

## FORMULATION AND *IN VITRO* EVALUATION OF POLY-HERBAL ANTI-AGEING FACE CREAM OF CORIANDRUM SATIVUM AND ROSE HIP OIL

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### ABSTRACT

**Objective:** The purpose of this study was to develop anti-ageing poly-herbal face cream by mixing the ethanol extract of *C. sativum* and rose hip oil in order to produce multipurpose effects on the skin such as fairness, softening and antiseptic effects.

**Methods:** Ageing of the skin is the result of continuous "wear and tear" processes. Chronological skin aging is a universal and inevitable process, while in contrast, photoaging results from the UV rays of sunlight, and the damage becomes apparent in sun-exposed skin. Cream is defined as semisolid emulsions which may be oil-in-water (o/w) or water-in-oil (w/o) type and these semisolid emulsions are meant for external applications. In this study creams (o/w type) were formulated based on the anti-oxidant potential of herbal extracts and its evaluation. *Coriandrum sativum* plant extracted by using soxhlet method with water as solvent. The creams were formulated with coriander oil, rose hip oil with different concentrations namely F1 to F6.

**Results:** The creams were to be stable during stability studies accordingly ICH guideline for 2 mo. *Coriandrum sativum* extract showed significant anti-oxidant activity with an IC<sub>50</sub> value is 34.25 µg/ml, while for ascorbic acid the IC<sub>50</sub> value was 46.68µg/ml.

**Conclusion:** 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:** Anti-aging, Poly Herbal cream, Anti-oxidant, Extraction

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### INTRODUCTION

Ageing is the changes in a person associated with physical, psychological, mental and social change. Aspects like knowledge, experience and wisdom may increase while reaction time, memory etc. may decline. Older population increases both in the developed and developing nations due to the medical facility [1-3].

Anti-ageing means holding back the signs of ageing on our skin-preventing or reducing the appearance of wrinkles, firming up the skin and dealing with uneven skin tone or age spots. Ultimately, anti-ageing is about looking younger and finding that elusive skincare fountain of youth. Anti-aging is possible when the process of regeneration dominant over degeneration. In the case of regeneration, the cells replace itself with stronger cells while in degeneration, existing replace with weaker one. The process of regeneration is termed as anti-aging while the process of degeneration is called as ageing [2, 3].

The cream is defined as semisolid emulsions which are oil-in-water (o/w) or water-in-oil (w/o) type and these semisolid emulsions are intended for external applications. Creams are often composed of two phases. Oil-in-water (o/w) emulsions are most useful as water-washable bases, whereas water-in-oil (w/o) emulsions are emollient and cleansing agents. An emulsifying agent is used to disperse the aqueous phase in the oily phase or vice versa [1, 4].

World Health Organization (WHO) as well our country has been promoting traditional medicine because they are less expensive, easily available and comprehensive, especially in developing countries. It is also true that eight percent of the world's population relies on medicinal plants for their primary health care. The whole world including the developed country recognized the importance of traditional medicine and has treatment strategies, guidelines and standard for ethnomedicine [2].

Coriander (*Coriandrum sativum* L.) which belongs to the family Apiaceae (Umbelliferae) is mainly cultivated from its seeds throughout the year. All parts of this herb are in use as a flavouring

agent and/or as traditional remedies for the treatment of different disorders in the folk medicine systems of different civilisations. It mostly contains essential oil and fatty oil. The rosehip seed oil (RHO) is extracted from the seed of the fruit of the wild plants of *Rosa* species such as *Rosa canina*, *Rosa rubiginosa*, *Rosa moschata* belonging to the family Rosaceae. It contains polyunsaturated fatty acid especially linoleic acid (54%), linolenic acid (17%) and oleic acid (16%) between others [2-5].

Although various types of cream is considered for anti-ageing these still appear to be limited in rate of tissue regeneration. Hence after a depth review regarding pathogenesis as well as different traditional and alternative treatment for anti-ageing, we have taken up the project to develop and formulate a herbal cream which will be effective and has a better rate of effectiveness for anti-ageing. The herbal cream that is planned to be formulated for anti-ageing will be oil/water (O/W) emulsion type which will be less oily, less greasy and less sticky in nature so that patient compliance is more and will be beneficial for all kind of people in our society [2, 4, 6].

After thorough review, we have selected following herbs to formulate the cream for anti-ageing action-

- Coriander oil (antioxidant property)
- Rose hip oil (rich source of vitamin C)

In this, we have made an attempt to formulate most complete herbal cream that contains herbs which will satisfy almost all the mechanism of anti-ageing activity effectively [2, 6, 7].

### MATERIALS AND METHODS

#### Materials

#### Collection of plant materials

The fresh plants of *Coriandrum sativum* were collected from the local market of Kamrup, Assam; and the oil was extracted by Clevenger apparatus. Rose hip oil was collected from ARAMACS Brand, Delhi.

### Chemicals and reagents

The chemicals used during the experiments were of analytical grade. Lanolin (Burgoyne Urbidges and Co), White petrolatum (Yarrowchem Products), Tween 60, Stearic acid (Himedia Lab), Mineral oil, Triethanolamine, Propylene Glycol (Merck Lab), Betadine; Povidone-iodine IP 5% w/w, (Win-Medicare) etc were used.

### Instruments

Clevenger Apparatus, Homogenizer, Centrifuge (REMI), Viscometer (Brookfield DV-E viscometer), Digital Balance (Denver Instrument), Digital pH meter (Systronics) etc. were used.

### Methods

#### Extraction of plant materials

The extractions of crude drugs were carried out by Simple distillation method using water (aqueous extract) by the clavenger apparatus. The plant was washed and placed in the RBF. The extraction process was performed for 6 h and the extract was collected [6, 7].

#### Antioxidant activity of *C. sativum*

The anti-oxidant activity was carried out by mixing 1.5 ml of the oil with 2.0 ml of a 0.2 M methanolic, 2,2-Diphenyl-1-

picrylhydrazyl (DPPH) solution at three final concentrations (5, 25 and 100 mg oil/ml). The mixture was then incubated in the dark for 30 min at 25 °C and the absorbance at 517 nm was recorded as (A sample), using Spectrophotometer. A blank experiment was also carried out applying the same procedure to a solution without the test material and the absorbance was recorded as (Ablank). The scavenging activity of each solution was then calculated as percent inhibition according to the following equation: [7, 8]

$$\% \text{ Inhibition} = [(A_{\text{blank}} - A_{\text{sample}}) / A_{\text{blank}}] \times 100$$

#### Formulation of herbal cream (O/W emulsion)

Ingredient of the oil phase (A) was melted in a beaker by using a water bath on constant stirring. Components of aqueous phase (B) were mixed together and warmed to about the same temperature of oil phase (up to 70 °C). The preservative methylparaben and concentrated aqueous extract of the plants were added into an aqueous phase and heated. Then oil phase was added to water phase little by little on constant stirring and perfume was added to it when the temperature was 35 °C-40 °C. Six different formulations (F1-F6) were prepared by using varying concentration of the aqueous extract, stearic acid and liquid paraffin. The formula for the cream is given in table 1 [2, 9].

**Table 1: Composition of *C. sativum* and rose hip oil based face cream**

Ingredients	Formulation code (%w/w)					
	F1	F2	F3	F4	F5	F6
Aq. Extract of <i>Coriandrum sativum</i>	2	2.5	3.0	3.5	4.0	5.0
Rose hip oil	1.0	1.5	2.0	2.5	3.0	3.5
Liquid paraffin	14	13.5	11.0	10.0	8.5	7.5
Lanolin	0.8	0.8	0.8	0.8	0.8	0.8
Stearic acid	10	11.0	12.0	13.5	14.5	15.5
Cetyl alcohol	-	0.5	0.5	1.5	1.5	2.0
Propylene glycol	2.5	2.5	2.5	3.0	3.0	3.0
Glycerine	4	4	4	4	4	4
Triethanolamine	1	1	1	1	1	1
Tween 60	5.0	5.0	5.0	5.0	5.0	5.0
Methyl paraben	0.1	0.1	0.1	0.1	0.1	0.1
Water	q. s	q. s	q. s	q. s	q. s	q. s

### Evaluation of cream

The formulations or creams were evaluated for different pharmaceutical parameters as follows\_

#### Type of emulsion

A portion of the product was taken in a watch glass. To that water soluble dye (methylene blue) was added, mixed properly and observed under the microscope the dispersed oil globules in the colored aqueous phase (*Dye method*). Fixed amount of cream was diluted with water and mineral oil separately. Then they are observed for separation of both the phases in oil and water (*Dilution method*) [9, 10].

#### Organoleptic evaluation

The prepared cream was evaluated for its organoleptic properties like color, odor, physical state, appearance, roughness etc [2, 12, 13].

#### pH of the cream

The pH meter was calibrated using standard buffer solution. About 0.5 g of cream was weighed and dissolved in 50.0 ml of distilled water and its pH was measured [7, 12].

#### Homogeneity

The formulations were tested for the homogeneity by visual appearance and by touch [2, 12, 13]

#### After feel

Emolliency, slipperiness and amount of residue left after the application of fixed amount of cream was checked [2, 12, 13]

#### Removal

The ease of removal of the cream applied was examined by washing the applied part with tap water [2, 12, 13]

#### Accelerated stability of cream

The accelerated stability studies of formulated cream were carried out at 40 °C/75% RH for 1 mo. The effects of temperature, humidity and time on the physical characteristics creams were evaluated for assessing the stability of the prepared of the formulations. The stability studies were out when the room temperature was 20 ° to 25 °C. The pH, viscosity, spreadability and phase separation in 10 and 40 min centrifugation were evaluated for stability after keeping for 1 mo [12-16].

#### Viscosity

The viscosity of the formulation was determined by Brookfield Viscometer. The viscosity measurements were done using Brookfield DV-II+viscometer using 64 spindles. The developed formulation was poured into the adaptor of the viscometer and the viscosity measured at different spindle speed from 0.5 to 100 rpm [2, 12, 15].

Table 2: Accelerated stability study of cream formulations

No of days	Temp. ( °C)	Form. code	Assessment parameters					
			pH	Homo genicity	Appearance	Spreadability	After feel effect	Ease of remove
0	RT	F4	6.33	G	NC	G	E	Y
	Acc.	F5	6.36	G	NC	G	E	Y
10	RT	F4	6.39	G	NC	G	E	Y
	Acc.	F5	6.44	G	NC	G	E	Y
15	RT	F4	6.45	G	NC	G	E	Y
	Acc.	F5	6.48	G	NC	G	E	Y
20	RT	F4	6.51	G	NC	G	E	Y
	Acc.	F5	6.55	G	NC	G	E	Y
30	RT	F4	6.56	G	NC	G	E	Y
	Acc.	F5	6.59	G	NC	G	E	Y

RT-Room Temperature, G-Good, NC-No Change, E-Emollient, Y-Yes

### Skin irritation test

The cream was evaluated for primary skin irritation test on experimental animals (shaved back of the mice) to evaluate the safety of cream. The experiment was conducted in accordance to the protocol approved by Institute Animal Ethics Committee (IAEC), Girijananda Chowdhury Institute of Pharmaceutical sciences. Guwahati, Assam. (Approval no-GIPS/IAEC/B. Ph/2017/20) [2, 16, 17].

### RESULTS

#### Antioxidant activity

In the present study, the total antioxidant activity of aqueous plant extract was found as IC<sub>50</sub> value is 34.25 µg/ml while for ascorbic acid IC<sub>50</sub> was 46.68 µg/ml.

#### Skin irritation test

The formulation F4 and F5 shows no redness, edema, inflammation and irritation during irritancy studies. These formulations are safe to use for skin.

#### pH of the cream

The pH of the cream was found to be in the 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, F4-6.33, F5-6.36 and F6-6.8

#### Viscosity

The viscosity of cream was in the range of 500-1500 cps which indicates that the cream is easily spreadable by small amounts of shear. F4 and F5 show good spreadable property than other formulations.

#### Homogeneity

All formulations produce a 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 F4 and F5 applied on skin was easily removed by washing with tap water

#### Appearance

When formulation was kept for a long time, it found that no change in color of cream.

#### Selection of formulation

From the above study, we have selected the best formulation on the basis of physical stability and the desired percentage of active ingredients. The formulation that was taken for further pharmacological evaluation was formulation 5 (F5).

### CONCLUSION

From above results, it is concluded that on combining the extracts of *Coriandrum sativum* and rose hip oil different components in a different ratio to get multipurpose effect such as anti-wrinkle, anti-aging and sunscreen effect on the skin. This activity may be mainly due to free radical scavenging, antioxidant activity of the extract also reported to supplying vitamin C which promoting tissue regeneration. The research work suggests that the herbal antioxidant formulation and its ingredients were studied to be consistent in quality and purity and can be easily used as a face cream. The validation of the cream was done and was found in limits. From above discussion, it is concluded that the formulation F4 and F5 are safe usable for the skin. This study can be helpful for upcoming researchers to select these herbs for the formulation and evaluation of other cosmetic applications which can be claimed for their efficacy with scientific data.

### CONFLICT OF INTERESTS

Declare none

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