

A Research Article on Formulation and Evaluation of Antiacne Herbal Face Wash

Rutuja V. Dalavi¹, Manali V. Gharat², Aniket R. Chikane³, Amit A. Dound⁴, Prof. Kajal A. Walunj⁵

Student, Samarth Institute of Pharmacy, Belhe, Pune, India^{1,2,3,4}

Assistant professor, Samarth Institute of Pharmacy, Belhe, Pune, India⁵

Abstract: *Now days consumption of herbal medicines has expanded many folds a report of side effects observed with standard drugs. Herbal face wash was produce from fresh herbs or fresh fruits to enhance the skin and improve beauty. In the world, increases the need for utilization of herbal medicines. Acne is a chronic inflammatory situation of skin that give rise to pimples and spots, on the face, shoulders, back, neck, chest, and upper arms. In this work, different aims were produce to development and evaluation of the herbal anti-acne gel containing extract of root of radish (*Raphanus sativus L.*), turmeric is a antibacterial agent, sandal wood as flavoring agent, lemon juice as a preservative, honey as humectant through to make pure herbal formulation. The plants have been described in literature having good anti-acne, anti-microbial, anti-oxidant, antiseptic, and anti-inflammatory activity. Prepared formulation was evaluated for numerous parameters like colour, appearance, pH, stability studies, biological activities. It was very great attempt to begin the herbal anti acne face wash contain extracts of herbal products.*

Keywords: Herbal medicines, *Raphanus sativus L.*, Anti-acne activity, Anti-microbial, anti-oxidant.

I. INTRODUCTION

India's herbal medication industry is perhaps the world's oldest medical care system. The Vedas, an ancient sacred text of the Indian people, make reference to an ancient kind of herbal medicine because the history of herbs in ancient India is so old. Ayurveda and Unani, two ancient herbal medicine systems, deal with the use of herbs and natural materials to treat health problems. Even while it can seem that herbal remedies are something new to western healers and doctors, the majority of prescribed medications still contain plant extracts.

1.1 Acne

Acne is the most prevalent skin ailment, affecting nearly everyone between the ages of 14 and 30 Acne vulgaris is the most common type, which is caused by inflammation of the sebaceous glands on the face, chest, and back. It is defined by the formation of one or more of the following: Scarring, come done, papule, pustule, nodule, sebaceous cyst.

1.2 Acne etiology can be divided into four categories:

- Follicular keratinization and desquamation abnormalities,
- Excessive sebum secretion
- Propionibacterium acnes proliferation in the follicle, followed by secondary infections, and
- Inflammation as a result of this Both humoral and cell-mediated mechanisms are implicated in immune responses. Acne isn't considered a contagious disease. Only those bacterial strains that can colonise normal skin as resident flora are capable of causing acne. As a result, only three microorganism species, Propionibacterium, Staphylococcus, and Escherichia species, can be responsible for the development/worsening of acne.

1.3 Acne is caused by a variety of factors:

Some of the risk factors that may impact the development of acne are listed below.

- Hormonal changes produced by puberty or pregnancy are treated.
- Medications like birth control pills and corticosteroids.
- A high-refined-sugar or high-carbohydrate diet, such as bread and chips.

- These hormones can cause an increase in oil production, which can lead to acne.
- Hormonal acne associated with puberty normally fades as a teenager grows older.
- Whiteheads, blackheads, tiny bumps, nodules, and cysts are all examples of acne lesions.

1.4 Face Wash

Acne prevention necessitates a delicate balance of moisturising and oil control, exfoliation and cell renewal, and is a must-have in any skincare regimen, acne or otherwise. Wash your face two times in a day, once in the morning and once at night. This aids in the removal of debris, germs, and sebum that clog pores and cause skin to seem murky or pimple-prone. Facewash might help you get rid of pimples. Some are designed to prevent acne while also reducing lines and wrinkles, while others are designed to simply wash the skin. Face wash properties: It should be stable and have a pleasing appearance. It should soften on application to the skin and spread freely without dragging. It should not have an oily or greasy feel during application.

A. Properties of face wash

- It should be stable and have a pleasing appearance.
- It should soften on application to the skin and spread freely without dragging.
- It should not have an oily or greasy feel during application.

B. Function of Face wash

Face wash has the following functions:

- Removing dead cells
- Rejuvenating skin cells, elevating tension, and
- Removing oil, grime, and pollutants.

C. Face wash benefits include:

- Removing dead skin cells, which allows new skin cells to replace old ones;
- Keeping skin fresh and healthy; and
- Making the skin look beautiful.

Dead skin cells and excess oil block pores, resulting in acne white heads, blackheads, and an overall tired appearance. All of the above skin issues can be avoided by exfoliating the pores on a regular basis. By removing dead skin cells, your skin will age more slowly and develop wrinkles at a slower rate. The goal of this study is to create several herbal formulations for treating acne by using locally accessible plant herbs to make anti-acne facewash. Based literature review this plants are having anti acne, anti oxidant, antiaging and anti microbial properties.

II. MATERIAL AND METHOD

Table 1: Ingredient Profile

Ingredient	Biological Source and Family	Use of Plant
Radish root	It is obtained from roots of <i>Raphanus sativus</i> L. belongs to family Brassicaceae.	It has Anti-acne property
Turmeric powder	It is obtained from dried rhizomes of <i>Curcuma longa</i> belongs to family Zingiberaceae	It has Antibacterial property. It is also used preservative.
Sandalwood powder	It is obtained from heartwood of the stems and <i>Santalum album</i> Linn. belongs to family Santalaceae.	It is used as a flavouring agent. It is used in the treatments of acne.
Aloe vera gel	It is obtained from dried <i>Dried latex of aloe leaves</i> . belongs to family Liliaceae.	It has moisturizing property.
Lemon juice	It is obtained from lemon juice of <i>Citrus limon</i> belongs to family Rutaceae.	It is used as preservative. It used to enhance the skin brightness. It is used as antiaging agent.
Honey	It is produce from the bees <i>Apis mellifera</i> belongs to family Fabaceae.	It is used as humectant. It is used in the removal of dead skin cells and removes the black spots.

2.1 Preparation of Herbal Anti Acne Face Wash

A. Preparation of Herbal Extract

- Washing and peeling radishes are steps in the radish selection process.
- After cutting the cubes, place them in 1000ml distilled water and continue to boil for 60 minutes. (Decoction technique).
- After 60 minutes, let it cool to room temperature before filtering.

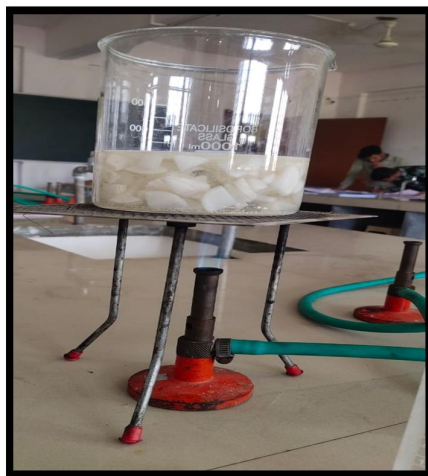


Fig 1. Extraction of Radish

2.2 Preformulation Study of Radish Extract

Test	Procedure	Observation
Carbohydrates	Molish Test: 2ml of solution was placed in a test tube. 1 drop of Molish Reagent was added. 2 ml of conc. HCl was added from the sides of test tube.	A violet ring at the junction of the two liquid indicates presence of carbohydrates.
Proteins	Millons Test: To 2 ml of filtrate few drops of Millon's reagent are added. The result was observed.	A white precipitate indicates presence of protein.
Phenolic compounds	Lead Acetate Solution: To 2-3 ml of aqueous extract add few drops of lead acetate solution.	A white precipitate indicate presence of phenolic compound.
Vitamins	Test for Vitamin C : To 2 ml of a 2% w/v solution add 2 ml of water 0.1 g of sodium bicarbonate and about 20 mg of ferrous sulphate, shake and allow to stand a deep violet colour is produced. add 5 ml of 1 ml sulphuric acid,	The colour disappeared indicated test as positive
Alkaloids	Mayers Test: To 1 ml of filtrate, few drop of Mayer's reagent are added by side of the test tube.	The white or creamy precipitate indicated test as positive.

Table 2: Pre-formulation study of radish extract

Development of Formulation

- The necessary amount of gelling ingredient, xanthan gum, was carefully weighed and distributed in rose water with moderate stirring to avoid air entrapment, then left to soak overnight.
- By gently swirling, the necessary amount of lemon juice was dissolved in the desired amount of honey.
- A desired amount of concentrated herbal extracts was added to the leftover rose water and gently combined with the honey combination above.
- Finally, this was combined with the previously soaked gel mixture.
- The prepared formulations were placed in an appropriate container and labelled.

Composition of Anti-Acne Herbal Face Wash

Sr. No.	Ingredient	Quantity [20 ml]
1	Radish Extract	2 gm
2	Turmeric	0.4 gm
3	Sandal wood	0.4 gm
4	Citric juice	0.4 gm
5	Aloe vera	0.4 gm
6	Honey	0.4 gm
7	Xanthan gum	0.4 gm
8	Sodium lauryl sulphate	0.4 gm
9	Rose water	Q. S.

Table 2: Composition of Anti-Acne Herbal Face Wash

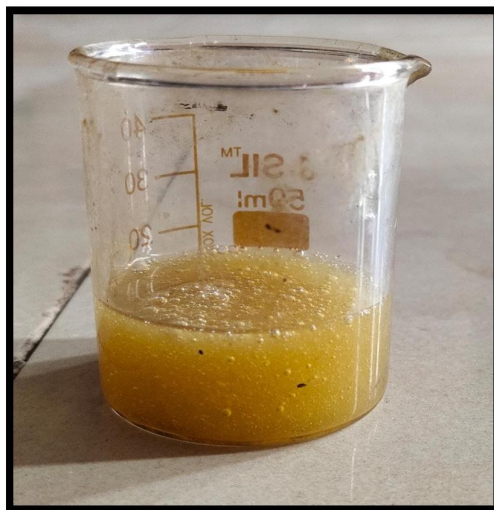


Fig. 2 Formulation of Antiacne Herbal Face Wash

III. EVALUATION TEST

3.1 Organoleptic Evaluation

1. **Color:** The formulation's colour was tested against a white background.
2. **Odour:** The odour of the formulation was assessed by sniffing it.
3. **Homogeneity:** After the development face wash has been placed in the container, it is visually inspected for homogeneity. They are examined for the appearance of aggregates and the presence of any.

3.2 Physical Evaluation

1. **pH:** Within 24 hours of preparation, the pH was tested using a digital pH metre.
2. **Washability:** Formulations applied to the skin were physically evaluated for their ability to be easily removed by washing with water.
3. **Foamability:** A small amount of gel was placed in a water-filled beaker. The initial volume was recorded, after which the beaker was shaken 10 times and the final volume was recorded.
4. **Spreadability:** On this ground slide, 2 gm of the gel under investigation was deposited. The formulation was placed between this slide and a second glass slide with the same dimensions as the fixed ground slide. The hook is included with the second glass slide. For 5 minutes, a weight of 500 mg was placed on top of the two slides to expel air and establish a homogenous gel coating between the two slides. The weight was measured and deposited in the pan, which was then hooked to the pulley. The top slide's time (in seconds) to cover a distance of 5 cm was recorded. Shorter interval suggests a higher coefficient of spreading. The synthesised gel's spreading coefficient was compared to that of a commercial face wash.
5. **Skin irritation test:** An irritant skin test is performed by putting the substance to the skin for 10 minutes. If there is no irritation, the product is deemed non-irritating.
6. **Stability Test:** The physical stability of the formulations was studied by placing in plastic containers and they were placed in a humidity chamber at 45 degree Celsius and 75% relative humidity. Their appearance and physical stability were inspected per a period of 3 months at interval of one month.

3.3 Biological Activities

In pharmacology, biological or pharmacological activity refers to a drug's positive or negative effects on living matter. Biological activity refers to a molecular entity's ability to have a certain biological effect on a target.

1. **Antimicrobial activity:** Antimicrobial activity is a broad phrase that encompasses all active principles (agents) that impede bacterial development, prevent the formation of microbial colonies, and may even kill

microorganisms.

2. **Antifungal activity:** An antifungal medicine, also known as an antimycotic medication, is a fungicide that is used to treat and prevent mycosis such as ringworm, candidiasis, and other fungal infections.

IV. RESULT AND DISCUSSION

4.1 Preformulation Study of Radish Extract

The result of Preformulation study of radish extract was listed below in table No. 3. It indicates that presence of Carbohydrates, Proteins, Phenolic compound and Vitamins.

Table 3 Preformulation Study of Radish Extract

Sr. No.	Test	Result
1	Carbohydrates	+
2	Proteins	+
3	Phenolic compounds	+
4	Vitamins	+
5	Alkaloids	-

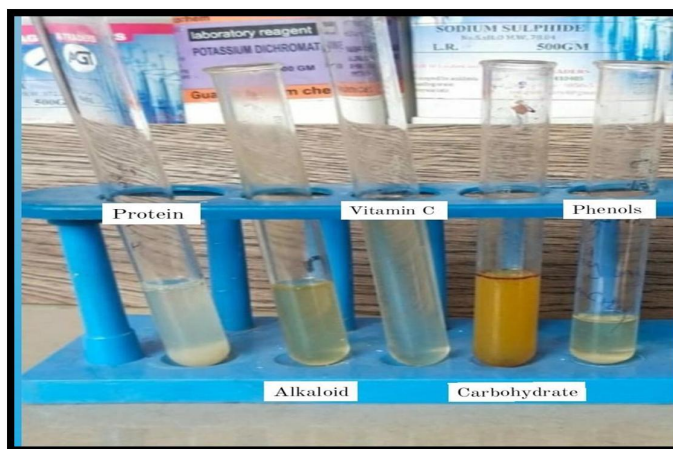


Fig 3. Preformulation test of Radish Extract

4.2 Evaluation Test

Organoleptic Evaluation

Herbal face wash was evaluated by organoleptic evaluation are listed below in table no. 4.

Table 4 Organoleptic Evaluation

Sr. No.	Evaluation tests	Result
1.	Colour	Yellowish colour
2.	Odour	Characteristic sandal odour
3.	Homogeneity	Normal

4.3 Physicochemical Evaluation

Herbal face wash was evaluated by physicochemical evaluation are listed below in table no. 5.

Table 5 Physicochemical Evaluation

Sr. No.	Evaluation tests	Result
1.	pH	5.3
2.	Wash ability	Good
3.	Foaming ability	Good
4.	Spread ability	Good
5.	Skin irritation test	No
6.	Stability test	Normal

Biological Activities

Cup-plate agar diffusion method using Nutrient agar. In this technique, Petri dishes of agar are prepared by pouring melted agar media previously incubated with selected microorganism i.e. *Staphylococcus aureus* (for antimicrobial activity) and *Candida albicans* (for antifungal activity). After solidification of agar cups are made with the help of borer and cup are filled with a solution of suitable concentration of sample and standard respectively. Take this Petri plates in the refrigerator for 10 minutes and then incubate at 37°C for 24 hrs. The antimicrobial and antifungal agent diffuses through the agar around its cup and produces a characteristic zone of inhibition of the microorganism sensitive to the sample. The diameter of which can be measured.

Table 6 Biological Activity

Sr No.	Parameter	Zone Of Inhibition	Result
1.	Antibacterial Activity	Zone of Inhibition Observed Diameter of Zone : 25 mm	Antibacterial Activity Present
2.	Antifungal Activity	Zone of Inhibition Observed Diameter of Zone : 23 mm	Antifungal Activity Present



Fig. 4 Antibacterial Activity



Fig. 5 Antifungal Activity

V. CONCLUSION

Herbal elements have made it possible to make cosmetics without hazardous side effects that can impart the necessary capabilities to heal skin diseases while requiring less space than synthetic products. Natural cures are a godsend for any illness. It is both safe and has fewer adverse effects. Herbal formulations are in high demand on the global market. It's a fantastic endeavour to build the herbal face cleanser with radish extracts. In this study, numerous natural ingredients such as radish, turmeric, sandalwood, citric juice, and aloe vera were used to manufacture herbal anti acne face wash, and the formulations were evaluated for the intended criteria. Physical properties of the polymers used in the formulations were assessed, including colour, smell, and viscosity. Formulations that have been prepared Physical properties such as colour, odour, pH, Spredability, skin irritation testing, and stability studies were assessed. During stability tests, honey produces humectant activity. The spreadability of these preparations is excellent. This mixture is suitable for use as a face wash.

ACKNOWLEDGEMENT

We owe a debt of gratitude to the Rural Education Institutes and Samarth Institute of Pharmacy, Belhe, Pune, for their invaluable advice and assistance.

CONFLICT OF INTEREST

The author declared no conflict of interest.

REFERENCES

- [1]. K. Kameswararao, T.karun Kumar, K.Malleswari, V.Ramya Krishna, P. N. S.S.Satyanarayanamma, M.Sandhyanjali. Formulation and Evaluation of Poly Herbal Anti Acne Face Wash, 2019.
- [2]. Samiksha Yadav, Mansi Gupta, Formulation and Evaluation of Anti-Acne Herbal Face Wash Gel. 2019; 9(4):523-525.
- [3]. Mayur N. Ghotkar, Shubham S. Kharade, Rushikesh S. Chavan, Ranjit S. Jadhav, Nisha M. Jagtap, Ganesh B. Vambhurkar. Formulation and Evaluation of Herbal Facewash for Acne.
- [4]. Shridevi Kuver, Gautam Palshikar. Formulation And Evaluation Of Herbal Antiacne Facewash.
- [5]. Harsharan Pal Singh, Neeraj Samnhotra, Sumeet Gullaiya, Ishpreet Kaur. Anti- Acne Synergistic Herbal Face Wash Gel : Formulation, Evaluation And Stability Studies.
- [6]. P. K. Mane, Aniket Dangare, Herbal Face Wash Gel Of Cynodon Dactylon Having Antimicrobial, Anti - Inflammatory Action.
- [7]. Dhanashri Sanjay Koli Abhyangshree Nandkumar Mane, Vinayak Balu Kumbhar, Kalyani Sanjay Shaha, Formulation & Evaluation Of Herbal Anti-Acne Facewash.
- [8]. Arun Rasheed, G. Avinash Kumar Reddy, S. Mohanalakshmi & C.K. Ashok Kumar, Formulation and comparative evaluation of poly herbal anti-acne face wash gel.
- [9]. Santhosh Kumar Banotha, Formulation and Evaluation of Herbal Facewash for Antimicrobial Activity.
- [10]. Rona Bae1, Young-Kyu Lee, and Seung-Koo Lee, Changes in Nutrient Levels of Aqueous Extracts from Radish (*Raphanus sativus* L.) Root during Liquefaction by Heat and Non-heat Processing, 30(4):409-416, 2012.
- [11]. Huynh Hoang Duy, Pham Thi Kim Ngoc, In Vitro Antifungal Efficacy of White Radish (*Raphanus sativus* L.) Root Extract and Application as a Natural Preservative in Sponge Cake, 2019.
- [12]. Nadia Khan, Abdul Waheed, Farrukh Siyar Hamid, Naveed Ahmed, Zafar Iqbal, Seemab Ali, Madiha Bashir and Hina Gul, Phytochemical Screening and Antibacterial Assay of Radish Seed Oil Phytochemical Screening and Antibacterial Assay of Radish Seed Oil.
- [13]. Chaudhari Urvashi R, Chauhan Jaydeep, Dr. Vyas Jigar, Ghodkar Janhvi, Herbal Radish and Carrot Topical gel.
- [14]. Nitin Yadav, Shashikant Maurya, Piyush Yadav, Manoj Kumar Yadav, Manish K. Maurya, A Review On :- Formulation And Development Of Face Wash.
- [15]. Riya Arora1, Geeta Aggarwal, Gitika Arora Dhingra, Manju Nagpal. Herbal Active Ingredients Used In Skin Cosmetics, Vol 12, Issue 9, 2019.
- [16]. Marta Klimek-Szczykutowicz, Agnieszka Szopa, and Halina Ekiert, Citrus limon (Lemon) Phenomenon—A Review of the Chemistry, Pharmacological Properties, Applications in the Modern Pharmaceutical, Food, and Cosmetics Industries, and Biotechnological Studies.
- [17]. Dhanashri N. Pawar, Arti P. Pawar, Yogita V. Dalvi, Formulation and Evaluation of Herbal Scrub Gel.
- [18]. Chambers HF, Deleo FR waves of resistance : staphylococcus aureus in the antibiotic era. Rev Microbiol, 2009, 7 (9).
- [19]. Mali S.A., Karekar P., Dr. Yadav A.V., "Formulation and evaluation of multipurpose herbal cream", International journal of science and research, 2015.
- [20]. Meena K.R., Pareek A., Meena R.R., "Antimicrobial activity of *Aegle marmelos* (Rutaceae) plant extracts" International journal of Medi Pharm research, 2016; 2.