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July-September 2015

International Journal of  
CHEMICAL AND PHARMACEUTICAL  
ANALYSIS

eISSN: 2348-0726 ; pISSN : 2395-2466

Research Article

Volume-2

Issue-4

Article ID: 723

## DEVELOPMENT AND EVALUATION OF HERBAL ANTIACNE FACEWASH

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Received: 20 May 2015 / Revised: 29 June 2015 / Accepted: 1 July 2015 / Available online : 30 September 2015

### ABSTRACT

*A cleanser is a facial care product that is used to remove make-up, dead skin cells, oil, dirt, and other types of pollutants from the skin of the face. This helps to unclog pores and prevent skin conditions such as acne. In the present work an attempt was made to formulate & evaluate face wash. Face wash were prepared by using the Neem oil, Turmeric, sodium lauryl sulphate, glycerine, perfume, propylene glycol, salicylic acid, propyl parabin. Evaluation parameter of the formulation was better for use because of their characteristics like smoothness, free from gritty particle, good spread ability, no irritation, and free from sensitivity. The formulation has the pH 7 similar to skin. In the current study Neem oil is used as antiacne action and so as to formulate antiacne face wash. The evaluation parameters studied includes colour, odour, pH, spread ability, adhesiveness, irritation, sensitivity.*

**Keywords** – Herbal, Antiacne, Facewash.

### 1. INTRODUCTION

Acne is not dangerous, but can leave skin scars. Human skin has pores (tiny holes) which connect to oil glands located under the skin. The glands are connected to the pores via follicles - small canals. These glands produce Sebum, an oily liquid. The sebum carries dead skin cells through the follicles to the surface of the skin. A small hair grows through the follicle out of the skin. Pimples grow when these follicles get blocked, resulting in an accumulation of oil under the skin.

Etiology of acne generally has following basic reasons:

- (a) Abnormal follicular keratinization and desquamation,
- (b) Excessive secretion of sebum,
- (c) Proliferation of *Propionibacterium acnes* in follicle followed by secondary infections, and
- (d) Subsequent production of inflammation.<sup>1</sup>

During immunological responses, both humoral and cell-mediated pathways are involved Acne is not thought to be contagious diseases. Among the bacterial strains, only those species that can colonize a normal skin as resident flora can be a cause of acne. Therefore, only three species of microorganisms can be responsible for the development/worsening the condition of acne; these are *Propionibacterium*, *Staphylococcus* and *Escherichia* species. Sebum, the lipid-rich secretion of sebaceous glands, has a central role in the pathogenesis of acne and provides a growth medium for *Propionibacterium acnes*. People with acne have higher rate of sebum production than unaffected individuals. Moreover, the severity of acne is generally proportional to the amount of sebum production.

Enlargement of the sebaceous glands and increased production of sebum is stimulated by the increase in production of adrenal and gonadal, androgens that precedes the clinical onset of puberty. The first signs of *Acne vulgaris* commonly occur at the time of puberty<sup>2,3</sup>.

Face wash are made from fresh herbs or fruits to improve the skin and enhance beauty. Face wash improves circulation and cleanse the entire face. Preventing acne often calls for a delicate balance of moisturizing and oil control, exfoliation and cell renewal and a staple in any skincare regimen, acne or otherwise involve washing your face twice per day once in the morning and once at night. This help to clear away debris, bacteria and sebum that clog pores and causes skin to look cloudy or to develop pimples. Face wash fight pimples. Some prevent acne while diminishing lines and wrinkles. Some are designed to do nothing but simply cleanse the skin. Other factors aggravating or worsening the acne conditions are secondary infections caused by some pathogenic strains of bacteria like *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Escherichia coli* etc. There are various topical and systemic therapies available in market to treat or control the acne but maximum of them have the side effects like itching, redness, skin peeling, stinging and photosensitivity. Again, the development of resistance of available antibiotics for *Propionibacterium acne* and other bacterial strains has necessitated the search for new antimicrobial agents<sup>6</sup>. Medicinal plants have been used as a source of acne remedies since ancient times and they have shown great promises in the treatment of infectious diseases. One of these medicinal plants is Neem belonging family Meliaceae. Traditionally, this plant claims the anti-inflammatory, analgesic and antimicrobial property<sup>4-7</sup>.

*Azadirachta indica*, also known as Neem and Indian Lilac is a tree in the mahogany family Meliaceae. It is one of two species in the genus *Azadirachta* and is native to India and the Indian subcontinent including Nepal, Pakistan, Bangladesh and Sri Lanka. Typically growing in tropical and semi-tropical regions. Neem trees now also grow in islands in the southern part of Iran. Its fruits and seeds are the source of Neem oil. Neem is a fast-growing tree that can reach a height of 15–20 metres (49–66 ft), rarely to 35–40 metres (115–131 ft). It is evergreen, but in severe drought it may shed most or nearly all of its leaves. Neem leaves are dried in India and placed in cupboards to prevent insects eating the clothes and also while storing rice in tins. Neem leaves are dried and burnt in the tropical regions to keep away mosquitoes. These flowers are also used in many Indian festivals like Ugadi. As an ayurvedic herb, Neem is also used in baths. Products made from Neem trees have been used in India for over two millennia for their medicinal properties. Neem products are believed by Siddha and Ayurvedic practitioners to be anthelmintic, antifungal, antidiabetic, antibacterial, antiviral, contraceptive and sedative. It is considered a major component in siddha medicine and Ayurvedic and Unani medicine and is particularly prescribed for skin diseases. Neem oil is also used for healthy hair, to improve liver function, detoxify the blood, and balance blood sugar levels. Neem leaves have also been used to treat skin diseases like eczema, psoriasis, etc. Neem is perceived in India as a beauty aid. Powdered leaves are a major component of at least one widely used facial cream. Purified neem oil is also used in nail polish and other cosmetics<sup>8-10</sup>.

Some Neem species have attracted attention from horticulturists, global development researchers and environmentalists because of desirable traits such as being fast-growing sources of wood, producing oil that can be used for cleaning and as a natural insecticide, or an ability to be used to drain swamps and thereby reduce the risk of malaria. Outside their natural ranges, neem is both lauded for their beneficial economic impact on poor populations. On warm days Neem forests are sometimes shrouded in a smog-like mist of vaporized volatile organic compounds (terpenoids); the Australian Blue Mountains take their name from the haze.

Acne is the most common disorder virtually seen to affect teenagers and young adults between age of 14-30. It is characterized by inflamed specialized sebaceous follicles which are present at face, back and chest. Some serious factors responsible for generation of acne are abnormal follicular keratinization and desquamation, excessive secretion of sebum, and proliferation of *Propioni bacterium* acnes in follicles. Other factors aggravating or worsening the acne conditions are secondary infections caused by some pathogenic strains of bacteria like *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Escherichia coli*, etc. There are various topical and systemic

therapies available in market to treat or control the acne but maximum of them have the side effects like itching, redness, skin, peeling, stinging and photosensitivity. Again, the development of resistance of available antibiotics for *Propionibacterium acne* and other bacterial strains has necessitated the search for new antimicrobial agents. Thus, the current work was designed to gain attention towards the alternate pathway for controlling the acne condition by decreasing the production of sebum from sebaceous glands<sup>10</sup>. The Neem oil, obtained from *Azadirachta indica* (Meliaceae) was chosen and its biocide action on various bacterial strains was established using agar-well diffusion technique to prove its efficacy in controlling the secondary infection condition i.e. worsening of acnes. There is little direct research into the effectiveness of Neem essential oil in the treatment of acne. However, it is certainly possible that Neem essential oil would be helpful in treating acne because of its antibacterial and anti-inflammatory properties. Research indicates that Neem essential oil is toxic to a wide range of bacteria, including *Propionibacterium acnes*, the primary bacteria in acne infections. Research also suggests that Neem oil has similar antibacterial capabilities as benzoyl peroxide, a commonly used over the counter topical medication for acne. Additionally, the anti-inflammatory properties of Neem oil may also provide some relief for inflammatory acne. However, like most topical acne treatments, topical Neem treatments do not necessarily deliver enough active ingredients to the site of infection. Even though Neem oil is toxic to *Propionibacterium acnes* bacteria on Petri dishes in the laboratory, there is no real evidence that topically applied Neem oil penetrates effectively into the follicle and sebaceous glands<sup>7-10</sup>.

## **2. MATERIALS AND METHODS**

### **2.1 Materials used in Face wash**

The Plant material used in the present study was collected from local areas, dried and powdered for further use and other materials were purchased from local market. The below mentioned are the details of the plant and other materials used for the formulation of face wash as follows:<sup>7,9,10,12</sup>

#### *Neem oil:*

Neem oil targets dry skin and relieves itchiness. It reduces irritation as well. Well known for its antimicrobial properties, Neem oil treats redness and wounds, and prevents any infection. It gets rid of acne-causing bacteria from the root and improves the overall health and immunity of your skin to keep future acne or ulcers at bay.

#### *Sodium lauryl sulphate:*

This widespread ingredient is an additive that behaves like soap. It is detergent and surfactant added to washes and shampoos, in order to create foaming.

#### *Glycerin:*

It is sugar alcohol used in numerous personal care products, including facial cleanser. This ingredient main purpose is to act as lubricant and humectants in order to hydrate the skin and enhance smoothness.

#### *Perfume:* As per choice.

#### *Propylene glycol:*

It is used in many face washes and acne cleansers to seal moisture in to skin and promote hydration.

#### *Salicylic acid:*

It dissolves sebum build-up and dirt to fight blackheads and whiteheads .This active ingredients can be extremely drying to skin when over used, so good moisturizers must always follow.

*Propylparaben:* Propylparaben is in the paraben family of preservatives used by the food, pharmaceutical, and personal care product industries.

## 2.2 Extraction of oil

**2.2.1 Optimisation of extraction:** Method: solid-liquid extraction; Instrument: Clavengers apparatus; Solvent: Water.

**2.2.2 Specification of clavengers apparatus:** Volume: 1000ml; Solvent use: water; Quantity of material loaded: 100gm; Quantity of solvent loaded: 500ml.

**2.2.3 Construction and working of Clavengers Apparatus:** Volatile oil is extracted by using an apparatus known as clavengers apparatus by process of hydro-distillation. This apparatus consist of spherical glass vessel charged with plant material containing oil to be extracted together with water in ratio of one part plant matter to three parts water. The device has narrow opening and the vessel is put on to a heating mantle, with an energy regulator for controlling the temperature. The vapor produce from mixture are passed through a long vertical glass tube. Cooling water entre the jacket of the condenser tube by inlet and is circulated their around prior to being discharge through an outlet to graduated collection vessel, typically a measuring tube, which is open to atmosphere. The volatile oil is immiscible in water and being less dense, separate out as an upper layer. Return conduits connect the base of measuring tube to vertical tube and allows recycling of aqueous part of vapors. The oil is calculated at outlet by opening a valve provided for that purpose.<sup>12</sup>

## 2.3 Development of Anti acne Face wash

### 2.3.1 Procedure:

- i) Mix all the ingredient in given proportional amount (Table-1).
- ii) Triturate it in mortal pestle till it from semisolid like substance.

### 2.3.2 Anti-acne activity:

Fig.no 2 Anti acne activity of herbal face wash using *Styphalococcus aureus*.

### 2.3.3 Procedure:

- 1) **Preparation of agar medium:** 2gm agar and 1gm nutrient broth and dissolve up to 60ml of water in volumetric flask, after preparing it keep it in incubator along with 2 petriplate for 20 min.
- 2) **Preparation of sterile place:** A sterile place is prepare so that no another dust particle will enter
- 3) **Anti acne procedure;** After incubation take the prepared medium into sterile place and pour that medium into 2 petriplate and after solidification of medium into petriplate with the help of glass spreader, spread the prepared face wash which was soluble in water in 1 petriplate and in another petriplate spread face wash n pimple together, after that the culture *Styphalococcus aureas* with the help of nicrome wire loop is spread into 2 petriplate n kept in sterile place for 24hours. It was found that in acne plate '*Styphalococcus aureaus*' bacteria was grown while in another plate in which acne n face wash was there no bacteria was grown.<sup>11-13</sup>

## 2.4 Evaluation Parameter

**Colour:** The colour of powder should be near to the skin tone to provide covering of blemishes of skin, without its visibility.

**Odour:** By smelling the product.

**pH:** 1 gram of product with 9 gram of water and shake vigorously then determine pH by glass or low range pH paper in aqueous solution.

**Adhesiveness:** It is a characteristic of particle size and shape and check by simply rubbing the power on skin. If there is no irruptions and rashes then consider it as free from grittiness.

**Spredability:** It is the term in which the product spread on the area and it should be good spredability with smoothness or free from grittiness of the particle.

**Irritation:** It is carried out by applying product on the skin for 10 minutes. If no irritation occurs then it is considered as a non irritating product.

Sensitivity: It is tested by "Patch Test". Apply product on 1cm<sup>3</sup> patch of skin, if there is no inflammation or rashes then it is considered as free from sensitivity.<sup>13-15</sup>

### 3. RESULTS AND DISCUSSION

A cleanser can be used as part of a skin care regimen together with a toner and moisturizer. Face wash is a soap-free, herbal formulation that cleans impurities and helps clear pimples. A natural blend of Neem has their antibacterial and antifungal properties to prevent the recurrence of acne over time. The results of evaluation are displayed in Table 2. For evaluation studies, characterization of formulation was done for its colour, odour, pH, spreadability and adhesiveness, irritation test and sensitivity test. The advantage of herbal cosmetics is their non toxic nature, reduce the allergic reactions and time tested usefulness of many ingredients. Formulation was found to be colorless. It has characteristic odour. The pH value was found to be 7. The prepared formulation was found to be good in adhesiveness and have good spreadability. It has no irritation and formulation was free from sensitivity. Thus Neem plant extract has good anti acne activity and hence use for preparation of anti acne face wash and the Anti acne face wash prepared was clear, pH-3. Neem is an excellent skin care ingredient known for its antibacterial properties. It improves general skin health and immunity, combating bacterial infections such as acne, boils and ulcers. Neem tackles bacteria from the root and prevents the recurrence of pimples and blemishes. It also helps to retain the skin's elasticity, making it supple and also has strong anti-inflammatory properties, which soothe your skin, making it an excellent ingredient in a face wash.

**Table 1 : Formulation of Face wash**

| S. No. | Ingredient             | Quantity Taken |
|--------|------------------------|----------------|
| 1.     | Neem oil               | 3ml            |
| 2.     | Sodium lauryl sulphate | 1gm            |
| 3.     | Glycerin               | 3ml            |
| 4.     | Propylene glycol       | 1ml            |
| 5.     | Salicylic acid         | 1gm            |
| 6.     | Propyl parabin         | 1gm            |
| 7.     | Perfume                | Q.S.           |

**Table 2 : Evaluation of Face wash**

| S. No. | Evaluation parameters     | Observation                      |
|--------|---------------------------|----------------------------------|
| 1.     | Colour                    | Light green                      |
| 2.     | Odour                     | Characteristic odour             |
| 3.     | pH                        | 7                                |
| 4.     | Adhesiveness              | Slightly adhesiveness            |
| 5.     | Spredability              | Easily spredability              |
| 6.     | Irritation                | No irritation                    |
| 7.     | Sensitivity               | Free from sensitive              |
| 8.     | Nature of face after wash | Soft and fresh, Clean from dirt. |

### 4. CONCLUSION

It features a soap-free, herbal formula that cleanses excess oil and impurities that clog pores to leave your skin clean, fresh and soft. With the action of Neem, this purifying face wash prevents future acne and helps make breakouts one less stress in your life. Herbal anti-acne face wash is not available in the market hence we prepare anti acne face wash by using Neem extract i.e. Neem oil. As Neem extract show anti acne activity, similarly prepared herbal anti acne face wash show anti acne activity. Also the prepared anti acne face

wash is better to use because of smoothness, spreadable, no irritation. Prepared face wash remove oil from skin. It is used in treatment of acne, pimples, and black heads due to the use of Neem oil.

#### **5. ACKNOWLEDGEMENT**

The authors are grateful to the management of Sri Ram Murti Smarak Institute of Engineering & Technology for providing all the necessary facilities for the successful completion of this work and Dr. Somesh, Professor and Head, Dept. of Botany, Bareilly College Bareilly, U.P., for authentication of the plant material.

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