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FORMULATION, EVALUATION AND STABILITY STUDY OF HERBAL CREAM CONTAINING EMBELIN

Snehal Singh¹, Biresh Kumar Sarkar², Maddi Ramaiah³, Manish Devgan⁴ and Y. Ankamma Chowdary⁵

SSRO¹, Bhopal, Madhya Pradesh, India.

National Institute of Ayurvedic Pharmaceutical Research², Moti Bagh Road, Patiala - 147001, Punjab, India.

Department of Pharmacognosy³, Hindu College of Pharmacy, Amaravathi Road, Guntur - 522002, Andhra Pradesh, India.

R. P. Educational Trust Group of Institutions⁴, Karnal - 132114, Haryana, India.

NRI College of Pharmacy⁵, Pothavarappadu, Krishna - 522212, Andhra Pradesh, India.

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Correspondence to Author:

Snehal Singh

SSRO, Bhopal,
Madhya Pradesh, India.

E-mail: bhadoriyaupendra@yahoo.co.in


ABSTRACT: In this study, the cream was formulated from the plant extract containing anti-oxidant ingredient Embelin and its quality control evaluation performed along with the antioxidant activity. The alcohol extract of the plant was used. The extract was tested for antioxidant activity by superoxide scavenging activity. Quality evaluation of the product was assessed by using different evaluation methods. The stability study was also performed, and no changes in the physical properties were observed. The formulations showed good spreadability, no evidence of phase separation and good consistency during this study period. The cream was found to be stable during the stability study. From the present study, it was concluded that it is possible to develop creams containing herbal extract having antioxidant property.

INTRODUCTION: The plant *Embelia ribes* contains embelin, quercitol, christembine, resinoid, tannins and minute quantities of volatile oil. The chief constituent is Embelin. Embelin is Soluble in an organic solvent like; alcohol, benzene chloroform and insoluble in water. Therapeutically it is used to treat abdominal disorders, lung diseases, constipation, indigestion, fungus infection, mouth ulcer, sore throat, heart disease, and obesity.

The fruit also used as an anthelmintic, astringent, carminative stimulant, antioxidant, antibacterial and anticancer agents. It has also been used to cure skin disorders, for dyeing hairs, treating acne, treating carbuncle infections, vitiligo, and leucoderma¹⁻⁴.

MATERIALS AND METHODS: Methanol used was of analytical grade. All the other chemicals and reagents used were of analytical grade.

Preparation of Extract: The plant was collected and dried it for 2 days in sunlight. Then crushed it to a fine powder and passed it from sieve no. 60. The collected powder was subject to maceration with ethanol in iodine flask for 7 days. The extract was filtered and evaporated to get the semisolid mass and then vacuum dried.

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Preparation of Cream: ⁵ The formulation of cream was done as motioned in **Table 1**. The moisturizer conditioner was a mixture of propylene glycol: glycerine: sorbitol (2:1:1). All the aqueous soluble ingredients were dissolved in water, and all oil soluble ingredients were mixed in separate beakers. The aqueous phase was then added to the oil phase slowly with constant stirring, and the mixture was homogenized for 30 min.

TABLE 1: COMPOSITIONS OF CREAM FORMULATION

Ingredients	% (w/w)
Extract	1.5
Stearic acid	10
Triethanolamine	1.5
Mineral oil	3
Moisturizer conditioner	10
Cetyl alcohol	2
Propylparaben	0.01
Sodium metabisulphite	0.1
Water Q.S. to 100 ml	Q.S.

Quality Control Evaluation of Creams: ^{6,7}

pH: pH was measured by pH meter.

Viscosity: Viscosity of cream was determined by Brookfield viscometer. The viscosity measurements were done using Brookfield Viscometer. The developed formulation was poured into the adaptor of the viscometer, and the angular velocity increased gradually from 0.5 to 20 rpm.

Spreadability Studies: 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. Spreadability can be determined as time in seconds taken by two slides to slip off from the formulation placed between them. Lesser the time is taken for the separation of the two, better the spreadability. Two glass slides of standard dimensions were selected. The formulation whose spreadability needs 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 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. Weight was put on the pan and the time taken for the upper slide to travel the distance and separate away from the lower slide under the direction of the weight was noted. The spreadability was then calculated from the following formula:

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

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

l = length of a glass slide (5cm)

t = time taken in

TABLE 2: RESULTS OF EVALUATION PARAMETERS OF FORMULATION

Parameter	Value
Spreadability (g cm/sec)	12.58
pH	6.4
The viscosity of cream (cps)	1598

Evaluation of Antioxidant Activity by Superoxide Scavenging Activity: ^{8,9}

The reaction mixture contained 2.650 ml phosphate buffer, 0.1 ml NBT, 0.2 ml KCN, 0.5 ml riboflavin and different concentrations of extracts in the final volume of 3 ml. The tubes were illuminated with an incandescent lamp for 15 min. Optical density was measured at 532 nm before and after illumination. The percentage of inhibition of superoxide generation was evaluated by comparing the absorbance value of control and test.

$$\text{Percentage inhibition} = C - T / C \times 100$$

C = absorbance of control,

T = absorbance of test

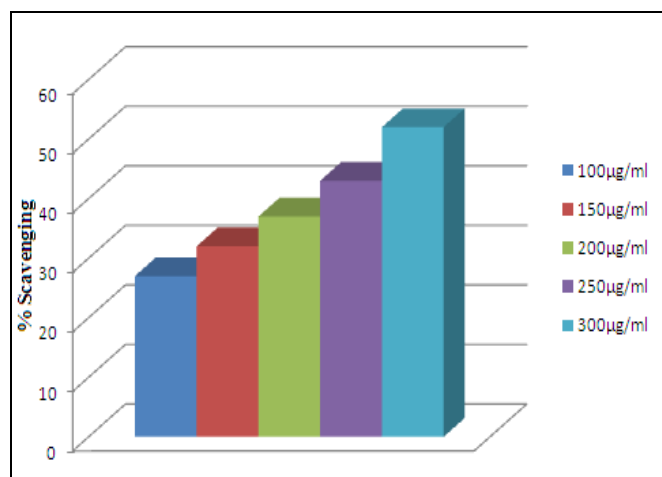


FIG. 1: RESULTS OF ANTIOXIDANT ACTIVITY STABILITY STUDIES ¹⁰

To assess the formulation stability, stability study was performed. The cream filled in a bottle and kept in the humidity chamber maintained at 30 ± 2 °C/ $65 \pm 5\%$ RH and 40 ± 2 °C / $75 \pm 5\%$ RH for two months. At the end of the study, samples were analyzed for any change in the physical properties and quality control parameters like; color & appearance, pH, viscosity and Spreadability.

TABLE 3: RESULTS OF STABILITY STUDY

Parameter	Value
Spreadability (g cm/sec)	12.66
pH	6.4
The viscosity of cream (cps)	1545
Colour & Appearance	No Change

RESULTS AND DISCUSSION: The Embelin extracted from the plant. The antioxidant activity of the extract showed that it was a potent free radical scavenger and antioxidant due to the presence of flavonoids and phenolic compounds. The results are summarized in **Fig. 1**. The cream was formulated from extract as mentioned in **Table 1**. Further various quality control parameters were performed for cream formations, and results are mentioned in **Table 2**. pH of the prepared cream was found to be around 6 which is suitable for topical application because the pH of the skin lies within the same range. The formulation also showed excellent spreadability as the result of spreadability study. The viscosity of cream was found to be different at different RPM which is inversely proportional to the rate of shear (rpm). The stability studies of the various parameters like visual appearance, nature, pH, and viscosity of the formulations showed that there were no significant variations in various study parameters after two months of the study period as summarized in **Table 3**.

CONCLUSION: Stability parameters like visual appearance, nature, viscosity, and fragrance of the formulations showed that there was no significant

variation during the study period. The prepared formulations showed proper pH range that is approximately pH 6; it confirms the compatibility of the formulations with skin. The cream was found to be stable during stability study; thus the present study concluded that it is possible to develop cream containing Embelin as herbal extracts and can be used as a potent antioxidant agent.

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CONFLICT OF INTEREST: Nil

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