2 ml
Eucalyptus oil	A.P.I	1 ml	1 ml	–	–
Jamul powder	A.P.I	2 gm	2 gm	2 gm	2 gm
Glycerin	Moisturizer	1 ml	1 ml	2 ml	2 ml
Propylene glycol	Moisturizer +Binder	1 ml	1 ml	2 ml	1 ml
Zno	Skin whitener	1 gm	1 gm	1 gm	1 gm
Methyl cellulose	Polymer	2 gm	–	–	–
Sodium alginate	Polymer	–	2 gm	–	–
Microcrystalline cellulose	Polymer	–	–	2 gm	2 gm
Beeswax	Base	0.9 gm	0.9 gm	–	–
Grape seed oil	Base	–	–	0.9 gm	–
Almond oil	Base	–	–	–	1 gm
Sodium benzoate /paraben	Preservative	0.1 gm	0.1 gm	0.1 gm	0.1 gm
Carrot powder	Vitamin A source	1 gm	1 gm	1 gm	1 gm
Vitamin E (saffranin)	Vitamin e source	–	–	–	1 ml
Lemon grass oil	Flavoring agent	1ml	1ml	–	–
Rose oil	Flavoring agent	–	–	1ml	1ml
Purified water	vehicle	Q.S	Q.S	Q.S	Q.S

Evaluation of 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. Results are listed in Table 2.

Test for microbial growth in formulated creams¹⁰

The formulated creams were inoculated on the plates of Muller Hinton 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. Results are listed in Table 3.

Table 2: Organoleptic Properties

S.No	Specification	Limits
1	state	semisolid
2	color	pinkish white
3	odor	characteristic
4	texture	smooth

Table 3: Microbial Test

Microbial load	Limits	Results
TMC	NMT 100	65
Limit tests: <i>E. coli</i> , <i>S. aureus</i> , <i>Salmonella</i>	No Characteristic colonies	complies

NMT – Not more than, TMC-Total microbial count

Stability studies¹¹

Stability testing of drug products begins as a part of drug discovery and ends with the demise of the compound or commercial product. To assess the drug and formulation stability, stability studies were done according to ICH guidelines. The stability studies were carried out as per ICH guidelines. The cream filled in bottle and kept in humidity chamber maintained at 30 ± 2 °C/ 65 ± 5 % RH and 40 ± 2 °C / 75 ± 5 % RH for two months. At the end of studies, samples were analyzed for the physical properties and viscosity. The results are listed in Table 4.

Table 4: Stability after 2 Months

Formulation	pH	Colour	Viscosity at 20 rpm
F1	5.3	Half white	590
F2	5.5	Yellowish white	610
F3	6.2	Pinkish white	650
F4	6.4	Pinkish white	695

pH of the Cream

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

Spreadability studies

An important criteria for semisolids is that it posses good spreadability. Spreadability is a term expressed to denote the extent of area to which the cream readily spreads on application to the skin. The therapeutic efficacy of a formulation also depends on its spreading value. A special apparatus has been designed to study the spreadability of the formulations. Spreadability is expressed in terms of time in seconds taken by two slides to slip off from the formulation, placed between, under the application of a certain load. Lesser the time taken for the separation of the two, better the spreadability. Two glass slides of standard dimensions were selected. The formulation whose spreadability had to be determined was placed over one of the slides. The other slide was placed on top of the formulations was sandwiched between the two

slides across the length of 5 cm along the slide. 100 g weight was placed up on the upper slide so that the formulation between the two slides was pressed uniformly to form a thin layer. The weight was removed and the excess of formulation adhering to the slides was scrapped off. One of the slides was fixed on which the formulation was placed. The second movable slide was placed over it, with one end tied to a string to which load could be applied by the help of a simple pulley and a pan. A 30g weight was put on the pan and the time taken for the upper slide to travel the distance of 5.0cm and separate away from the lower slide under the direction of the weight was noted.

The spreadability was then calculated from the following formula:

$$\text{Spreadability} = \frac{m \times l}{T}$$

m = weight tied to the upper slide (30g)

l = length of glass slide (5cm)

t = time taken in seconds.

The results are listed in Table 5.

Table 5: Spreadability studies

Formulation	Time in seconds	Spreadability [g cm/sec]
F1	11	13.63
F2	11	13.63
F3	10	15
F4	8	18.75

Viscosity

Viscosity of the formulation was determined by Brookfield Viscometer. The viscosity measurements were done using Brookfield DV-II + viscometer using LV-4 spindle. The developed formulation was poured into the adaptor of the viscometer and the angular velocity increased gradually from 0.5 to 20 rpm.

Homogeneity

The formulations 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.

Removal

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

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, erythematic, edema, was checked if any for regular intervals up to 24 hrs and reported.

RESULTS

Antioxidant Capacities

In the present study, the total antioxidant potential of the ethanolic and aqueous leaf extracts was found as 2.26 and 1.06 mg ascorbic acid equivalent per ml of the extract, respectively.

pH of the Cream

The pH of the cream was found to be in range of 5.6 to 6.8 which is good for skin pH. All the formulations of cream were shown pH nearer to skin required i.e. pH of F₁-5.8, F₂-6.0, F₃-6.5 and F₄-6.7.

Viscosity

The viscosity of cream was in the range of 500-1000 cps which indicates that the cream is easily spreadable by small amounts of shear. F₃ and F₄ show good spreadable property than other formulations.

Homogeneity

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

After feel

Emolliency, slipperiness and amount of residue left after the application of fixed amount of cream was found good

Removal

The cream of F₃ and F₄ applied on skin was easily removed by washing with tap water

Irritancy test

The formulation F₃ and F₄ shows no redness, edema, inflammation and irritation during irritancy studies. These formulations are safe to use for skin.

Appearance

When formulation were kept for long time, it found that no change in colour of cream.

DISCUSSION

From above results it is concluded that on combining the extracts of *Punica granatum* leaves and *Daucus carota* different components in different ratio to get multipurpose effect such as whitening, antiwrinkle, antiaging and sunscreen effect on skin. As we know that it is not possible to increase the extent of efficiency of medicinal and cosmetic property of single plant extract, but by combining the different natural components can be possible to increase the efficacy of extracts. In this regard, we mixed the extracts of Punica, neem oil; jamul powder and *Daucus carota* to improve as well synergize the cosmetic properties of prepared products compare to individual extracts. Further research will carry out to check scientifically the synergistic action of selected formulation. These studies suggest that composition of extracts and base of cream of F₃ and F₄ are more stable up

to 12 months and safe; it may produce synergistic action without side effects as this cream comprising of many natural substances.

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