International Journal of Herbal Medicine
Available online at www.florajournal.com

IJHM International Journal of Herbal Medicine

E-ISSN: 2321-2187
P-ISSN: 2394-0514
IJHM 2017; 5(6): 92-95
Received: 16-09-2017
Accepted: 17-10-2017

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Preparation and evaluation of poly herbal anti-aging cream by using different synthetic polymers

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Abstract
Herbal formulations have growing demand in the world market and the plants have been reported in the literature having good anti- microbial, anti-oxidant and anti-inflammatory activity. In this study cream was formulated based on the anti-oxidant potential of herbal extracts and its evaluation. Green tea leaves were a shade dried and extracted using a Soxhlet extraction method. The cream was formulated with Neem oil, Jamul seed powder, olive oil of different concentrations namely F_1, F_2, F_3 and F_4. The cream was stable during stability studies according to ICH guidelines 30±2 ^{0}C / 50±5% RH and 40±2 ^{0}C / 75±5% RH for two months. The evaluations of all formulations were done on different parameters like pH, spreadability, stability etc. Formulations F_3 and F_4 showed good spreadability, good consistency, homogeneity with good appearance, pH, and no evidence of phase separation and ease of removal. The formulation F3 and F4 shows no redness, edema, inflammation and irritation to the skin during irritancy studies. These studies suggest that the composition of extracts and base of cream of F4 is more stable and safe, it may produce synergistic action. It can be concluded that herbal cream without side effects having anti-oxidant property can be used as provision of a barrier to protect the skin and avoid aging of the skin.

Keywords: Herbal cream, anti-aging, green tea, antioxidant and polyherbal

1. Introduction
Skin aging is the result of a continual deterioration process because of damage to cellular DNA and protein. The ageing 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 the 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 of neutral lipids slows down, resulting in dry and pale skin with wrinkle [1]. In contrast, Photo Aging is caused by over exposure to UV rays from sunlight. It is characterized by dry, pale and sallow skin, displaying fine wrinkles as well as deep furrows caused by the disorganization of epidermal and dermal components associated with elastosis and heliodermatis. Herbs and plants have already proved useful as tool in complementary medicine [2].
Cosmetic products are used to protect against exogenous and endogenous harmful agents, and enhance the beauty and attractiveness of skin [3]. The use of cosmetics not only developing an attractive external appearance, but towards achieving longevity of good health by reducing skin disorders [4]. The synthetic or natural ingredients present in a skin care formulation that supports the health, texture, integrity of skin, moisturizing, maintaining the elasticity of skin by reduction of type I collagen, photo protection etc. This property of cosmetics is due to presence of ingredients in skin care formulations, because it helps to reduce the production of free radicals in the skin and manage the skin properties for a long time [5]. The cosmetic products are the best choice to reduce skin disorders such as hyperpigmentation, skin ageing, skin wrinkling, rough skin texture etc. The demand of herbal cosmetic is rapidly expanding. Olive oil contains abundant amounts of Vitamin A. It acts as a very good anti-oxidant which slows down the process of ageing. Vitamin C produces collagen in the body which is essential protein for making our skin elastic and it also prevents wrinkles on skin [6].
The literature shows that anti-oxidant substances of that living organism always acts as a "protective chain", that is, different anti-oxidant substances possess a synergistic effect and protect each other from direct destruction in the reactions of neutralization of the free radicals and other reactive species [7-8]. The poly herbal cosmetic formulation is recommended for management of skin properties for a long time and their effects are also well accepted in the community of different countries. The selected herbal extract described in present investigation has been utilized medicinally in crude extract to treat various skin diseases.

2. Materials and Methods

Glycerine and Propylene Glycol procured from Sisco research laboratories, Mumbai, India. Zinc Oxide from Merck Specialties, Mumbai, India. Micro Crystalline Cellulose from Qualigens fine chemicals, Mumbai, India. Bees Wax (White) from Nice chemicals, Cochin, India. Sodium Benzoate from S d fine-Chem. Limited, Mumbai, India. Olive Oil from Consumer Manufacture Pvt Ltd, India. Green Tea Leaves, Neem Oil, Jamul Seed, Eucalyptus Oil and Lemon Oil Collected from Local Area and Purified water Prepared from Laboratory.

2.1 Preparation of Green Tea Extract using Methanol

Extraction in chemistry is a separation process consisting in the separation of a substance from a matrix. Extraction of fresh tea leaves was done with 60% methanol and 70% acetone using Soxhlet Apparatus for 1hr. The extracts were centrifuged at 4 °C to enhance cell breakage and to separate the particles from the extract. In case of bulk material the tea leaves were homogenized in a Homogenizer along with the solvent and maceration was allowed to take place in order to obtain maximum yield. The extraction process was repeated at least 3 times to avoid any loss of essential components [9].

2.2 Preparation of Jamul Seeds Powder

There are two ways of making this powder, one with drying in the sun and the other without by dry roast.

2.3 Sun Dried Jamul Seeds Powder

Separate the seeds and fleshy part of the fruit. Wash the seeds and dry in sun for a week. By then we will have really dry seed, whose outer skin will be peeled off. Seeds should be pounded along with the outer skin and made into a fine powder. Since this is sun dried, it becomes really hard and mixer blades might go for a toss if we try to make a powder of it! So take caution to pound it into smaller pieces before running in the food processor or mixer [9].

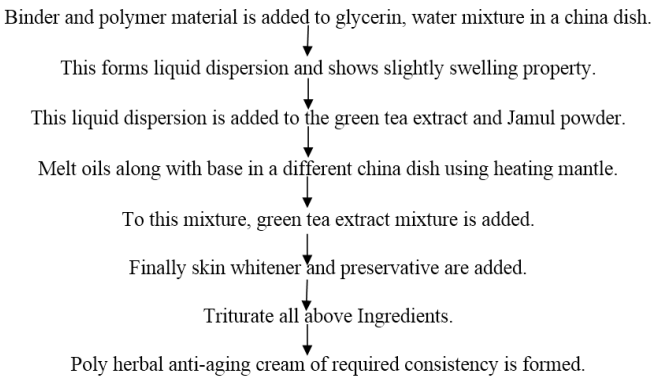
2.4 Powder from wet seeds

The powder can also be made immediately after you wash off the flesh. Heat a pan, and dry roast the seeds till they turn crispy. Pound them into fine powder and store for consumption. The only difference I found in this method is, at times it becomes difficult to get it roasted well and dry. Have employed Method-1 i.e. prepared powder by drying Jamul seeds under the sun [10].

Table 2.1: Formulation of Poly herbal Anti-aging Cream [11]

Ingredients	Category	F_1	F_2	F_3	F_4
Green Tea extract	A.P.I	4ml	4ml	4ml	4ml
Neem Oil	A.P.I	4ml	4ml	4ml	4ml
Eucalyptus Oil	A.P.I	4ml	4ml	4ml	4ml
Jamul Powder	A.P.I	2gm	2gm	2gm	2gm
Glycerine	Moisturizer	2ml	2ml	4ml	4ml
Propylene Glycol	Moisturizer + Binder	2ml	2ml	4ml	2ml
Zinc Oxide	Skin Whitener	1gm	1gm	1gm	1gm
Micro Crystalline Cellulose	Polymer	-	-	4gm	4gm
Bees Wax	Base	2gm	2gm	4gm	4gm
Sodium Benzoate	Preservative	.2gm	.2gm	.2gm	.2gm
Olive Oil	Vitamin-A Source	2ml	2ml	4ml	4ml
Lemon grass oil	Flavouring Agent	-	-	4ml	4ml
Purified water	Vehicle	Q.S	Q.S	Q.S	Q.S

Preparation of Poly-Herbal Anti-aging Cream [11]



2.5 Evaluation of Poly-Herbal Anti-aging Cream

2.5.1 Organoleptic evaluation

The cream thus obtained was evaluated for its organoleptic properties like color, odor, and state. The appearance of the cream was judged by its color and roughness and graded [11].

2.5.2 Test for microbial growth in formulated creams

The formulated creams were inoculated on the plates of Muller Hinton agar media by the streak plate method and a control was prepared by omitting the cream. The plates were placed into the incubator and are incubated at 37 ^{0}C for 24 hours. After the incubation period, plates were taken out and check the microbial growth by comparing it with the control [11].

2.5.3 Stability studies

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 with 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 [11].

2.5.4 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 [11].

2.5.5 Spreadability studies

An important criteria for semi solids is that it possess good spreadability. Spreadability is a term expressed to denote the extent of the 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 upon 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 with the help of a simple pulley and a pan. A 30g weight was put on the pan and the time taken to 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 [11]. The spreadability was calculated from the following formula:

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

m = weight tied to the upper slide (30g), l =length of glass slide (5cm), t =time taken in seconds.

2.5.6 Viscosity: Viscosity of the formulation was determined by Brookfield Viscometer. The viscosity measurements were done using Brookfield DV-II + Viscometer using LV-4spindle. The developed formulation was poured into the adaptor of the viscometer and the angular velocity increased gradually from 0.5 to 20 rpm [11].

2.5.7 Homogeneity: The formulations were tested for the homogeneity by visual appearance and by touch [11].

2.5.8 After feel: Emolliency, slipperiness and amount of residue left after the application of fixed amounts of cream was checked [11].

2.5.9 Removal: The ease of removal of the cream applied was examined by washing the applied part with tap water [11].

2.5.10 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 [11].

3. Results and Discussion

3.1 Antioxidant Capacities: In this study, the total antioxidant potential of the ethanolic and aqueous leaf extracts was found to be 2.26 and 1.06 mg ascorbic acid equivalent per ml of the extract, respectively.

3.2 P^H of the Cream: The pH of the cream was found to be in between 5.6-6.8 which is good for skin pH. All the formulations of cream were shown pH nearer to skin required i.e. pH of F_1-5.8, F_2-6.0, F_3-6.5 and F_4-6.7.

3.3 Viscosity: The viscosity of cream was in between 500-1000 cps which indicates that the cream is easily spreadable by small amounts of shear. F_3 and F_4show good spreadable property than other formulations.

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

3.5 After feel: Emolliency, slipperiness and amount of residue left after the application of fixed amounts of cream was found good.

3.6 Removal: The cream of F_3 and F_4 applied on the skin was easily removed by washing with tap water.

3.7 Irritancy test: The formulation F_3 and F_4 shows no redness, edema, inflammation and irritation after applying to the skin. These formulations are safe to use for skin.

3.8 Appearance: When formulation was kept for a long time, it was found that there is no change in organoleptic properties of cream as shown in Table 3.1.

Table 3.1: Organoleptic Properties

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

3.9 Microbial Test: When formulation was tested for growth of microbes, it was found that there is growth of microbes within the prescribed as shown in Table 3.2. So these formulations are safe to use for skin.

Table 3.2: Microbial Test

Microbial Load	Limits	Results
TMC	Not More Than 100	65
Limit tests: E.Coli, S.aureus, Salmonella	No characteristic colonies	Complies

3.10 Stability Studies: When formulation was subjected for long term stability studies, i.e. for about a period of 2 months, it was found that there is no change in properties of cream like pH, color and viscosity as shown in Table 3.3.

Table 3.3: Stability studies after 4 months

Formulation	P^h	Colour	Viscosity(Cps)
F1	5.3	Brownish white	590
F2	5.5	Brownish white	610
F3	6.2	Brownish white	650
F4	6.4	Brownish white	695

3.11 Spreadability Studies: When formulation was subjected to spreadability studies, it was found that the cream takes less time to spread as shown in Table 3.4.

Table 3.4: 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

4. Conclusion

From which are mentioned all the above results, it is concluded that on combining the extracts of Green tea leaves and Olive oil different components in different ratio to get

multipurpose effect such as whitening, anti-wrinkle, anti-aging and sunscreen effect on skin and suggesting that composition of extracts and base of cream of F_3 and F_4 are more stable up to 12 months and safe, it may produce synergistic action without side effects as this cream comprising of much natural substances.

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