FORMULATION AND EVALUATION OF ANTI-ACNE HERBAL FACEWASH GEL

Krishnamurthy A. Kamalapurkar, Revati D. Mengshetti* and Pradnya G. Vhanamane

Master of Pharmacy, Department of Pharmaceutics, D.S.T.S Mandal’s College of Pharmacy Solapur-413004, Maharashtra, India.

ABSTRACT

Acne Vulgaris is an inflammatory disorder of pilosebaceous unit, which runs a chronic course and it is self-limiting. Acne vulgaris is triggered by propionibacterium acnes in adolescence, under the influence of normal circulating dehydroepindrosterone. It is a very common skin disorder which can present with inflammatory and non-inflammatory lesions. The Aim of this study was to formulate and evaluate the herbal face wash gel containing extracts of Azadirachta indica (Neem), Ocimum Basillicum (Tulsi) and Tea tree oil. The plants have been reported in the literature having good anti-microbial, anti-inflammatory activity. Formulations were evaluated for various parameters like color, pH, consistency, Viscosity, etc.

KEYWORDS: Acne vulgaris, Face wash, Spreadability, Anti-microbial.

INTRODUCTION

Skin is the number one target for most cosmetics and personal care products. Consumers apply products to their skin for many reasons such as to cleanse, protect, moisturize, peel or cover it. Skin is the largest sensory and contact organ in the human body. Its surface area in adults is approximately 1.5-2 m². [1]

It performs many key functions, such as protection against external physical, chemical, and biologic assailants, as well as prevention of excess water loss from the body and a role in thermoregulation. [2]

Face skin is the major part of the body, which specify the health of an individual. It
comprises of materials such as amino acids, lipids and carbohydrates etc. so that a balanced nutrition is required for the skin to keep it clear, glossy and healthy, it deals with the formulation and evaluation of polyherbal face wash gel preparation.\[^3\]

Herbal cosmetics are prepared, using different cosmetic ingredients to form the base in which one or more herbal ingredients are used to cure various skin ailments.\[^4\] A gel is a solid jelly like material that can have properties ranging from soft and weak to hard and tough. Gels are defined as a substantially dilute cross linked system, which exhibits no flow when in the steady state. By weight, gels are mostly liquid, yet they behave like solids due to three-dimensional cross linked network within the liquid.\[^5\]

Acne vulgaris is a common dermatological disorder of the pilosebaceous unit has a complex pathophysiology and can be triggered by a number of factors. It primarily affects teenagers; however, it can also affect adults. Acne is estimated to affect 40-50 million people in the US, with an 85% prevalence in those aged 12-24 years, which makes it the most common skin disorders that dermatologists treat. With regard to gender, acne is significantly higher among women than among men in all age groups. Acne primarily affects the skin; however, it may also cause distress and, in some individuals, contributes to lowered self-image.\[^1\]

**Drug profile for herbal face wash**

**Herbal medicines**

*Azadirachta indica* (Neem)

*Synonym:* Melia azadirachta

*Biological source:* It consists of leaves and other aerial parts of *Azadirachta indica*

*Family:* Meliaceae
Use: Antibacterial, antifungal, anti-inflammatory, antiseptic, and highly beneficial for oily and acne prone skin

**Ocimum Basilicum (Tulsi)**

![Image of Ocimum Basilicum (Tulsi)](image)

**Synonym:** Sacred basil, Holy basil, Tulsi  
**Biological source:** Leaves of Ocimum sanctum, Ocimum Basilicum  
**Family:** Labiatae  
**Use:** Tulsi may be beneficial for acne due to its antibacterial, antifungal and anti-inflammatory properties. It benefits the skin by preventing blackheads, acne and relieves skin infections.

**Tea tree oil (Melaleuca alternifolia)**

![Image of Tea tree oil (Melaleuca alternifolia)](image)

**Synonym:** Australian tea tree oil, Oleum, Teebaum  
**Biological source:** Leaves of Melaleuca alternifolia  
**Family:** Myrtle  
**Use:** Due to its antibacterial and anti-inflammatory properties, tea tree oil may help to treat...
acne. It also benefit oily skin and help to relieve dryness, reduce itchy skin due to its anti-inflammatory effects.

**List of other excipients used in the formulation**

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbapol 940</td>
<td>Thickening, dispersing, suspending and emulsifying agents</td>
</tr>
<tr>
<td>Methyl paraben</td>
<td>Preservative</td>
</tr>
<tr>
<td>Propyl paraben</td>
<td>Preservative</td>
</tr>
<tr>
<td>Triethanolamine</td>
<td>Emulsifier and surfactant</td>
</tr>
<tr>
<td>Propylene glycol</td>
<td>Humectant, fragrance ingredient</td>
</tr>
<tr>
<td>Sodium lauryl sulphate</td>
<td>Foaming agent</td>
</tr>
</tbody>
</table>

**EXPERIMENTAL WORK**

**Methods**

1. **Collection**
   Leaves of neem and tulsi were collected from the local area of Solapur and tea tree oil was collected from the local market of Solapur.

2. **Preparation of extracts**
   Leaves of neem and tulsi were dried in hot air oven at 45°C temperature and powdered with the help of grinder. Desired quantity of herbal drugs were weighed and each herb macerated with rose water in conical flask for 3 days separately. After 3 days, contents were filtered out by using simple filtration method and filtrates were collected in vessels separately. [3]

3. **Filtration**
   Filtration of extract was done by using simple filter paper and funnel for 2 times.

4. **Evaporation**
   Water bath was used for evaporating the filtrate. Filtrate was evaporated at 60°C temperature until the desired concentration of extract was obtained.

**Formulation of herbal facewash gel**

1. Carbopol 940 was dispersed in distilled water and the beaker was kept aside to swell the carbopol 940 to form gel.

2. Take distilled water and required quantity of methyl paraben and propyl paraben were taken and dissolved by heating on water bath, solution was cooled and propylene glycol and sodiumlauryl sulphate were added.

3. Further required quantity of extract was mixed to the above mixture and add this solution into the carbopol 940 gel with continuous stirring and triethanolamine was added
dropwise to the formulation for adjustment of required skin pH and to obtain the gel at required consistency.\textsuperscript{[6]}

Formulation table

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Ingredients</th>
<th>F1</th>
<th>F2</th>
<th>F3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Neem extract</td>
<td>2ml</td>
<td>3ml</td>
<td>4ml</td>
</tr>
<tr>
<td>2.</td>
<td>Tulsi extract</td>
<td>2ml</td>
<td>3ml</td>
<td>4ml</td>
</tr>
<tr>
<td>3.</td>
<td>Tea tree oil</td>
<td>2ml</td>
<td>3ml</td>
<td>4ml</td>
</tr>
<tr>
<td>4.</td>
<td>Carboxpol 940</td>
<td>1 gm</td>
<td>1.5gm</td>
<td>2gm</td>
</tr>
<tr>
<td>5.</td>
<td>Methyl paraben</td>
<td>0.06gm</td>
<td>0.06gm</td>
<td>0.06gm</td>
</tr>
<tr>
<td>6.</td>
<td>Propyl paraben</td>
<td>0.03gm</td>
<td>0.03gm</td>
<td>0.03gm</td>
</tr>
<tr>
<td>7.</td>
<td>Triethanolamine</td>
<td>0.2 ml</td>
<td>0.2 ml</td>
<td>0.2ml</td>
</tr>
<tr>
<td>8.</td>
<td>Propylene glycol</td>
<td>2 ml</td>
<td>2ml</td>
<td>2 ml</td>
</tr>
<tr>
<td>9.</td>
<td>Sodium lauryl sulphate</td>
<td>1gm</td>
<td>2 gm</td>
<td>3 gm</td>
</tr>
<tr>
<td>10.</td>
<td>Distilled water</td>
<td>Q.S to 30 ml</td>
<td>Q.S to 30 ml</td>
<td>Q.S to 30 ml</td>
</tr>
</tbody>
</table>

![Fig. no. 1: Formulation batches of herbal gel F1, F2, F3.](image)

Evaluation tests

The formulated face wash gel was evaluated for following parameter\textsuperscript{[2,6]}

1. **Color**

The color of the face wash gel was checked visually.

2. **Odor**

The formulation was evaluated for its odor by smelling it.

3. **Consistency**

It was determined manually.

4. **pH**

\( \text{pH} \) of 1 \% aqueous solution of the formulation was measured by using a calibrated digital pH meter at constant temperature.
5. Spredability
Two sets of glass slides of standard dimensions were taken. The herbal gel formulation was placed over one of the slides. The other slide was placed on the top of gel, such that the gel was sandwiched between the two slides in an area occupied by a distance of 6 cm along the slide. A 20 gm weight was tied to the upper slide carefully. The time taken for the upper slide to travel the distance of 6 cm and separated away from the lower slide under the influence of the weight was noted.[7]

Formula: M×L/T

6. Washability
The product was applied on hand and was observed under running water.

7. Foamability
Small amount of gel was transferred in a beaker containing water. Initial volume was noted, beaker was shaken for 10 times and the final volume was noted. Foamability was analyzed by applying onto skin with contact with water.

8. Grittiness
The gel was checked for the presence of any gritty particles by applying it on the skin.

9. Viscosity
About 10 ml of formulated sample was taken in the beaker and checked on digital viscometer and record the observation.

RESULTS AND DISCUSSIONS
The different gel formulation were prepared using various ingredients as mentioned in table 1. The formulation was prepared by trial and error basis until a gel was obtained with distinctive feature. The Neem extract, Tulsi extract, Tea tree oil were used as main ingredient since individually it constitutes of all essential properties of face wash formulation such as antifungal, antibacterial properties.

Developed herbal formulation was pale green in color; due to neem and tulsi extract. All formulation was found to be homogeneous easily washable with slightly acidic pH which was suitable with skin physiology. Viscosity of herbal gel was determined by Brookfield viscometer and ranging between 4305-4372 CP.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Evaluation test</th>
<th>Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F1</td>
<td>F2</td>
</tr>
<tr>
<td>1.</td>
<td>Color</td>
<td>Green</td>
</tr>
<tr>
<td></td>
<td>Odor</td>
<td>Characteristic</td>
</tr>
<tr>
<td>---</td>
<td>------</td>
<td>----------------</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Consistency</td>
<td>Semisolid</td>
</tr>
<tr>
<td>4</td>
<td>pH</td>
<td>6.3</td>
</tr>
<tr>
<td>5</td>
<td>Spreadability (gm.cm/sec)</td>
<td>2.4</td>
</tr>
<tr>
<td>6</td>
<td>Washability</td>
<td>Washable</td>
</tr>
<tr>
<td>7</td>
<td>Foamability</td>
<td>Foam appears</td>
</tr>
<tr>
<td>8</td>
<td>Grittiness</td>
<td>Nil</td>
</tr>
<tr>
<td>9</td>
<td>Viscosity (CP)</td>
<td>4305</td>
</tr>
</tbody>
</table>

**CONCLUSION**

Natural remedies are more acceptable in the belief that they are safer with fewer side effects than the synthetic ones. Herbal formulations have growing demand in the world market.

This study aimed at developing gerbil face wash gels for anti-acne treatment using seed extracts of *Azadirachta indica* and *Ocimum basillicum* and tea tree oil using carbopol as Gelling agent. Desired formulation of the gel was prepared and evaluated for their physicochemical properties, like Color, odor, pH, spreadability, viscosity, etc. So From the studies it was concluded that the prepared formulation can be effectively used for facial care.

**ACKNOWLEDGEMENT**

The author is thankful to the D.S.T.S Mandal’s College of Pharmacy, Solapur for providing necessary facilities to conduct this work and also to Prof. Krishnamurthy A. Kamalapurkar for their valuable support and guidance.

**REFERENCES**
