

Formulation and Evaluation of Herbal Anti-Acne Foaming Face Wash

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ABSTRACT

In the past, people have changed their lifestyle to keep up with the changing times. Nowadays, cosmetics are designed to cleanse, protect, and replenish the skin. People have been concerned about acne, which is common among teens and adults as a result of their daily lifestyles. Herbal products are popular in the global market, and one such product is a face wash. A foaming face wash is a gentle cleanser used to remove makeup, dead skin cells, dirt, oils, and other pollutants from the face without causing any discomfort to the skin. Current research has focused on the use of extracts of Aloe vera, Turmeric, Neem Oil, and Rosehip Oil, which have been found to have beneficial anti-acne, anti-bacterial, antioxidant and anti-inflammatory property. The face wash was prepared with ingredients at different concentrations and was evaluated for various parameters like colour, odour, consistency, spreadability, washability, foamability, irritancy and stability.

Keywords: Anti-Bacterial, Anti-Acne, Antioxidant, Anti-Inflammatory.

INTRODUCTION

Face wash is a skincare product that is used to cleanse the skin, removing makeup, dead skin cells, oil, dirt, and other pollutants. It is intended to help keep pores clean and prevent skin conditions such as acne. Skin is prone to dirt and other pollutants due to exposure to the sun and pollution, which can accumulate in the skin and lead to discoloration, including blackheads and whiteheads, as well as acne, and blemishes. Cleaning the skin is essential for maintaining healthy skin, as it helps to remove dirt, oil, makeup and prepares the skin for topical use. However, face wash can also damage the skin by removing natural moisturizing factors, leading to a breakdown of the skin barrier and the development of acne vulgaris. Acne vulgaris is a common skin condition that occurs when the hair follicles beneath the skin become blocked^[1]. It is characterized by an increase in sebum production by the sebaceous glands, resulting in follicular distention, and is often accompanied by bacterial proliferation^[2].

ANATOMY OF SKIN

The skin is the largest organ in the human body, covering the entire external surface. It serves as a first line of defense against pathogens, ultraviolet radiation, and chemical exposure, as well as providing a mechanical barrier against injury. Additionally, it regulates temperature and water release in the environment. Skin color can vary between individuals, depending on race, age, geographical location, season, and part of the body. Additionally, skin color is affected by health conditions and emotions,

including stress. The primary pigment responsible for skin color in humans is melanin, which is produced by melanosomes in the skin cells, melanocytes, and keratinocytes. Skin color is determined by the presence of melanin and melanoids in the skin, as well as the presence of other components such as water content, oxygen content, and the intercellular adherence of the skin cells. Dark skin has more melanosomes, which are bigger, thicker, and more numerous. When exposed to UV light, the production of melanin increases, and this is more common in dark than light skin. The melanocytes make melanin by converting tyrosine to dihydroxyphenylalanine (DOPA), which is then converted into a polymer through an oxidative reaction^[3].

LAYERS OF SKIN

- ✓ Epidermis
- ✓ Dermis
- ✓ Hypodermis

The formulation of a face cleanser penetrates only till depth of stratum corneum and layers of epidermis.

Layers of epidermis:

- a) Stratum basale: It is the deepest layer. It is separated from the dermis by a basement membrane called the basal lamina. The basal lamina is attached to the stratum basale by a hemidesmosome. The cells in the basale are cuboidal-to-columnar, with mitotically activated stem cells.
- b) Stratum spinosum :Stratum spinosum is also known as the prickle-cell layer. It is made up of irregular, polyhedral cells called spines, which extend outward and contact neighboring cells by a process called desmosomes.
- c) Stratum granulosum: It is a diamond-shaped layer of cells that contain keratohyalin granules. Keratin filaments are aggregated in the granulosum of the stratum corneum.
- d) Stratum lucidum: It is a thin, clear layer that contains the transformation product, eleidin. It is mainly found in thick skin.
- e) Stratum corneum: The outermost layer is keratin, and keratin-rich scales called stratum corneum are once living cells. These are called keratinocytes. This layer is very thick, particularly thick in callused skin.

Cells of the epidermis

- Keratinocytes
- Melanocytes
- Langerhans cells
- Merkel's cell

Dermis:

It consists of two layers of connective tissue that connect together.

- Papillary layer: Outer layer, which is thinner and is made up of loosely connected connective tissue. It connects the epidermis to the skin.
- Reticular layer: Deeper layer, which is thicker and less cell based. It is made up of densely connected connective tissue, which is made up of bundles of collagen fibres.

The dermis contains the skin's connective tissue, skin glands, hair, many sensory neurons and blood vessels.

Hypodermis:

- Also termed as subcutaneous fascia,
- Deepest layer of skin.
- In addition to adipose tissue, it also contains hair follicles, sensory neurons, blood vessels, and other skin structures^[4].

Acne

Acne is a skin disorder that develops when oil and dead skin cells clog hair follicles. Pore blockage produces blackheads, whiteheads and other types of pimples.

Types of acne:

Acne can be classified into comedones, epidemic acne, pustular acne, cystic acne, and nodular acne. Comedones are the ones that don't cause inflammation and can be split into two categories: whiteheads, and blackheads.

- Whiteheads, also known as obstructive comedones, appear as raised, new or white bumps. Blackheads (open comedones), on the other hand, look like open pores with dark patches made up of melanin, sebum and hair follicle cells.
- Papules are crimson, hard, and elevated, with a diameter of less than 5 mm. A pustule is a little lump on the skin that contains infectious material.
- Lesions, commonly subcutaneous cysts and nodules, that are narrow, raised lesions that penetrate deeper into the dermis and tissues. The diameter of a subcutaneous cyst is typically less than 5 mm, while a nodule is generally larger than 5 mm.
- Pustules refers to type of skin lesion composed of a small amount of pus. They can appear on any surface of the body, but are most commonly found on the cheeks, chest, or back. The cause of a pustule is usually a bacterial, viral, fungal, or parasitic infection.
- Nodular Acne is one of the most serious types of acne. Nodules are hard bumps or knots that form deep under the skin. Nodules start below the skin's surface and appear as red bumps. Nodules usually don't have whiteheads or blackheads at the center. Nodules can last over weeks or even months.

Acne is a disease that is caused by a variety of physiological factors, including overgrowth of hair follicles and an increase in sebum production caused by high androgen levels. Additionally, acne can be caused by the presence of microorganisms, such as *Propionibacterium acnes*, *Propionylcoccus epidermidis*, and other factors. To gain a better understanding of the etiology of acne, new concepts are being developed. These concepts may include alterations in biological markers, sensitivity of target cells, neuroendocrine responses, genetic factor, and environmental factors. A variety of herbal and synthetic compounds have been observed to have a significant effect on acne.

There can be various mechanism such as:

- ✓ Sebum secretion regulation

- ✓ Antibiotics that inhibit the growth of two major acne-causing bacteria:
- ✓ Propionibacterium acnes (PBA) and Staphylococcus epidermidis.
- ✓ keratolytic agents, which are responsible for the removal of the stratum corneum and the inhibition of sebum production beneath the skin.
- ✓ Anti-inflammatory activity to reduce the symptoms caused by inflammation and inflammation-related redness^[5].



Types of acne

FACE WASH

A face wash is a facial cleansing product used to remove makeup, dead skin cells and oil, dirt and other impurities from the skin. It helps to clean pores and prevent skin diseases such as acne. A face wash can be added to your skincare routine in addition to a toner and a moisturizer.

Benefits of face wash

- It helps to keep skin clean and healthy.
- It makes the skin radiant.
- The combination of dead skin cells and excess oil can clog pores, causing acne, white heads, blackheads and a tired appearance. Regular pore exfoliation prevents all the above skin problems.
- Exfoliation increases circulation. It removes dead skin cells and promotes the growth of new skin cells.
- It promotes skin regeneration and rejuvenation.
- It removes dead skin cells, resulting in a slower rate of skin aging.

Properties of face wash:

- ✓ It should soften the skin upon application.
- ✓ This product should be designed to be stable and aesthetically pleasing.
- ✓ It should spread evenly and not be difficult to apply, and the creamy residue should not remain viscous after evaporation.

- ✓ It should not be greasy during application, and should leave a fine, emollient layer on the skin.
- ✓ The physical action of the product should be to purify the skin and to open the pores, not to absorb.

Advantages of herbal cosmetics over synthetic cosmetics:

These remedies are becoming increasingly popular since the majority of women today prefer natural products over synthetic cosmetics for their personal beauty care, as these are the products which nourish the body, improve health and provide satisfaction. These products are free from synthetic chemicals and have comparatively fewer adverse effects than synthetic cosmetics.

Various herbs used in cosmetics:

- **Neem:**Neem is one of the Ayurveda medicinal plants that is highly valued for its healing properties, which include antibacterial, anti-fungal and antiviral properties.
- **Aloe vera:**Aloe vera has been used in traditional Ayurveda medicine to treat various types of skin injuries, such as burns, cut, insect bites, eczema and more. In addition to skin injuries, aloe vera is also used to treat digestive problems due to its antiseptic, antibacterial and wound healing properties.
- **Turmeric:** Turmeric is known to hydrate and nourish the skin, and it can also catalyze the removal of dead skin. It can help to reduce the signs and symptoms of skin-related problems, such as eczema, when applied to the skin.
- **Rosehip oil:** Rosehip oil is considered to be the ultimate anti-ageing oil, as it contains high levels of antioxidants, which help to lock up moisture in the deep layers of the skin, as well as increase collagen production, which helps to fight against signs of aging^[6].

Function of skin:

- The skin plays a vital role in protecting the body from damage, providing a barrier against mechanical heat and physical injury.
- It prevents moisture loss.
- Reduces the harmful effects of UV rays.
- It regulates temperature It is an immune system organ.
- It detects infections It protects the body from pathogens.
- It aids in water resistance by blocking the absorption of nutrients from the body^[7].

AIM AND OBJECTIVES

AIM:

To prepare and evaluate herbal anti-acne foaming face wash.

Objective:

- To identify and collect various herbal plants.
- To extract herbal components without adding any chemical preservatives.
- To formulate and evaluate herbal anti-acne foaming face wash.
- To carry out evaluation tests related to foaming face wash.
- The formulated foaming face wash will be subjected to accelerated stability study as per ICH guidelines.

Plant profile:**A ALOE VERA****Uses:**

- It has anti-inflammatory properties which help in reducing pain, swelling, and pain in wound and promoting collagen formation and release. .
- It is a dependable source for treating bacteria and fungal infections.
- It has antioxidant properties which help in repairing UV damage and slows down the ageing process of your skin.
- It soothes rashes and sunburns by cooling.
- It also helps boost wound healing^[8].

B TURMERIC**Uses :**

- Turmeric is a powerful ingredient that can be used to add a natural glow to the skin.
- It is known to be effective in treating acne
- It also helps in treating atopic dermatitis.
- It aids with psoriasis^[9].

C NEEM OIL:



Uses:

- To reduce scars.
- To treat dry skin and fine lines.
- To soothe the skin that is inflamed and irritated.
- To treat uneven skin tone.
- To combat several signs of early aging^[10].

ROSEHIP OIL:



Uses:

- It reduces Inflammation.
- It protects against Sun Damage
- It also reduces Hyperpigmentation Reduces Scars and Fine Lines
- It Strengthens Skin Immune System^[11].

METHODOLOGY AND MATERIALS

EXTRACTION PROCESS:

PLANT MATERIALS: All the ingredients used in the preparation I,e aloe vera, turmeric, neem oil and rosehip oil. We extract from following processes: -

1) EXTRACTION OF NEEM OIL:

take 20 grams of dry neem leaves and grind them into a powder. Add 100 ml of olive oil to the powder.Boil in a water bath for 30 minutes. Use cheese cloth to filter out any solid residue.

2) EXTRACTION OF ALOEVERA:

Take 2 medium pieces of raw Aloe vera leaves. Take a look at the jelly. Transfer the gel to the mixer grinder. Filter out the juice to prevent clumps.

3)EXTRACTION OF ROSEHIP OIL:

In order to extract the rosehip seeds, weigh out a sample of 30 grams. Place the sample into a 24-ml extraction vessel, using a funnel to pour the sample in, then place the wool plug on top of the vessel. Tamping the sample with the tamping rod will cause it to compress. The void volume should be filled and the vessel should be sealed. The sample should be extracted according to the extraction condition specified. The collection vial should be removed and residual moisture from the oil should be dried in a dry oven at a temperature of 105°C.

FORMULATION STEPS INVOLVED IN PREPARATION:

The process of formulation preparation can be illustrated by dividing the components into distinct stages.

Stage A is composed of the base ingredients.

Stage B is composed of the main ingredients.

Stage C is composed of the excipients.

Stage D is composed of the preservatives.

Stage E is composed of the fragrance of the formulation.

FORMULATION TABLE:

Slno	Stage	Ingredient	F1	F2	F3
1	A	Glycerin	25ml	35ml	30ml
2	A	Distilled water	q.s	q.s	q.s
3	B	Aloe vera	30ml	28ml	35ml
4	B	Turmeric	3gm	4gm	3gm
5	B	Neem oil	5ml	4ml	8ml
6	B	Rosehip oil	8ml	3ml	5ml
7	C	Sodium lauryl ether sulphate	30ml	30ml	30ml
8	D	Sorbic acid	0.25gm	0.25gm	0.25gm
9	D	Sodium benzoate	0.5gm	0.5gm	0.5gm
10	E	Rose essence	0.1ml	0.1ml	0.1ml

Method of preparation:

The method of preparation is as follows:

- The components of Stage A are weighed in accordance with the formulation table before being added to the beaker.
- The glycerin is taken in greater quantities than the distilled water.
- The ingredients of Stage B are then mixed together for two minutes in order to achieve uniformity.
- Finally, the component of Stage C is added, followed by the addition of 30ml of Sodium Lauryl Ether Sulphate, 0.5ml of Sodium Benzoate, 0.25 ml of Sorbic Acid.
- Stage E ingredient added to add fragrance. Finally, the desired volume is achieved by adding the distilled water.

PACKAGING AND STORAGE CONDITIONS

The product is enclosed inside a cylinder-shaped container, which is equipped with a silicon brush at its base. This brush facilitates in better penetration of the formulation into the skin, allowing for a more precise therapeutic effect.



Silicone head can be removed for easy cleaning



The silicon brush not only distributes the formulation, but also provides a soft facial massage to the face, which facilitates the circulation of blood on the face, due to the presence of lymphatic nodes on the face and neck. Massaging the face helps to remove the fluid from the lymphatic nodes, thus promoting the circulation of essential nutrients and oxygen to the skin.

The product is formulated according to safety standards and the packaging is easy to use. Therefore, it can be said that the formulation improves the therapeutic effect of the product. Store the product in a cool, dry area away from sunlight.

EVALUATION

Physical characteristics such as colour, appearance, smell and uniformity were visually assessed.

- 1. Colour:** The colour of foaming face wash was checked visually.
- 2. Odour:** The odour of the formulation was checked by smelling it.
- 3. Consistency:** The consistency of the composition was verified manually.
- 4. Determination of pH:** The pH strip was used to determine the pH value of the formulated face wash formulation. To determine the colour change, one should take a pH paper and dip it into the formulated face wash solution of 1% water at a fixed temperature.
- 5. Spreadability:** The spreadability of the formulation was achieved by having the formulation on hand and using fingers to spread it.

6. **Washability:** By applying the required amount of sample to both hands and observing under running water.
7. **Foamability:** Foamability refers to the consistency of foam produced by the facial wash formulation. A small amount of face wash applied to the skin and rubbed onto the hand. The formulation was found to produce consistent foam.
8. **Accelerated stability:** This procedure is conducted by storing the formulated herbal foaming facial wash in a sealed, airtight container in a cool and dry environment.

RESULTS

The prepared formulation underwent satisfactory results in terms of colour, smell, uniformity, pH, spreadability, washability and stability

Sl no	Parameters	F1	F2	F3
01	Colour	Yellowish green	Yellowish green	Yellowish green
02	Odour	Pleasant	Pleasant	Pleasant
03	Consistency	Semi-liquid	Semi-liquid	Semi-liquid
04	pH	5	5.9	6
05	Spreadability	4.19	5.41	5.60
06	Washability	Good	Good	Good

Foamability: All four formulations were found to produce uniform foam.

DISCUSSION

Based on the above results, it is concluded that by combining extracts of aloe vera, turmeric, neem, rosehip oil in different concentrations to get multipurpose effects such as anti-bacterial, anti-aging, anti-wrinkle, and sunscreen effects on the skin are achieved. It is evident that the effectiveness of individual plant extracts cannot be increased, however, by combining the various natural components, it is possible to enhance the efficacy of the extracts. To this end, we have combined aloe vera, turmeric, neem oil and rosehip oil extract to enhance the cosmetic properties of the prepared products. The yellowish green colour of the formulation increased with the concentration of the extract, as did the viscosity and pH of the formulation. The product's pH value ranged between 5.9 and 7.0. The anti-acne foaming face wash was found to inhibit the growth of bacteria that inhibit acne, and all the formulations demonstrated the same function.

CONCLUSION

The results of a study on the Formulation and Evaluation of Anti-Acne Foaming Face Wash demonstrate that the formulated product is both safe and effective in its therapeutic function. Herbal ingredients have enabled the development of cosmetics without any adverse effects, which can provide the necessary properties to treat skin conditions and are more cost-effective than synthetic products. Herbal medications are considered to be more suitable for treating acne than allopathic medications, as allopathic medications are prone to adverse reactions, including contact allergies, local irritations, photosensitivity, itchiness, and skin redness.

Lastly it is concluded that the preparation of the product, which is prepared by the use of Aloe vera,

Neem oil, Turmeric, Rose hip oil as well as Glycerine, and SLES, will show a prominent and successful therapeutic response to skin conditions and diseases, including acne.

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