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

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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. If 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

## 1. 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 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 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]. 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].

### 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 Green tea 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 of Poly herbal Anti-aging Cream [11]

| Ingredients | Category | $F_1$ | $F_2$ | $F_3$ | $F_4$ |
|---|---|---|---|---|---|
| Green tea extract | A.P.I | 2ml | 2ml | 2ml | 2ml |
| Neem oil | A.P.I | 1ml | 1ml | 1ml | 2ml |
| Eucalyptus oil | A.P.I | 1ml | 1ml | - | - |
| Jamul powder | A.P.I | 2gm | 2gm | 2gm | 2gm |
| Glycerin | Moisturiser | 1ml | 1ml | 2ml | 2ml |
| Propylene glycol | Moisturiser + Binder | 1ml | 1ml | 2ml | 1ml |
| Zinc oxide | Skin whitener | 1gm | 1gm | 1gm | 1gm |
| Microcrystalline cellulose | Polymer | - | - | 2gm | 2gm |
| Beeswax | Base | 1gm | 1gm | - | - |
| Sodium benzoate /paraben | Preservative | 0.1gm | 0.1gm | 0.1gm | 0.1gm |
| Olive oil | Vitamin-A Source | 1ml | 1ml | 2ml | 2ml |
| Lemon grass oil | Flavouring agent | - | - | 1ml | 1ml |
| Purified water | Vehicle | Q.S | Q.S | Q.S | Q.S |

### 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 0C for 24hours. 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 $P^H$ 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:

Spreadability = m×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 LV4spindle. 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 2.31 and 1.12 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 $P^H$. All the formulations of cream were shown pH nearer to skin required i.e. $P^H$ of $F_1$-5.1, $F_2$-6.2, $F_3$-6.6 and $F_4$-6.7.

**3.3 Viscosity:** The viscosity of cream was in between 5001000 cps which indicates that the cream is easily spreadable by small amounts of shear. F3 and F4 show 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 F3 and F4 applied on the skin was easily removed by washing with tap water.

**3.7 Irritancy test:** The formulation F3 and F4 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.

**Table 2:** Organoleptic Properties

| S. No | Specifications | Limits |
|---|---|---|
| 1. | State | Semisolid |
| 2. | Colour | Pinkish white |
| 3. | Odour | 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. So these formulations are safe to use for skin.

**Table 3:** 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.

**Table 4:** Stability studies after 4 months

| Formulation | Ph | Colour | Viscosity(Cps) |
|---|---|---|---|
| F1 | 5.3 | Half white | 590 |
| F2 | 5.4 | Pinkish white | 610 |
| F3 | 6.3 | Brownish white | 650 |
| F4 | 6.5 | Pinkish whte | 695 |
| F5 | 6.6 | Pinkish white | 698 |

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

**Table 5:** Spreadability Studies

| Formulation | Time in Seconds | Spreadability(g cm/sec) |
|---|---|---|
| F1 | 11 | 13.59 |
| F2 | 11 | 13.59 |
| F3 | 10 | 15.02 |
| F4 | 9 | 17.89 |
| F5 | 10 | 18.01 |

## 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, antiaging and sunscreen effect on skin and suggesting that composition

of extracts and base of cream of F4 and F5 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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