FORMULATION, EVALUATION AND STABILITY STUDY OF HERBAL CREAM CONTAINING EMBELIN

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ABSTRACT: In this study a cream was formulated from the plant extract containing anti-oxidant ingredient Embelin and its quality control evaluation performed along with antioxidant activity. Alcohol extract of 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 of 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 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 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 been also used to cure skin disorders, for dyeing hairs, treating acne, treating carbuncle infections, vitiligo and leucoderma. ¹⁴

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 day in sunlight. Then crushed it to 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.

Preparation of Cream: The formulation of cream was done as motioned in Table 1.
moisturizer conditioner was 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 oil phase slowly with constant stirring and the mixture was homogenized for 30 min.

### TABLE 1: COMPOSITIONS OF CREAM FORMULATION

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>% (w/w)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extract</td>
<td>1.5</td>
</tr>
<tr>
<td>Stearic acid</td>
<td>10</td>
</tr>
<tr>
<td>Triethanolamine</td>
<td>1.5</td>
</tr>
<tr>
<td>Mineral oil</td>
<td>3</td>
</tr>
<tr>
<td>Moisturizer conditioner</td>
<td>10</td>
</tr>
<tr>
<td>Cetyl alcohol</td>
<td>2</td>
</tr>
<tr>
<td>Propyl paraben</td>
<td>0.01</td>
</tr>
<tr>
<td>Sodium metabisulphite</td>
<td>0.1</td>
</tr>
<tr>
<td>Water Q.S. to 100 ml</td>
<td>Q.S.</td>
</tr>
</tbody>
</table>

**Quality Control Evaluation of Creams:**

**pH:** pH was measured by pH meter.

**Viscosity:** Viscosity of cream was determined by Brookefield viscometer. The viscosity measurements were done using Brookefield 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 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 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 on 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:

\[
\text{Spreadability} = \frac{m \times l}{t}
\]

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

\(l = \) length of glass slide (30cm)

\(t = \) time taken in

### TABLE 2: RESULTS OF EVALUATION PARAMETERS OF FORMULATION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spreadability (g cm/sec)</td>
<td>12.58</td>
</tr>
<tr>
<td>pH</td>
<td>6.4</td>
</tr>
<tr>
<td>Viscosity of cream (cps)</td>
<td>1598</td>
</tr>
</tbody>
</table>

**Evaluation of Antioxidant Activity by Superoxide Scavenging Activity:**

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

\[
\text{Percentage inhibition} = \frac{C - T}{C} \times 100
\]

C=absorbance of control,

T=absorbance of test
To assess the formulation stability, stability study was performed. 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 study, samples were analyzed for any change in the physical properties and quality control parameters like; colour & appearance, pH, viscosity and Spreadability.

### TABLE 3: RESULTS OF STABILITY STUDY

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spreadability (g cm/sec)</td>
<td>12.66</td>
</tr>
<tr>
<td>pH</td>
<td>6.4</td>
</tr>
<tr>
<td>Viscosity of cream (cps)</td>
<td>1545</td>
</tr>
<tr>
<td>Colour &amp; Appearance</td>
<td>No Change</td>
</tr>
</tbody>
</table>

### RESULTS AND DISCUSSION:

The Embelin extracted from plant. The antioxidant activity of the extract showed that it was a potent free radical scavenger and antioxidant due to the presence of flavanoids 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 formulations 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 is lies within same range. Formulation also showed excellent spreadability as the result of spreadability study. Viscosity of cream was found to be different at different RPM which is inversely proportional to 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 potent antioxidant agent.

### REFERENCES:

2. The Merck Index, An Encyclopedia of Chemicals, Drugs and Biologicals. 14th ed, Published by Merck Research Laboratories; 605, 2673.

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