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Formulation and Evaluation of Face Wash by Using Antiacne Agent

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Abstract

Formulation and evaluation of face wash by using anti acne agent shows that the prevention of acne using aloe vera, Neem, Turmeric oil, etc. by extraction method of leaves and also phytochemical studies shows presence of alkaloids, flavanoids, terpenoids, glycosides, saponins, tannins etc. The overall study concludes that the importance of skin health and function of herbal formulation in skin-care regimen, notably in treating acne. Herbal skin care products can provide natural alternatives to synthetic treatment, promoting healthy and bright skin.

Keywords: Face Wash, Flavonoids Content, Skin-Care Regimen, Bright Skin

1. INTRODUCTION

1.1. Acne

Acne is a skin ailment caused by the clogging of hair follicles with oil, dirt, or dead skin, resulting in whiteheads, blackheads, cysts and pimples. Pimples emerge as red spots with a white centre when blocked hair follicles become inflamed or infected with microorganism. Acne may be classified as Comedonal, Papula, Pustular, Cystic and Nodular.^[1]

1.2. Types of Acne:

1.2.1. Acne rosacea

- Rosacea is more common in middle aged women.
- A disorder that causes facial redness & small, red, pus-filled pimples.
- It might be confused with acne or other skin diseases. The blood vessel in the face widens in this disease, resulting in a flushed appearance.

1.2.2. Acne vulgaris

- Acne vulgaris is a very prevalent skin [pilosebaceous unit] condition that affects almost everyone at some point in their lives.
- Acne is most common in teenagers, but it also affects a significant number of men & women between the ages of 20 to 30 years.^[2]

Acne symptoms: -

- a. Whiteheads (non-inflammatory)
- b. Blackheads (non-inflammatory)
- c. Papules (inflammatory)
- d. Pustules (inflammatory)
- e. Cystic Lesions (inflammatory)

f. Nodules (inflammatory)

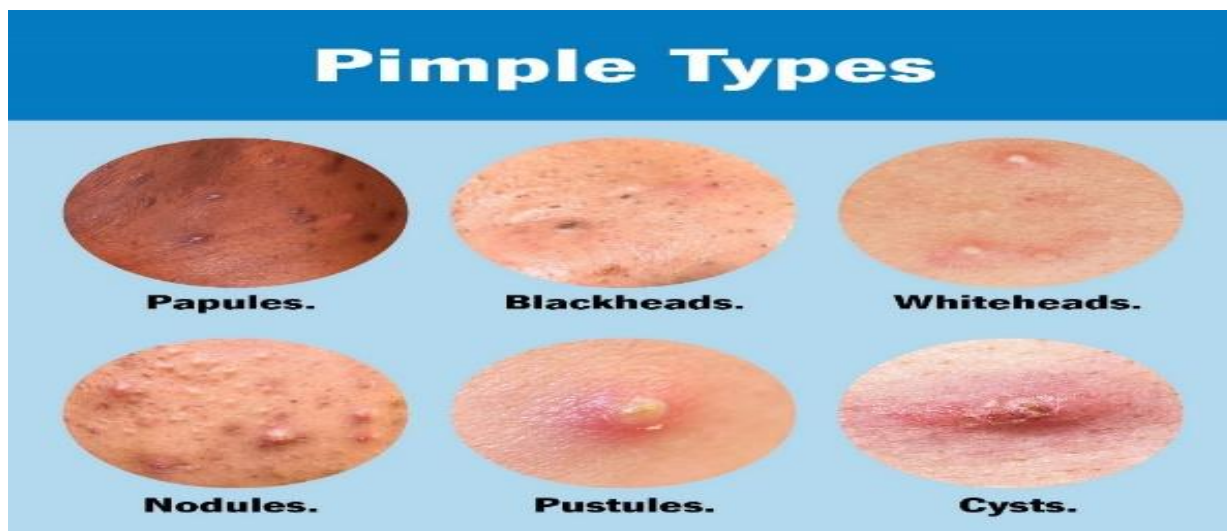


Fig. No 1. Symptoms of Acne

2. Face Wash

A facial cleanser (face wash) is an essential skincare product in everyone's daily skincare routine. Face washes unclog pores by eliminating dead skin cells, dirt, oil, sweat, sebum, makeup and other pollutant from your skin. Instead of regular soap we use a face wash to cleanse our faces. Ordinary soaps might promote moisture loss in the delicate skin on the face. It should be stable and appealing in appearance. It should soften when applied the skin and spread easily without dragging. It shouldn't be oily. Application leaves a greasy feeling.^[3]

2.1. Advantages of Face wash

- Prevention of acne (Acne prevention)
- Slower wrinkle development
- Removal of dead skin cells
- They also provide nutrients to all skin types
- They improved blood circulation.^[4]

2.2. Properties of Face wash

- Cleanser containing herbs and botanicals are recommended for oily skin since they clear the pores and minimize oil buildup.
- It should spread easily and not drag.
- A decent face cleanser should be stable and appealing to the eye.
- A thin emollient film should remain on the skin after application. ^[5]

3. PLANT PROFILES

3.1. ALOE VERA

Synonym: - Aloe Africana, Aloe barbadensis.

Botanical Name: - It is obtained from dried juice of leaves of Aloe barbadensis miller.

Family: - Liliaceae

Chemical constituents: - Aloin, Aloe-emodin.

Uses: Hydrating agent & Anti-wrinkle. It is a reliable source for the treatment of bacterial and fungal diseases.



3.2. NEEM

Synonym: - Neem leaves

Botanical Name: - It is obtained from dried leaves of Azadirachta indica.

Family: - Meliaceae

Chemical constituents: - Nimbin & Nimbanene, Nimbolide, Ascorbic acid.

Uses: - Antibacterial & highly beneficial for oily and acne prone skin.



3.3. TURMERIC OIL

Synonym: - Haldi, Turmeric, Haridra

Botanical Name: - It is obtained from dried rhizome of *Curcuma longa*.

Family: - Zingiberaceae

Chemical constituents: - Curcumin, Essential oil

Uses: - Antifungal & it protects the skin from many infections.

Hydrates the stratum corneum of the skin.



3.4. PEPPERMINT OIL

Synonym: - Mint, Brandy mint.

Botanical Name: - It is obtained from dried leaves of *Mentha piperita* L.

Family: - Labiatae.

Chemical constituents: - Menthone & menthol

Uses: -Antibacterial, cool skin & scalp.



3.5. HONEY

Synonym: - Madhu, Shahad

Botanical Name: - Honey is a sugar secretion deposited in honey comb by the bees, *Apis mellifera*, *Apis dorsata*.

Family: - Apidae

Chemical constituents: - Glucose, Fructose, Protein.

Uses: - Sweetener & Antioxidant.



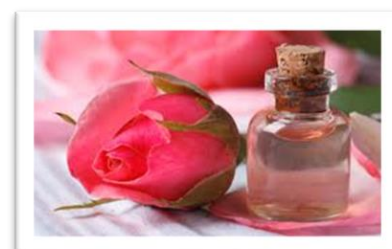
3.6. ROSE WATER

Botanical Name: - *Rosa damascena*

Family: - Rosaceae

Uses: - Balances natural oils in the skin

Natural Hydration, it has antioxidant properties.



3.7. LEMON JUICE Fig No.8 Lemon Juice

Botanical Name: - Lemon is the fruits obtained from *Citrus limon*.

Family: - Rutaceae

Chemical constituents: - Vitamin C, Citric acid, Tannins.

Uses: - Natural pH adjuster^[6]



4. MATERIAL AND METHOD

4.1. Collection of herbs: - Leaves of neem, turmeric oil, aloe vera, peppermint oil, honey, lemon juice, glycerin, rose water, retha, carbopol 934 were collected from the local area.^[7]

4.2. Extract preparation: - 15 grams of leaves were weighed and placed in the thimble of a Soxhlet extractor. Fill the Soxhlet extractor with 150 ml of water measured using a cylinder. After coupling the device, a condenser unit was linked to an above water tank to collect increasing solvent vapor. The heat source was a heating mantle at 68°C. The solvent evaporated in the distillation path, thimble, and expansion adapter, then condensed in the Soxhlet extractor's condenser unit. The condensed vapor returned to the thimble as liquid droplets, coming into contact with the sample inside. After extraction, the extractor was removed and the extract was collected. After extraction, the liquid was discharged into a condenser to separate solvent from oil extract. The mixture was distilled at 68°C until the neem oil extract was totally solvent-free.



Fig No. 2 Soxhlet apparatus

4.3. Phytochemical test for Neem

These tests are used to detect the presence of various functional groups, which is indicative of type of phytochemical present in the plant.

Test for Alkaloid

Mayer's test: - To a Few drops of Mayer's reagent added 3ml of extract. Cream coloured precipitate indicate presence of alkaloid.

Test for Carbohydrate

Molisch test: - To 2-3 ml of the test solution, add few drops of molisch reagent solution and shake it. Then add Conc. sulphuric acid from sides of test tube. Voilet ring should be formed at the junction of two liquids. ^[13]

Test for Flavonoids

Lead acetate test: - To small quantity of extract, lead acetate solution was added. Yellow coloured precipitate formation shows presence of flavonoids.

Test for Amino acid

Ninhydrin test: - To the heated 3ml of test solution add 3 drops of 5% Ninhydrin solution and boil for 10 minutes. Purple or bluish colour appear. ^[14]

Test for Steroids or Terpenoids

Add 2ml of extract, 2ml of chloroform and 2ml of concentrated sulphuric acid. It was shaken well. Chloroform layer appeared red and acid layer showed greenish yellow fluorescence.

Test for Glycosides

Killer killani test: - To the test solution few drops of Ferric chloride solution and conc. Sulphuric acid was added formation of two layer occur, lower layer of reddish-brown colour and upper layer of bluish green colour. ^[15]

Test for Saponin

Foam test: - The drug extracts were vigorously shaken with water. Persistent foam formation indicates presence of saponin.

Test for Tannins

To 1ml of extract, ferric chloride solution was added and formation of dark blue or greenish black colour shows the presence of tannins. ^[16]

4.4. Preparation of formulation

1. To start, different formulation batches were made, as shown in table.
2. After that, it was let to soak in hot rose water for the entire night (not to exceed 60⁰ C,50% of the batch size).
3. The appropriate quantity of honey and the required amount of lemon juice were blended together with gentle swirl.
4. After adding the appropriate quantity of concentrated herbal extracts to the leftover rose water, the honey mixture above was carefully blended.
5. This was finally combined with the gel mixture that had been soaked earlier.
6. Formulations were produced, filled the right container, and tested for effectiveness.

Table No. 1 Composition of Antiacne Herbal Facewash

Sr. No.	Ingredients	Quantity		
		F1	F2	F3
1.	Aloe vera	2ml	5ml	10ml
2.	Neem Extract	2ml	5ml	10ml
3.	Turmeric oil	0.4ml	0.8ml	2ml
4.	Peppermint oil	0.2ml	0.8ml	2ml
5.	Honey	2ml	5ml	10ml
6.	Carbopol 934	0.2g	0.5g	1g
7.	Lemon juice	2ml	5ml	10ml
8.	Glycerine	2ml	5ml	10ml
9.	Rose water	q. s	q. s	q. s
10.	Retha	q. s	q. s	q. s
11.	Methyl paraben	q. s	q. s	q. s



Fig No. 3 Formulation of Antiacne Herbal Facewash

5. EVALUATION TEST

The produced formulation was subjected to in-vitro testing.

a. Physical Appearance

Color: The color of the face wash was examined visually.

Odour: Smelling the formulation was used to assess its odour.^[17]

b. pH Determination

A digital pH meter was used to determine the pH of the mixtures. For two hours, one gram of face wash was dissolved in 100ml of demineralized water. The pH of each mixture in triplicate. Before use, the instrument was calibrated with standard buffer solutions at 4, 7 and 9.^[18]

c. Viscosity Determination

Viscosity of the face wash was determined using Brookfield viscometer.

d. Irritancy Test

Mark a 1 sq.cm mark on the left dorsal surface. A specific amount of prepared face wash was applied to the designated region, and the time was reported. Irritation, redness and edema were assessed and reported at regular intervals up to 24 hours.^[19]

e. Washability Test

The product was put to the hand and watched while flowing water.^[20]

f. Consistency

Consistency refers to the state of a product when applied to the skin.

g. Foamability

A small amount of face wash was placed in a beaker filled with water. The initial volume was recorded, the beaker was shaken ten times and the final volume was recorded. The foamability of the product was also tested by applying it to the skin while it was in contact with water.^[21]

h. Grittiness

By putting it to the skin, the product was tested for the presence of any gritty particles.

i. Spreadability

Spreadability is determined using Spreadability testing equipment. It is made up of a wooden block with a pulley at one end. The Spreadability was assessed using this method on the basis of 'slip' and 'Drag' placed on the ground slide, the face wash was sandwiched between the slide load of 1 kg was held on slab so that gel spreader without air bubbles and excess face wash was scraped off. Spread ability was then calculated by using formula

$$S=M \times L/T$$

Where,

S=Spreadability,

L=length move by glass slide

M=weighting the pan

T= Time taken to separate the slide completely from each other.

j. Stability studies

Stability testing of prepared formulation was conducted for most stable formulation at room temperature studied for 7 days.

Microbiological Content Testing

In the laboratory, nutritional agar was made aseptically by dissolving 28g of dried nutrient agar foundation medium in 800ml of distilled water. The mixture was then boiled in a water bath until the agar melted, after which the solution was sterilized in an autoclave. The prepared medium was used for plate preparation throughout the study. Place these petri plates in the refrigerator for 10 minutes before incubating at 37°C for 24 hours. The Antimicrobial agent diffuse through the agar surrounding its cup, forming a distinct zone of inhibition or bacterium susceptible to the sample. The diameter can be measured. These methods were used to assess microbial growth with Staphylococcus aureus as the bacteria and nutrient agar as the culture medium. [22,23]

6. RESULT AND DISCUSSION

Table No. 2 Phytochemical analysis of neem extract

Sr. No.	Class of Compounds	Result
1.	Alkaloids	Positive
2.	Carbohydrates	Negative
3.	Flavonoids	Positive
4.	Amino acid	Positive
5.	Terpenoids	Positive
6.	Glycosides	Negative
7.	Saponins	Positive
8.	Tannins	Negative

Evaluation Studies

Table No. 3 Evaluation Parameters

Sr. No.	Parameters	Inference		
		F1	F2	F3
1.	colour	Dark green colour	Dark green colour	Dark green colour
2.	odour	Pleasant	Pleasant	Pleasant
3.	pH	5.6	5.4	5.9
4.	Irritancy	No irritation	No irritation	No irritation
5.	washability	Good	Good	Good
6.	Consistency	Semi-solid	Semi-solid	Semi-solid
7.	Foamability	Good	Good	Good
8.	Grittiness	No gritty particle	No gritty particle	No gritty particle
9.	Spreadability	1.207 g.cm/sec	2.192 g.cm/sec	1.538 g.cm/sec
10.	Viscosity	1533.3 cp	1656.0 cp	1598.4 cp
11.	Stability test	Normal	Normal	Normal

Table No. 4 Microbiological Control Test

Sr. No.	Parameter	Zone of Inhibition	Result
1.	Antibacterial Activity	Zone of Inhibition Observed Diameter of Zone: 12mm	Antibacterial Activity Present

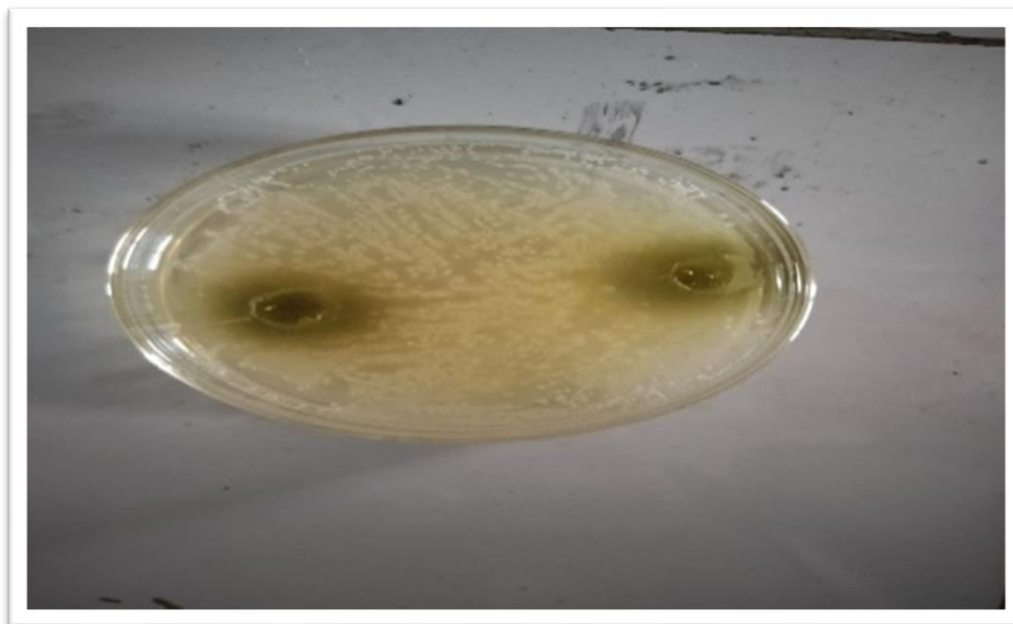


Fig No. 4 Antimicrobial Activity

7. CONCLUSION

We can conclude that the importance of skin health and the function of herbal formulations in skincare, notably in treating acne. Following significant literature analysis and experimentation, it is clear that herbal components such as neem, turmeric, and aloe vera have potent therapeutic qualities useful to skin health. We have three formulation F1, F2 and F3 upon comparing all three formulation F3 is better than other two. F3 formulation have good appearance, odour, cleansing, Spreadability and foaming property. It did not give harshness and skin irritation. Herbal skincare products can provide natural alternatives to synthetic treatments, promoting healthy and bright skin.

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