

FORMULATION AND EVALUATION OF ANTI-ACNE HERBAL FACE WASH

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INTRODUCTION

Face skin is the major part of the body, which indicates the health of an individual. It consists of materials such as amino acids, lipids and carbohydrates etc, so that a balanced nutrition is required for the skin to keep it clear glossy and healthy. In ancient times women are very conscious about their beauty and started to dress themselves because they wanted to increase their own beauty. Even today, people especially in rural areas, and hilly region select the natural remedies like plants extracts for cosmetics purposes like- neem, aloe vera, tulsi, orange rose. Herbal cosmetics are products which are used to purify and beautify the skin.

The main advantage for using an herbal cosmetic is that it is pure and does not have any side effects on the human body men have rough skin and when they don't take sufficient care then the skin turns dark due to over exposure of the sun¹.

Acne vulgaris is an extremely common disorder of skin [pilosebaceous unit] that affects virtually all individuals at least once during life. The incidence of acne peaks at teenage, but substantial numbers of men and women between 20-30 years of age are also affected by the disorder.

Acne may be classified as comedonal, papular, pustular, cystic & nodular. Comedonal acne is noninflammatory & divided into two types: whiteheads & blackheads. White heads (closed comedo) present as fresh or white coloured, raised bumps whereas blackhead (open comedo) present as open pores containing dark coloured skin roughage consisting of melanin, sebum & follicular cells. Papules appear as red, solid, elevated lesions often less than 5mm in diameter. Pustules are circumscribed skin elevations containing purulent material. Cysts & nodules are solid, elevated lesions involving deeper dermal & subcutaneous tissue. Cysts are less than 5 mm in diameter whereas nodules exceed 5mm².

Types of herbal face wash:

There are many types of herbal face washes

- 1) Neem and Tulsi Face Wash
- 2) Sandalwood and Honey Face Wash
- 3) Neem and Tea tree Face Wash
- 4) Orange and Lemongrass Face Wash
- 5) Aloe vera Face Wash ETC.

Advantages of herbal face wash:- The main advantage for using an herbal cosmetic is that it is pure and does not have any side effects on the human body men have rough skin and when

they don't take sufficient care then the skin turns dark due to over exposure of the sun.

Method:-

a) Collection

Leaves of neem were collected from the local area of Balaghat. Fruits of lemon, bulb of *Curcuma longa* and aloe vera were collected from the local market of Balaghat in month of October.



Fig. 1: COLLECTION OF RAW MATERIAL

b. Preparation of extract neem, aloe vera and cucumber

Extracts of lemon, aerial part of Neem, whole plant of aloe vera, bulb of *Curcuma longa* were prepared by Maceration Process or trituration in the mortar pestle.



Fig. 2: EXTRACTION OF NEEM

c. Filtration

Filtration of extract was done by using simple filter paper.

d. Preparation of gel

A small quantity of water was added with preservatives, propylene glycol and sodium lauryl sulphate were dissolved well. To the above solution carbopol was added little by little and

stirred well until a gel like dispersion was obtained. To this the extracts were added one by one to get a complete gel like consistency. Then triethanolamine was added finally¹.

4. DRUG PROFILE

ALOEVERA:

Scientific name:- Aloe vera

Family:- Asphodelaceae

Kingdom:- Plantae

Order:- Asparagales

Rank:- Species

Aloevera is the oldest medicinal plant ever known and the most applied medicinal plant worldwide. Extracts of Aloe vera is a proven skin healer. Aloe vera help to soothe skin injuries affected by burning, skin irritations, cuts and insect bites, and its bactericidal properties relieve itching and skin swellings.



Fig. 3 : PLANT OF ALOEVERA

USES OF ALOEVERA:- Aloe vera is extensively used in beauty products and for good reason. It's got antiviral and antibacterial properties, and the ability to help treat everything from constipation to diabetes. The green-cactus looking plant that sits out in your garden isn't just a plant with its roots in folklore, it's the crux of a million dollar industry that extends from beauty creams to healthy juices and diet supplements. Aloe vera or aloe vera-based products can be used in the winter as well as in the summer and by people of all skin types. Aloe vera treats the cells on the epithelial level of the skin which is why it's recommended by dermatologists to remove tan, treat sunburn and stretch marks. One way to use aloe vera is to apply the gel directly, another would be to make a pack using aloe vera along with some other special ingredients from your kitchen.

a) Aloe vera for dry skin - Take some aloe vera, a pinch of turmeric, a teaspoon of honey, a teaspoon of milk and a few drops of rose water. Blend this mix till you get a paste. Apply it and leave in for about 20 minutes or so.

b) Aloe vera scrub - Grab half a cup of fresh aloe vera gel, a cup of sugar and two tablespoons of lemon juice. The sugar will help exfoliate and scrub off dead skin, the aloe vera will deep clean the skin and the lemon will help fade out scars and tan. Stir the three ingredients together and use it to scrub both face and body.

c) Aloe vera for acne - Take some aloe vera gel, blended walnuts with a flour like

consistency and honey. Aloe vera's healing properties coupled with the antioxidants from honey will leave you with smooth and clear skin.

d) Aloe vera for sensitive skin - Grab some aloe vera gel, cucumber juice, yogurt and rose oil and blend them to a paste. Apply and leave for around 20 minutes, then rinse it off.

NEEM:-

Scientific name: *Azadirachta indica*

Family: Meliaceae

Higher classification: *Azadirachta*

Rank: Species

Kingdom: Plantae



Fig. 4: LEAVES OF NEEM

Neem is one of the most beneficial species for the mankind. The importance of neem, as a source of medicines and biopesticides, was known for centuries in India. The common name of the neem tree is Margosa and the Sanskrit name of the neem tree is "Arishtha" means "The reliever of sickness" and hence is considered as "sarbaroganibarini".

Neem, botanic name, *Azadirachta indica*, derived from Farsi, "Azad diraklzt-lHind" literally means the "noble or free tree of India" suggesting that it is intrinsically free from pest and disease problems and is benign to the environment.

Neem is known with various common names in Asian countries

Table No. 1: COMMON NAMES OF NEEM.

Country	Common name(s)
India	Limba, Limbo, Neem, Nim, Nimb, Nimba, Verbu, Vepa, Veppam, etc. (more than 100)
Indonesia	Imba, Intaran, Mimbo, Mindi
Iran	Azad-draklzt-l-himli (Free tree of India, Persian), Nib

Malaysia (West)	Mambu
Pakistan	Nimmi
Singapore	Nimbagaha
Sri Lanka	Kohomba
Thailand	Dao, Kwinin, Sadao India
Yemen	Meraimarah

LEMON:-

Scientific name:- Citrus x limon

Rank:- Species

Higher classification:- Citrus Fruits



Fig. 5: Fruits of lemon

Lemon juice, rind, and peel are used in a wide variety of foods and drinks. The whole lemon is used to make marmalade, lemon curd and lemon liqueur. Lemon slices and lemon rind are used as a garnish for food and drinks. Lemon zest, the grated outer rind of the fruit, is used to add flavor to baked goods, puddings, rice, and other dishes.

Juice

Lemon juice is used to make lemonade, soft drinks, and cocktails. It is used in marinades for fish, where its acid neutralizes amines in fish by converting them into nonvolatile ammonium salts. In meat, the acid partially hydrolyzes tough collagen fibers, tenderizing the meat, but the low pH denatures the proteins, causing them to dry out when cooked. In the United Kingdom, lemon juice is frequently added to pancakes, especially on Shrove Tuesday.

Lemon juice is also used as a short-term preservative on certain foods that tend to oxidize and turn brown after being sliced (enzymatic browning), such as apples, bananas, and avocados, where its acid denatures the enzymes.

Peel
In Morocco, lemons are preserved in jars or barrels of salt. The salt penetrates the peel and rind, softening them, and curing them so that they last almost indefinitely. The preserved lemon is used in a wide variety of dishes. Preserved lemons can also be found in Sicilian,

Italian, Greek, and French dishes.

A major industry use of the peel is manufacturing of pectin - a polysaccharide used as a gelling agent, thickening agent and stabilizer in food and other products.

Oil

Lemon oil is extracted from oil-containing cells in the skin. A machine breaks up the cells, and uses a water spray to flush off the oil. The oil/water mixture is then filtered and separated by centrifugation.

Leaves

The leaves of the lemon tree are used to make a tea and for preparing cooked meats and seafoods.

Lemons were the primary commercial source of citric acid before the development of fermentation-based processes. And as a cleaning agent etc.

5.4. CUCUMBER:-

Scientific name: *Cucumis sativus*

Family: Cucurbitaceae



Fig. 6:Cucumber

Cucumber (*Cucumis sativus*) is a widely cultivated plant in the gourd family, Cucurbitaceae. It is a creeping vine that bears cucumiform fruits that are used as vegetables. There are three main varieties of cucumber: slicing, pickling, and seedless. Within these varieties, several cultivars have been created. In North America, the term "wild cucumber" refers to plants in the genera *Echinocystis* and *Marah*, but these are not closely related. The cucumber is originally from South Asia, but now grows on most continents.

The cucumber is a creeping vine that roots in the ground and grows up trellises or other supporting frames, wrapping around supports with thin, spiraling tendrils. The plant may also root in a soilless medium and will sprawl along the ground if it does not have supports. The vine has large leaves that form a canopy over the fruits. The fruit of typical cultivars of cucumber is roughly cylindrical, but elongated with tapered ends, and may be as large as 60 centimeters (24 in) long and 10 centimeters (3.9 in) in diameter. Botanically speaking, the cucumber is classified as a pepo, a type of botanical berry with a hard outer rind and no internal divisions. Much like tomato and squash, it is often perceived, prepared and eaten as a

vegetable. Cucumber fruits consist of 95% water⁵.

5. EXCIPIENT PROFILE



Carbopol 940:- (gelling agent)



Fig. 7: Crbop01940

Chemical formula	(C3H4O2)n
Molar mass	Variable
log P	0.25700

Carbopol is a water soluble polymer, used as an emulsifying, stabilizing, suspending, thickening and gelling agent in many industries. Carbopol is available in several different grades, which are widely used in manufacture of cosmetics and toiletries, including gels, creams and lotions, detergents, and air freshners. Carbopol 940 polymer is a white powder, crosslinked polyacrylic acid polymer. It is an extremely efficient rheology modifier capable of providing high viscosity & forms sparkling clear gels or hydro-alcoholic gels and creams. Its short flow, non-drip properties are ideal for applications such as clear gels, HCl gel, creams.

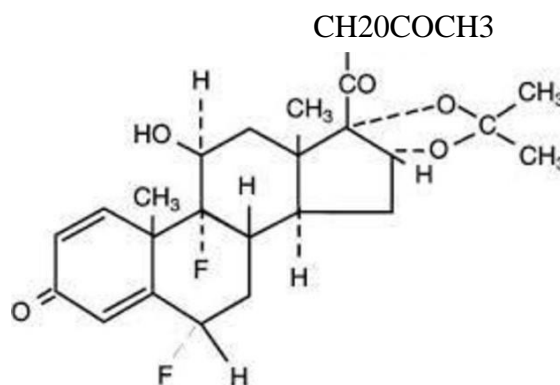


Fig. 8: structure of carbop01940

Features/Benefits

- Compatible with other materials used in styling gels ●
- High viscosity builder and stabilizer
- Provides clarity and a high suspending ability in hair gels ●
- Provides high clarity
- Short flow rheology characteristics
- Methyl paraben:- (preservative)

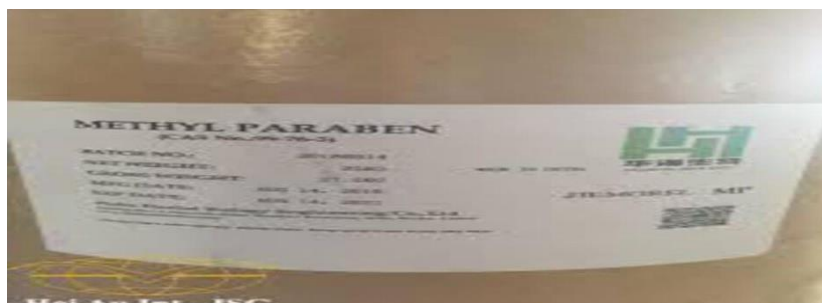


Fig. 9: Methyl paraben

Molar mass: 152.15 g/mol

Formula: C₈H₈O₃

Boiling point: 275 °c

Appearance: Colorless crystals or white crystalline powder

Related Parabens: Ethylparaben; Propylparaben; Butylparaben

OCH₃

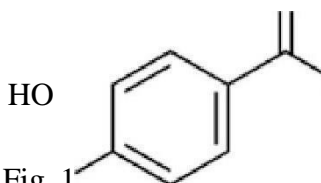


Fig. 10: Methylparaben

Methylparaben, designated as food additive E218 in Europe, is a preservative that inhibits the growth of bacteria and fungi in many products, but it is frequently used in cosmetics. It and other parabens are produced by esterifying para-hydrobenzoic acid (hence the name "paraben").

Propyl paraben:- (Preservative)



Fig. 11: Propyl paraben

Molar mass: 180.2 g/mol

Formula: $C_{10}H_{12}O_3$

Density: 1.06 g/cm³

Melting point: 96 to 99 °c (205 to 210 °F; 369 to 372 K)

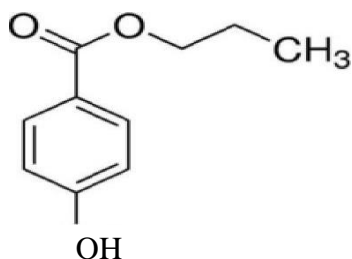


Fig. 12: Structure of propyl paraben

Propylparaben, the n-propyl ester of p-hydroxybenzoic acid, occurs as a natural substance found in many plants and some insects, although it is manufactured synthetically for use in cosmetics, pharmaceuticals, and foods. It is a member of the class of parabens.

Triethanolamine:- (Neutraliser)



Fig. 13: Triethanolamine

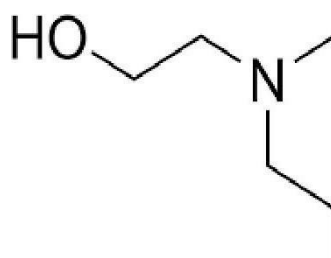
Formula: $C_6H_{15}NO_3$

Density: 1.13 g/cm³

Molar mass: 149.188 g/mol

Boiling point: 335.4 °c

Melting point: 21.60 °c; 70.88 °F; 294.75 K



AvOH

OH

Fig. 14: Structure of Triethanolamine

Triethanolamine aka Trolamine is a viscous organic compound that is both a tertiary amine and a triol. A triol is a molecule with three alcohol groups. Approximately 150,000 tonnes were produced in 1999. It is a colourless compound although samples may appear yellow because of impurities.

Propylene glycol:- (Humactant)



Fig. 15: Propylene glycol

Density: 1.04 g/cm³

Boiling point: 188.2 °c

Molar mass: 76.09 g/mol

Solubility in acetone: Miscible

Solubility in diethyl ether: Miscible

Solubility in chloroform: Miscible

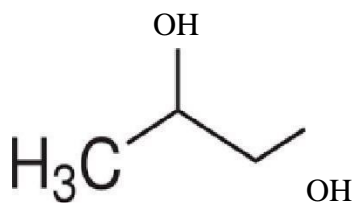


Fig. 16 : Structure of Propylene glycol

Propylene glycol is an organic compound with the chemical formula $\text{CH}_3\text{CH}(\text{OH})\text{CH}_2\text{OH}$. It is a viscous, colorless liquid, which is nearly odorless but possesses a faintly sweet taste. Containing two alcohol groups, it is classed as a diol. It is miscible with a broad range of solvents, including water, acetone, and chloroform.

Sodium lauryl sulphate:- (Foaming agent)

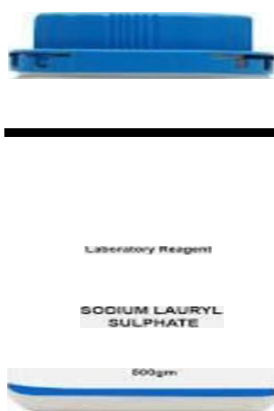


Fig. 17: Sodium lauryl sulphate

Formula: $\text{CH}_3(\text{CH}_2)_{10}\text{CH}_2(\text{OCH}_2\text{CH}_2)_n\text{OSO}_3\text{Na}$

Molar mass: 288.38 g/mol

Density: 1.05 g/cm^3

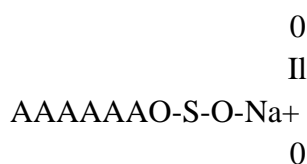


Fig. 18:Structure of SLS

Sodium Lauryl Sulfate (SLS), also known as Sodium dodecyl sulfate, is a widely used surfactant in cleaning products, cosmetics, and personal care products. The sodium lauryl sulfate formula is a highly effective anionic surfactant used to remove oily stains and residues.

Distilled water :- (Vehicle)

Distilled water is water that has been boiled into vapor and condensed back into liquid in a separate container. Impurities in the original water that do not boil below or near the boiling point of water remain in the original container. Thus, distilled water is one type of purified water⁷.



Fig. 19: Distilled water

6. EXPERIMENTAL DETAILS

Table No. 02: LIST OF INGREDIENTS.

SR. NO.	INGREDIENTS	PARTS USED	PROPERTY	QTY
1.	Extract of lemon	Fruit	Antibacteria Antioxidant	1
2.	Extract of neem	Leaves	Kills acne causing bacteria	1
3.	Extract of aloe vera	Whole plant	Soothing ,moisturizer, cooling	1
4.	Extract of cucumber	Pulp	Antiseptic, antibacterial, anti inflammatory	1
5.	Carbopol 940		Gelling agent	1
6.	Methyl paraben	-----	Preservative	02
7.	Propyl paraben	-----	Preservative	0.1

8.	Triethanolamine		Neutraliser	2
9.	Propylene glycol	-----	Humectant	2
10.	Sodium lyrul sulphate	-----	Foaming agent	2
11.	Distilled water	-----	Vehicle	

7. EVALUATION

The prepared face wash was evaluated for various parameters as follows:-

Physical evaluation- Physical parameters such as colour, appearance & consistency were checked visually.

Washability- Formulations were applied on the skin then easily remove by washing with water were checked manually.

Colour- The colour of the face wash was checked visually.

pH- pH of 1% aqueous solution of the formulation was measured by using a calibrated digital pH meter at constant temperature.

Viscosity- The viscosity of face wash was determined by using Ostwal Viscometer.

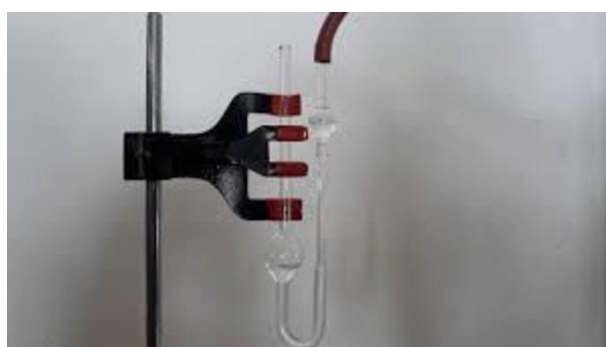


Fig. 20: Ostwal viscometer

Spreadability- Spreadability denotes the extent of area to which the gel readily spread on application to skin or the affected part. The bioavailability efficiency of a gel formulation also depends on its spreading value. The spreadability is expressed in terms of time in seconds taken by two slides to slip off from the gel, placed in between the slides, under certain load. Lesser

the time taken for separation of two slides, better the spreadability.

Spreadability was calculated by using the following formula,

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

Where,

EVALUATION

S- Spreadability

M- Weight tied to the upper slide

L- Length of the glass

T- Time in sec.

Irritancy test- The face wash was applied on left hand dorsal surface of 1 sq. cm and observed in time interval 1 to 2 hrs.

8. RESULT AND DISCUSSION

The results of evaluation are displayed in Table 05. Formulation was orange in color, whereas, marketed formulation was green in color. Formulation was found to have semisolid consistency. The formulations were found homogenous, easily washable. The formulated face wash has slightly alkaline pH which is compatible with normal physiology.

Table No. 3: EVALUATION OF FORMULATION.

Sr. No.	Parameter	Marketed Formulation	Formulated Batch
1.	Colour	Green	Red
2.	Consistency	Semi-solid	Semi-solid
3.	Wash ability	Good	Good
4.		6.9	6.3
5.	Viscosity	1690 cp	1556cp
6.	Spreadability	2.16	1.69
7.	Irritation test	Non irritant	Non irritant

9. CONCLUSION

Natural remedies are more acceptable in the belief that they are safer with fewer side effects than the synthetic ones. Herbal formulations have growing demand in the worldmarket. It is a very good attempt to establish the herbal face wash containing aqueous extracts of neem leaves, whole plant of aloe vera, pulp of cucumber, extract of lemon. This study revealed that the developed herbal formulation was comparatively better than other formulation. The herbal face wash is one of the most well recognized acne treatments, herbal face wash not only moisturized, they also used as a cleanser. Preferably they used for oily and dry skin physiology. It provides numerous essential nutrients to the required for maintaining the normal skin functioning. It also promotes the natural glow to the skin. The herbal face wash was prepared from various herbs like Neem, Aloe vera, Cucumber, Lemon etc. It gives beneficial effects to the face. The various parameters like colour, pH, consistency,

washability, irritability and

spreadability was checked and evaluated hence, from the present investigation it was found that the formulated herbal face wash was found to be more efficient as compared to the marketed face wash. At this formulation contains all herbal ingredients its nightersproduce any harmful action on skin and are reliable.

10. REFERENCE

1. Tiwle R & Sanghi Dk "Formulation & Characterization Of Herbal Face Wash/Scrubber", European Journal Of Pharmaceutical & Medical Research , 2016,3(11).
2. Ingle A And Meshram Mb "Formulation & Evaluation Of Ayurvedic Facewash" International Journal Of Phytopharmacy, May-Jun 2018; Vol. 8 (3).
3. Koli Ds, Mane An ,Kumbhar Vb, Shaha KS "Formulation & Evaluation Of Herbal AntiAcne Face Wash" World Journal Of Pharmaceutical Sciences, 15 April 2016 Vol. 5, Issue 6.
4. Ali A Sharique And Mahor Gajendra "Recent Update On The Medicinal Properties And Use Of Aloevera In The Treatment Of Various Ailments". Pharmaceutical Communication, 2016 Vol. 9(2).
5. Pandey Amit And Shing Shweta "Asystemic Review Of Its Industrial And EthnoMedical Efficacy", International Journal Of Pharmaceutical Research And Allied Sciences, 2016 vol. 5(1).
6. Dr. Tapar Kk And Pardeshi D Madhuri "Formulation & Evaluation Of AloeveraOil With Active Ingradient", International Journal Of Research In Economics & SocialScience, 2016 vol. 6.
7. Ramachandra Ct & Rao P Srinivasa "Processing Of Aloevera Leaf Gel : A Review" American Journal OfAgricultural & Biological Science, 2008 Vol. 3(2).
8. Kumar Sampath Kp, Bhowmik Debjit, Chiranjib, Biswajit "Apotential Herb & Its Medicinal Importance", Journal Of Chemical & Pharmaceutical Research, 2010 Vol. 2(1).
9. Tambe Rashmi, Kulkarni Maushumi, Joice Aney, Gilani Imran "Formulation & Evaluation Of Aloevera Gel", Journal Of Pharmacy Research, 2009 Vol. 2(10).
10. Nazir A, Khan Mki, Maan Aa, "The Therapeutic Properties & Application Of Aloevera".Journal Of Herbal Medicine, 2017.
11. Pounikar Y, Jain P, Khurana N, Omray Lk, Patil S, Gajbhiye A, "Formulation & Characterization Of Aloevera Cosmetic Herbal",International Journal Of Pharmacy & Pharmaceutical Science, 2012 Vol. 4.
12. Deva Samieh Abdul, Sharma Sanjay, Ara Tasneem, Madan Jyotsana, Bal Amadeepsingh "Phytochemical & Therapeutic Profile Of Aloevera", Journal Of Natural Remedie, 2013 vol. 2(6).