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# Formulation and Evaluation of Anti-Acne Herbal Face Wash Gel

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## ABSTRACT

Acne is a chronic inflammatory disorder of pilosebaceous unit, which involves increased sebum production by sebaceous glands and abnormal desquamation of hair follicles occur in response to increasing androgen levels with the onset of puberty. Obstruction of follicles causes follicular distention which is often accompanied by the proliferation of the bacteria Propionibacterium acnes and the activation of an inflammatory response. The present work aimed to prepare the face wash gel containing Thai herbal extract.The plants have been reported in the literature having good anti-microbial, anti-oxidant and anti-inflammatory activity. Prepared formulation was evaluated for various parameters like colour, appearance, consistency, pH, viscosity, stability studies and consumer acceptance test. Results showed that the gels were non-irritant, stable and posses anti-acne activity. The efficacy when tested with a standard was almost same to that of polyherbal gel. Concluded that from this study, extract was proved to be stable and considered as an effective herbal formulation for acne treatment.

**Keywords:** Acne vulgaris, Anti-acne activity, Anti-microbial, Inflammatory response.

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## INTRODUCTION

The herbal drug industry in India is probably the oldest medical care system in the world. The history of herbs in ancient India is so old that the ancient form of herbal healing has even been mentioned in the Vedas, an ancient religious work of the Indians. The ancient herbal healing methods of Ayurveda and Unani deal with the use of herbs and natural products to tackle health conditions. Although herbal medicines would appear to be new for western healers and medical practitioners, the truth is that most prescribed medicines even today contain plant extracts.

Acne may cause long-lasting and detrimental psychosocial and physical effects. It is associated with depression and anxiety, regardless of disease severity, although the psychological effects usually improve with treatment. Furthermore, acne may cause permanent scarring that is difficult to correct.

Acne vulgaris is characterized by noninflammatory, open or closed comedones and by inflammatory papules, pustules, and nodules. Acne vulgaris typically affects the areas of skin with the densest population of sebaceous follicles (eg, face, upper chest, back). Local symptoms of acne vulgaris may include pain, tenderness, or erythema Systemic symptoms are most often absent in acne vulgaris. Severe acne with associated systemic signs and symptoms, such as fever, is referred to as acne fulminans. Severe acne, characterized by multiple comedones, without the presence of systemic symptoms, is known as acne conglobata.

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 a three-dimensional cross-linked network within the liquid. It is the crosslinking within the fluid that gives a gel its structure (hardness) and contributes to the adhesive stick track.

The therapeutic use of medicinal plants has gained considerable momentum in the world during the past decade. The overuse of synthetic drugs with impurities results in higher incidence of adverse drug reactions in more advanced communities has motivated mankind to go back to nature for safer remedies. However, it should be ensured that commercial formulations based on medicinal plants are safe, effective and of standard quality. Today, over the world, there is a great deal of interest in Ayurvedic system of medicine and thus the demand for various commonly used medicinal plants in the production ol Ayurvedic medicine is ever increasing.

## MATERIALS

| Herb name | Part used | Use |
|---|---|---|
| Curry leaf | Leaves | Anti-inflammatory |
| Bel patra | Leaves | Anti-acne |
| Green tea | Leaves | Anti aging |

## METHODS

### Preparation of herbal extracts

**1. Extraction of Murraya koenigii**

5 gm of the prepared material macerated with 50ml of water, shaken frequently and allowed to stand for 24 hrs. Thereafter filtered, evaporated the filtrate to dryness and weight was taken.

**2. Extraction of Bel patra**

5 gm of the powdered material macerated with 50ml of water, shaken frequently and allowed to stand for 24 hr. Thereafter filtered and used.

**3. Extraction of Green Tea**

5 gm of the powdered material macerated with 50ml of water, shaken frequently and allowed to stand for 24 hr. Thereafter filtered and used.

### Method of Preparation of Gel Containing Extract

Firstly carbopol 934 was dispersed in distilled water and purified water kept the beaker aside to swell the carbopol 934 for 1 dayand then stirring should be done to mix the carbopol934 to form gel.Take 5ml of distilled water and required quantity of methyl paraben and propyl paraben or 2gm of sodium lauryl sulphate were dissloved by heating on water bath then solution was cooled.

In another beaker weight and transfer the required quantity of extracted drug powder and dissolved in gel base and 0.025ml triethanolamine was addeddrop wise to the formulation for adjustment of required skin ph (6.8-7) and to obtain the gel at required consistency. Lastly both solutions was mixed using by glassrod.By using this method we prepared 5 formulation with 5 different concentration of carbopol 1% 0.90% 0.80% 0.60% 0.50% respectively. Methyl paraben and propyl paraben use as a preservatives.

### Preparation of Gel base

| S.NO | INGREDIENTS(gm) | F1 | F2 | F3 | F4 | F5 |
|---|---|---|---|---|---|---|
| Step 1-Gel Base | | | | | | |
| 1. | Carbapol 934(gm) | 0.50 | 0.60 | 0.80 | 0.90 | 1.0 |
| 2. | Distilled water(ml) | 30 | 30 | 30 | 30 | 30 |
| Step 2-Formulation of herbal gel | | | | | | |
| 1. | Curry leaves extract | 1 | 1 | 1 | 1 | 1 |
| 2. | Bel patra extract | 1 | 1 | 1 | 1 | 1 |
| 3. | Green tea extract | 1 | 1 | 1 | 1 | 1 |
| 3. | Methyl paraben | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 |
| 4. | Propyl paraben | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| 5. | Triethanolamine | 0.025 | 0.025 | 0.025 | 0.025 | 0.025 |
| 6. | Gel base | 30 | 30 | 30 | 30 | 30 |
| 7. | Sodium lauryl sulfate | 0. 20 | 0.20 | 0.20 | 0.20 | 0.20 |

Carbopol 934 was used as gelling agent in the preparation. Gel was prepared by dispersing Carbopol 934 in purified water with constant stirring at a moderate speed then the pH of gel was adjusted to 5 to 5.5 using Triethanolamine (TEA).Gel was prepared using varying concentration of gelling agent viz. 1, 0.90, 0.80, 0.60 and 0.50 gm while keeping other variables constant by method.

### EVALUATION OF FORMULATION

### 1 Physical appearance

The optimized gel was inspected visually for its colour, homogeneity, consistency and phase separation.

| Batch Code | Colour | Homogeneity | Consistency | Phase separation |
|---|---|---|---|---|
| HG1 | brown | Excellent | Excellent | None |
| HG2 | brown | Excellent | Excellent | None |
| HG3 | brown | Excellent | Excellent | None |
| HG4 | brown | Excellent | Excellent | None |
| HG5 | brown | Excellent | Excellent | None |

### 2 Measurement of pH

The pH values of 1% aqueous solutions of the optimized gel was measured at 25$^0$C using a pH meter (Systronic digital pH meter 335, India).

| S. No. | Formulation code | pH value |
|---|---|---|
| 1 | HG 1 | 5.56 |
| 2 | HG2 | 5.5 |
| 3. | HG3 | 5.7 |
| 4. | HG4 | 5.2 |
| 5. | HG5 | 5.9 |

### 3. Rheological study

The viscosity of the formulated batches was determined using a Cone and Plate Viscometer with spindle 7 (Brookfield Engineering Laboratories). The assembly was connected to a thermostatically controlled circulating water bath maintained at 25$^0$C. A definite quantity of gel was added to a beaker covered with thermostatic jacket. The gel were rotated at 100 rotations per minute with spindle 7.

### 4. Spreading Coefficient

A ground glass slide was fixed on the wooden block. 2 gm of gel under study was placed on this ground slide. The gel preparation was then sandwiched between this slide and second glass slide having same dimension as that of the fixed ground slide. The second glass slide is provided with the hook. Weight of 500 mg was placed on the top of the two slides for 5 min to expel air and to provide a uniform film of the gel between the two slides. Measured quantity of weight was placed in the pan attached to the pulley with the help of hook. The time (in sec) required by the top slide to cover a distance of 5 cm was noted. A shorter interval indicates better spreading coefficient (Gupta and Gaud, 2005). Spreading coefficient of prepared gel was compared with the marketed gel

| S. No. | Formulation | Spreading Coefficient (g.cm/sec) |
|---|---|---|
| 1 | Prepared Gel HG1 | 4.6±0.78 |
| 2 | HG2 | 9.3 ± 0.23 |
| 3 | HG3 | 11.6 ± 0.58 |
| 4 | HG4 | 7.6 ± 0.38 |
| 5 | HG5 | 14.4 ± 0.72 |
| 6 | Marketed gel | 14.35±0.92 |

## RESULTS AND DISCUSSION

Gels have the potential to be efficient, viable, safe and cost effective system for administration of herbal on account of their biodegradability, biocompatibility, and suitability for topical applications and low immunogenicity.

Herbalgel was prepared by emulsification technique and optimized for various formulation variables. Finally the gel was prepared using 1 gm of Carbopol, 2.5 ml of Liquid paraffin and 0.9 ml of Tween 20 and charecterized for its physical appearance, pH, spreadability, extrudabilityand drug content .The prepared herbalGel formulation was light yellow coloured viscous creamy preparation with a smooth and homogenous appearance.

The pH value of the optimized formulation was found to be 5.57 which was near the pH value of the skin, so it does not give any adverse effect. The pH value of formulation was found to be suitable for topical delivery.

The values of spreadability indicate that the gel is easily spreadable by small amount of shear. Spreadability of marketed product was 14.62±0.85 gm cm/sec while that of formulated gel was found to be 9.28 ±0.82 gm cm/sec, which indicates that spreadability of prepared gel containing herbal was good as compared to the marketed gel (Table 5.6).

The % extrudability of prepared gel and marketed cream was found to be 84% and 85% respectively, which indicate that Tretinoin gel possess better extrudability as compared to marketed gel.

## CONCLUSION

Natural remedies are boon to any disease. It is safe as well as having less side effects. In the world market, herbal formulations are in a great demand. It is a very good attempt to establish the herbal face wash containing extracts of Murraya koenigii and bel patra. This study concludes that the developed formulation of batch F1 & F2 was comparatively better than other formulations.

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