

Formulation and evaluation of anti-acne herbal face wash

Surabhi Vasant Gandole and Bhavana Dnyandeo Tambe *

SMBT Institute of D. pharmacy, Dhamangaon, Igatputi, Nashik, Maharashtra- 422403 India.

International Journal of Science and Research Archive, 2024, 11(02), 1660–1667

Publication history: Received on 01 March 2024; revised on 17 April 2024; accepted on 20 April 2024

Article DOI: <https://doi.org/10.30574/ijrsra.2024.11.2.0614>

Abstract

Herbal cosmetics are the preparation used to enhance the human appearance. Herbal formulations have significant demand in the global market. It is more acceptable to believe that natural remedies are safer with synthetic subjects than with fewer side effects. The current research works focuses extraction of neem leaves (*Azadirachta indica*), turmeric (*Curcuma longa*), aloe vera, glycerin, lemon juice, rose water and xanthan gum they have anti-acne, anti-inflammatory, anti-oxidant properties, with the help of this herbal ingredient developed and evaluates as a herbal anti-acne face wash. The face wash showed a multipurpose effect and all these herbal ingredients showed significant different activities. The ingredient uses in herbal face wash having properties softening of skin, remove acne as well as promote healing. The prepared formulation was evaluated based on number of criteria including consistency, pH test, spread ability, stability test, cleansing test, foam ability and grittiness.

Keywords: Herbal drug; Herbal Drug Extract; Anatomy of Skin; Herbal face wash; Anti-Acne

1. Introduction

Skin is the major part of body and face skin is one of the sensitive and representative parameter human personality. It performs many vital functions, including protection against external, physical, chemical and biological. To skin healthy, clear, glossy, a balanced nutrition is required. Acne is a skin disorder (that nearly everyone will experience at some point in their life time. Although the prevalence of acne increases during adolescence, it affects many men and women between the ages of 20 and 30. In which face wash preparation mainly content Turmeric Rhizomes, Honey, Xanthan gum, Rose water, neem, aloe vera, Lemon juice. It shows many properties like antibacterial, anti-fungal or many skin problem. [6, 8, 9, 10]

1.1. Skin

Despite the fact that you might not consider the skin to be an organ, it is composed of tissues that function as a unified structure to carry out specific and vital tasks. The integumentary system, which includes the skin and its supporting tissues, gives the body general protection. Connective tissue holds the many layers of cells and tissues that make up the skin to the underlying structures. There are many blood vessels in the deeper layer of skin, which is well vascularized. It also contains a large number of sensory fibers as well as sympathetic and autonomic nerve fibers that facilitate brain-to-brain communication. The three layers of skin are as follows: [6]

- Epidermis
- Dermis
- Subcutaneous (hypodermis)

* Corresponding author: Ms. Bhavana Dnyandeo Tambe.

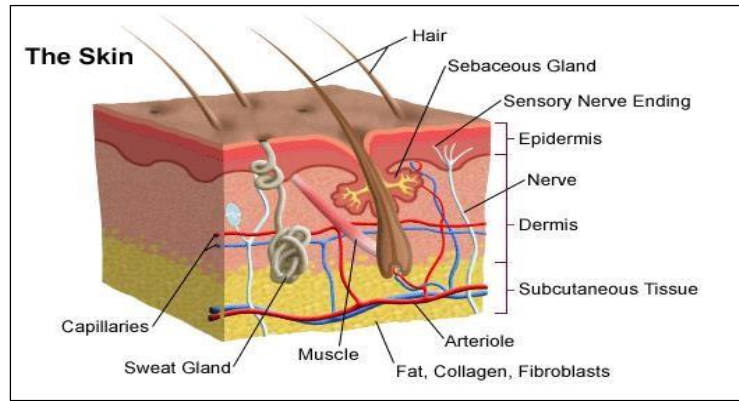


Figure 1 Anatomy of Skin

1.2. Types of acne

Acne is a common condition that causes several types of skin blemishes, each with a distinct appearance and symptoms. Types of acne include whiteheads, blackheads, papules, pustules, cystic acne, and more. [13]

1.2.1. Whiteheads

These are small or flesh-colored spots or bumps. On lighter skin, they usually have a white, circular center surrounded by a red halo. On darker skin, the surrounding area may appear dark or purple-hued. Whiteheads typically do not cause carrying.

1.2.2. Blackheads

Blackheads are small, dark-colored spots that may appear as slightly raised bumps. The skin around a blackhead usually appears normal, while the center of the blackhead is darker than the surrounding area. This

1.2.3. Papules

Coloration is not a result of trapped dirt. Blackheads are simply whiteheads that have opened and widened. When the contents of a whitehead are exposed to air, they darken. Papules are bumps under the skin's surface that are less than 1 centimeter (cm) in diameter. Papules themselves will appear solid, tender, and raised.

1.2.4. Pustules (pimples)

Pustules are larger, tender bumps with a defined circular center filled with whitish or yellowish pus. The area around a pustule appears red or pink on light skin and a deep brown or black on darker skin. The pus in the pustule is typically a combination of immune cells and bacterial cells collected in the blocked pore. Pustules typically look like much larger and more inflamed whiteheads.

1.2.5. Nodules

Nodules are hard, inflamed lumps located deep within the skin. Like papules, nodules have no visible head. Nodules are a severe form of acne blemish and can cause skin complications such as dark spots or scarring. This type of acne lesion develops when clogged pores become infected, and swell beneath the skin surface.

1.2.6. Cysts

Cysts are very large, painful, red or white lumps situated deep in the skin. Unlike nodules, these cysts fill with pus and are typically soft to the touch. Cysts are the most severe type of acne blemish

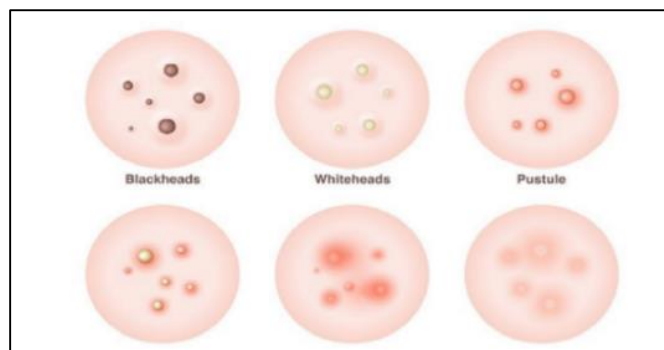


Figure 2 Types of Acne

1.3. Face wash

A face wash is a type of facial cleanser that is specifically designed to remove makeup, dirt, oil, dead skin cells, and other impurities from the skin of the face. This helps to unclog pores and prevent skin conditions such as acne, leaving the skin feeling clean and refreshed. A face wash is typically used as part of a daily skincare routine, along with a toner and moisturizer. [4, 5, 12]

1.3.1. Objectives

- To formulate and evaluate herbal anti-acne face wash.
- To treat acne, pimples and to help make skin clear and healthy.
- To remove excess oil without removing nutrients from the skin.
- To make skin soft and remove dead skin.

1.3.2. Advantages of face wash

1. Helps keep skin clear and healthy.
2. It makes the skin radiant.
3. The combination of dead skin cells and excess oil can clog pores, causing Acne, white heads, black heads and a tired appearance.
4. Regular pore exfoliation prevents all of the above skin problems.
5. Exfoliation accelerates the blood circulation.
6. It helps to remove dead skin cells and helps new skin cells replace old ones.
7. Promotes skin regeneration and rejuvenation. [1, 4, 5, 12]

1.3.3. Properties of face wash

1. Oily skin requires cleansers with herbs and botanical which will clean the Pores and reduce oil
2. A good face wash should be stable and have a pleasant appearance.
3. The face wash should soften on application to the skin, making it easy to spread.
4. The face wash should spread easily on the skin without dragging or feeling oily or greasy.
5. After the water has evaporated, the residue of the face wash should not become viscous.
6. The physical action of the face wash should be that of flushing the skin and opening pores, rather than absorbing into the skin. [1, 3, 4, 12]

2. Material and methods [1, 4, 5, 7, 8 - 10]

2.1. Collection of Material

Aloe Vera leaves, Neem Leaves, Turmeric, and Honey, Lemon collected from local Ayurveda garden Nasik and Xanthan gum, Sodium lauryl sulphate, Methyl paraben, rose water are collected from SMBT Institute of D. pharmacy Laboratories

Instruments used: Soxhlet apparatus, Digital. P^H meter, water bath (for evaporation)

Table 1 Herbal Drugs and their Uses

| Sr. No. | Name of Crude drugs / Medicinal plants | Picture | Chemical constituent | Uses |
|---------|--|---|------------------------------------|---|
| 1. | Neem (<i>Azadirachta indica</i>) |  | Azadirachtin, nimbin, nimbolinin | Antiseptic, it is use in the treatment and prevention of acne |
| 2. | Aloe Vera |  | Salicylic acid , Cinnamon acid. | Hydrating agent, Ant wrinkles |
| 3. | Turmeric (<i>Curcuma longa</i>) |  | Curcuminoids | Antimicrobial agent, Anti-inflammatory, Antioxidant |
| 4. | Honey |  | Pigments, Vitamins | Antioxidant |
| 5. | Xanthan gum |  | | non-toxic thickener and stabilizer |
| 6. | Rose water |  | Citronellol, Geraniol | Flavoring Emollient, agent agent, Cooling |
| 7. | Lemon juice |  | limonene | natural pH adjuster |

2.2. Additives used in face wash

2.2.1. Thickening Agent

A thickening agent or thickener is a substance which can increase the viscosity of a liquid without substantially changing its other properties. An additive used as a thickener, stabilizer and emulsifier, xanthan gum is made when strains of the *Xanthomonas campestris* bacteria are fed a solution of glucose been derived from corn, soy, dairy or wheat.

2.2.2. Preservative

To prevent the growth of harmful bacteria and mold. Methyl paraben is a methyl ester of p-hydroxybenzoic acid. It is a stable, non-volatile compound used as an antimicrobial preservative in foods, drugs and cosmetics

2.2.3. Foaming Agent

Sodium lauryl sulphate (SLS), is a used cosmetics, and personal care products. The sodium lauryl sulfate formula is a highly effective anionic surfactant used to remove oily stains and residues.

2.3. Preparation of extract

2.3.1. Aloe Vera Gel

Take some aloe Vera leaves and wash with distilled water .then dissect the outer part of edges of the leaves using a sterile knife. Then remove the jelly part i.e. aloe-vera gel is collected. Then collect the pulp and blend with the help of a blender. [2,11]

2.3.2. Extraction of Neem Leaves

Take Neem leaves and dried in room temperature. After proper drying leaves was powdered with help of blender. Soxhlet apparatus was used for extraction, 50 gm Neem leaves powder was taken and placed in thimble, RBF containing the 500 ml Ethanol as a solvent for 3 hours. After Neem leaves extraction, filter it and kept on water bath for 1hour for evaporation. [2, 11]

2.3.3. Extraction of Turmeric

Take fresh turmeric, cut into small pieces and dried in room temperature. After proper drying rhizomes pieces was powdered with help of blender. A Soxhlet apparatus was used for extraction. 50gm turmeric coarse powder was taken and placed in thimble, which is placed in distillation flask containing the 500 ml ethanol as a solvent. The assembly was placed and then the temperature was kept at 60°C for 3 hrs. After turmeric extraction, extraction filter out and kept on water bath for 1 hour for evaporation. [2, 11]

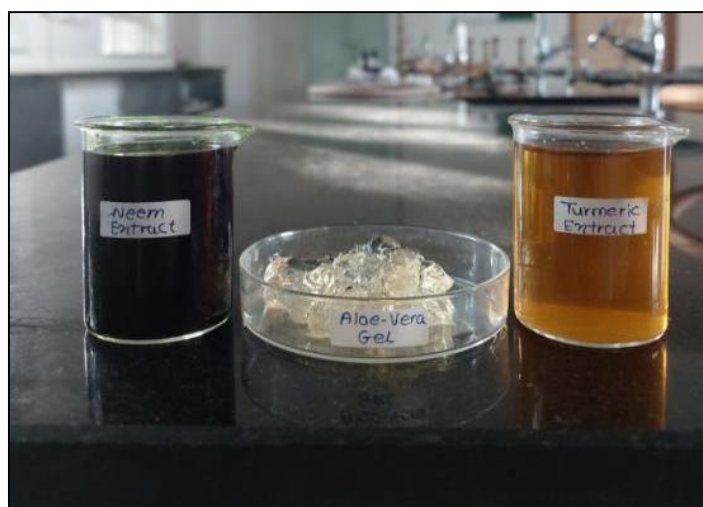


Figure 3 Preparation of Herbal Extract (Neem Extract, Aloe Vera Gel and Turmeric Extract)

2.4. Preparation of Herbal Face wash

- First add required quantity of Xanthan gum put in rose water for overnight in a beaker.
- In second beaker, aloe vera gel, glycerin, honey and few drops of lemon juice mix it.
- Transfer second beaker mixture (aloe vera gel + glycerin +honey +few drops of lemon juice) into to rose water mixture (Xanthan gum +Rose water)
- Mix the two, mixtures are together.
- Then add the Neem extract and Turmeric extract to above mixture, Mix it properly, finally add sodium lauryl sulfate to the above mixture. Mix it properly to make viscous Herbal Face wash. [4, 5, 12]

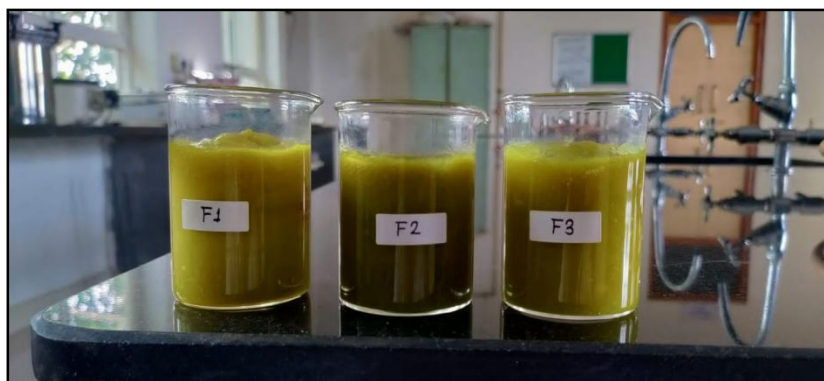


Figure 4 Formulation of Herbal Face Wash

2.5. Composition of Herbal Face Wash

Table 2 Formulation Table

| Sr. No. | Name Of Drug | F1 | F2 | F3 | Uses |
|---------|-----------------------|---------|---------|---------|------------------------------------|
| 1. | Neem Extract | 4 ml | 4.5 ml | 3 ml | Anti-bacterial property |
| 2. | Turmeric Extract | 3 ml | 2 ml | 2.5 ml | Anti-inflammatory, Anti-tanning |
| 3. | Aloe vera gel | 5 gm | 6 gm | 5 gm | Anti-pigmentation properties |
| 4. | Honey | 3 ml | 5 ml | 3 ml | Antioxidant and Nourishing agent |
| 5. | Lemon juice | 5 drops | 6 drops | 6 drops | Natural cleanser and pH adjuster |
| 6. | Glycerin | 5 ml | 5 ml | 4 ml | Moisturizer |
| 7. | Xanthan gum | 0.25 gm | 2 gm | 2 gm | Thickening agent and stabilizer |
| 8. | Rose water | 100ml | 100ml | 100ml | Cooling and flavoring agent |
| 9. | Methyl paraben | 0.02 gm | 0.02 gm | 0.02 gm | Preservative |
| 10. | Sodium lauryl sulfate | 2 gm | 2 gm | 2 gm | Foaming agent |

2.6. Evaluation parameters

1. Physical evaluation: Physical parameters, such as color, appearance and consistency, are examined for people with visual Impairment
2. Wash-ability: The product will be painted by hand and was observed under running water.
3. P^H test: Using a digital pH meter calibrated at constant temperature, the pH of 1% of the hydro transpiration is calculated.
4. Cleansing test: The Facial Residue Test's white surface displays all residue on facial skin by pressing the whole test area of the test strip onto the facial skin for 3 to 5 seconds. Within seconds the residue test will show how effective your cleanser has worked – even better than any competitive product.
5. Stability test: Place the product at -10°C for 24 hours and place it at room Temperature (25°C) for 24 hours. This completes one cycle. If the product passes three cycles then you can have a good degree of confidence in the stability of the product. An even more rigorous test is a -10°C to 45°C five cycle test.
6. Foam-ability: Shaking Tube Method – 40 ml of Surfactant solution was taken in a 100 ml measuring cylinder. The solution was vigorously shaken by hand. The amplitude of shaking was around 5 cm while the frequency of shaking around 3 Hz. The maximum foam height gave the foaming ability.
7. Spread-ability: Spread-ability indicate the limit of the area in which the gel spreads easily on the skin or the affected part. The biological availability of the functionality to create a gel also depends on the value of the

extension. By slides spread-ability two seconds, put the second slide to slide out of jail, it shows below a certain weight. Reduce the time needed to separate the two slides, a good spread-ability.

8. Viscosity: Viscosity checked by Brookfield viscometer
9. Grittiness: The product was checked for the presence of any gritty particles by applying it on the skin. [4, 5, 11, 12]

3. Results and discussion

The turmeric, aloe Vera, neem, honey, lemon juice, containing face wash was showed multipurpose effect. The face wash was formulate and evaluated for color, odor, pH, spread ability, wash ability, grittiness, foam-ability and obtained results are given in table no.3. Formulation F3 is better than F1 and F2 because it has good spread-ability, was-ability, grittiness, foam-ability, pH is neutral and face wash is in semi liquid form so that it can be easily pour into the container.

Table 3 Evaluation Table

| Test | Formulation F1 | Formulation F2 | Formulation F3 |
|----------------|-------------------|-------------------|-------------------|
| Color | Yellowish | Green | Light Green |
| Odor | Pleasant | Pleasant | Pleasant |
| Texture | Smooth | Smooth | Smooth |
| Spread-ability | Easily Spreadable | Easily Spreadable | Easily Spreadable |
| Wash-ability | Easily Washable | Easily Washable | Easily Washable |
| Foam-ability | 2.4 ml | 2 ml | 3 ml |
| pH | 6 | 7 | 6 |
| Viscosity | 1450 | 1560 | 1660 |
| Grittiness | No Grittiness | No Grittiness | No Grittiness |

4. Conclusion

By using Aloe Vera gel, Neem, turmeric, honey, and lemon juice the face wash showed a multipurpose effect and all these herbal ingredients showed significant different activities. Based on results and discussion, the formulation were stable at room temperature and can be safely used on the face. It is use to remove acne as well as promote healing, softening of skin .The extract of *Azadirachta indica*, *Curcuma longa* has anti-acne activity.

Compliance with ethical standards

Acknowledgments

I would like to acknowledge and give my warmest thanks to my guide Prof .Bhavana Tambe who made this work possible. Her guidance and advice carried me thorough all the stages of my project. I would also like to thank Dr.Y.V.Ushir Sir and SMBT Institute of Pharmacy for providing me facilities.

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Author's Contributions

- Conception, design and writing of the work: Ms.Surabhi V.Gandole
- Drafting the article: Ms. Bhavana D.Tambe
- Critical revision of the article: : Ms.Surabhi V.Gandole
- Final approval of the version to be submitted - All named authors should approve the paper prior to submission: : Ms.Surabhi V.Gandole, Ms. Bhavana D.Tambe

References

- [1] S.B.Gokhle, C.K.Kokate, A.R. PUROHIT Pharmacognosy: study of crude drug. Nirali publication, pp75-80,
- [2] Dr.K.R.Khandelwal, Dr.Verunda Sethi volume 2 pharmacognosy practical book
- [3] T. L. Takale, A. S. Surwase, A review on herbal face wash Volume 11, Issue5, 2023 | ISSN: 2320-2882
- [4] Ankita Sehgal, Maneesh Banyal, formulation and evaluations of anti acne face wash Volume-9,Issue-2,2023 IJARIE-ISSN(O)-2395-4396
- [5] Vishal Prajapati, Shashikant Maury, formulation and evaluation of anti-acne herbal face wash Volume 8, pp: 518-523 ISSN: 2249.7781
- [6] Rahul Phate, human anatomy and physiology book: study of skin pharm career publication pp: 15-18.
- [7] Bruna De Monaco Lopes, Vinicius Lopes Lessa, Xanthan gum: properties production, quality and economic preservatives Vol. 54, 2015, No. 3, pp.185–194 ISSN 1336-8672
- [8] Prajakta Dondre, Ravindra Bakle, An overview on herbal cosmetics and cosmeceuticals article 15, pp: 75-78 ISSN 0976-044X
- [9] Jogdand Rutuja, Prof.S.A.Ghadge, Dr.Santosh Jain Formulation and Evaluation of Turmeric and Aloe Cold Cream Volume 8, Issue 6 June 2023 |ISSN: 2456-4184
- [10] Mangal pawar Mounds, Miss S.S.Shete, Preparation and Evaluation of Herbal Turmeric Cream Volume 10 Issue 1 | ISSN: 2349-6002
- [11] R. M. Mehta Pharmaceutics-2 Book
- [12] Dnyaneshwar S. Solanki, Suraj Dattatray SAGRULE Formulation, Development and Evaluation of Instant Whitening Face wash Volume 9, Issue 5, 2541-2557. ISSN 2277– 7105
- [13] O. Prapapan, C. C. Chatchavarn Classification of Acne: An Evidence-Based Review of the Literature Volume: 14, pp: 38-43 Publisher ID: TODJ-14-38.