IJNRD.ORG ISSN : 2456-4184
INTERNATIONAL JOURNAL OF NOVEL RESEARCH AND DEVELOPMENT (IJNRD) | IJNRD.ORG
An International Open Access, Peer-reviewed, Refereed Journal

FORMULATION AND EVALUATION OF HERBAL ANTI-ACNE FOAMING FACE WASH

Rabitha Kulsum[1], Digpati Roy[2], Dr Kavitha P.N[3]

[1]Student, K.R College Of Pharmacy

[2]Professor, K.R College Of Pharmacy

[3]Principle, K.R College Of Pharmacy

ABSTRACT

In the past, individuals have altered their way of life to adapt to the times. These days, cosmetics are made to nourish, protect, and cleanse the skin. Acne has caused people to worry because it affects both teens and adults frequently due to their daily lifestyles. A face wash is one of the many herbal items that are well-liked on the international market. A foamy face wash is a mild cleanser that can be used to remove makeup, grime, dead skin cells, oils, and other pollutants from the face without irritating the skin. Aloe vera, turmeric, neem oil, and rosehip oil extracts have been the subject of recent research since these substances have been shown to have beneficial anti-acne, anti-bacterial, anti-oxidant, and anti-inflammatory properties. facial wash was made with components in varying quantities, and it was tested for stability, colour, odour, consistency, spreadability, washability, and foamability.

KEYWORDS: Anti-Bacterial, Anti-Acne, Anti-Oxidant, Anti-Inflammatory.

INTRODUCTION

Face wash is a product for skincare that is used to wipe away makeup, dead skin cells, oil, dirt, and other impurities from the skin. It is meant to aid in pore maintenance and shield against skin issues including acne. Due to exposure to the sun and pollution, skin is susceptible to dirt and other pollutants, which can collect in the skin and cause discolouration, such as blackheads and whiteheads, as well as acne and pimples. Cleaning the skin is crucial for keeping it healthy since it helps to get rid of dirt, oil, and makeup and gets the skin ready for topical application. Face wash, however, can potentially harm the skin by eliminating natural moisturizing agents, which can cause the skin barrier to break down and cause acne vulgaris[1]. The common skin disorder known as acne vulgaris is brought on by clogged hair follicles under the skin. The sebaceous glands produce more sebum, which causes follicular distention, and it is frequently accompanied by bacterial proliferation[2].

ANATOMY OF SKIN

It provides a mechanical barrier against injury and acts as a first line of defense against infections, UV radiation, and chemical exposure. It also controls the environment's temperature and water evaporation. Depending on a person's race, age, region, season, and part of the body, their skin tone can differ. In addition, stress and other negative emotions and situations have an impact on skin tone. Melanin, which is produced by melanosomes in skin cells as well as melanocytes and keratinocytes, is the main pigment responsible for the color of a human's skin. The amount of melanin and melanoids in the skin, as well as other factors including water and oxygen content as well as the skin cells' intercellular adhesion, all contribute to the color of the skin. There are more melanosomes in darker skin, and they are larger, thicker, and more frequent. Melanin production rises in dark skin more frequently than it does in light skin when exposed to UV rays. By converting tyrosine to dihydroxyphenylalanine (DOPA), which is then transformed into a polymer through an oxidative process, the melanocytes produce melanin[3].

LAYERS OF SKIN

- Epidermis
- Dermis
- Hypodermis

A face cleanser's formulation only penetrates as far as the stratum corneum and epidermal layers.

Layers of epidermis:

a. **Stratum basale:-** it is the layer with the greatest depth in the epidermis. A basement membrane known as the basal lamina separates it from the dermis. A hemidesmosome connects the stratum basale to the basal lamina. The cuboidal-to-columnar basal cells contain mitotically active stem cells.

b. **Stratum spinosum :** the layer of prickle cells, or stratum spinosum. It is made up of irregular polyhedral cells called spines that stretch outward and make contact with surrounding cells through a mechanism known as desmosomes.

c. **Stratum granulosum:** is a layer of cells with keratohyalin granules that is diamond-shaped. In the stratum corneum's granulosum, keratin filaments are collected.

d. **Stratum lucidum**: is a thin, transparent layer that includes the transition product eleidin. It is primarily seen in thick skin.

e. **Stratum corneum**: The outermost layer is made of keratin, and stratum corneum, which are scales rich in keratin, were once living cells. They are referred to as keratinocytes. In callused skin, this layer is very thick.

Cells of the epidermis

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

Dermis:

It is made up of two layers of connective tissue that converge.

- Papillary layer: The outer layer, which is thinner and composed of connective tissue that is loosely attached. It ties the epidermis and skin together.
- Reticular layer: A thicker, less cell-based, deeper layer. It is composed of tightly woven collagen fiber bundles that form connective tissue that is densely linked.

The dermis is made up of the connective tissue, skin glands, hair, many sensory neurons, and blood arteries that make up the skin.

Hypodermis:

The deepest layer of skin, also known as subcutaneous fascia, comprises adipose tissue as well as hair follicles, sensory neurons, blood arteries, and other skin components[4][5].

Acne:

Acne vulgaris is described as "a common skin condition caused by clogged hair follicles under the skin."

Acne is also known as a chronic inflammatory condition of the pilosebaceous unit. It is characterized by excessive sebum production by sebaceous glands and aberrant hair follicle desquamation, which results in follicular distention and is frequently accompanied by bacterial growth. An inflammatory response is triggered as a result of Propionibacterium acnes.

Types of acne:

Comedones, epidemic acne, pustular acne, cystic acne, and nodular acne are different types of acne.The two types of comedones—whiteheads and blackheads—that do not result in inflammation are known as comedones.

a. **Whiteheads :-** commonly referred to as obstructive comedones, manifest as elevated, fresh, or white pimples.Contrarily, blackheads (open comedones) resemble open pores with dark patches consisting of melanin, sebum, and hair follicle cells.
b. **Papules:-** have a diameter of less than 5 mm, are red, firm, and raised. A pustule is a tiny skin bump that contains infectious material.

c. **Lesions :-** Common subcutaneous lesions include thin, elevated cysts and nodules that extend deeper into the dermis and tissues. A nodule typically has a diameter greater than 5 mm, whereas subcutaneous cysts typically have a diameter less than that.

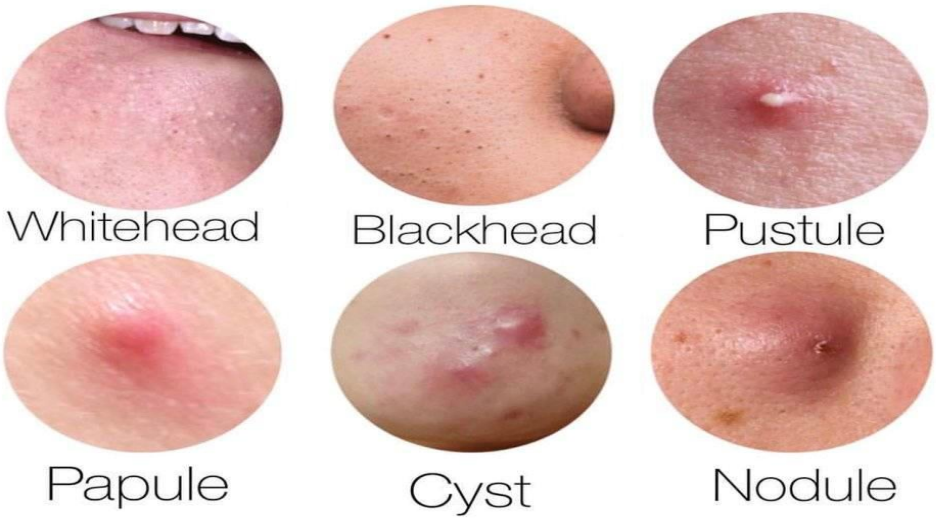
d. **Pustules :-** refers to a particular kind of skin lesion that contains a small amount of pus. They can appear anywhere on the body, but the cheeks, chest, and back are where they are most frequently encountered. Typically, a bacterial, viral, fungal, or parasitic infection is what causes pustules.

e. **Nodular acne:-** One of the most severe forms of acne is nodular acne. Hard lumps or knots called nodules develop deep beneath the skin. Nodules start as red pimples beneath the skin's surface. Blackheads or whiteheads are typically absent from the center of nodules. Weeks or even months may pass between nodules.

A number of physiological reasons, including an excessive number of hair follicles and an increase in sebum production brought on by elevated testosterone levels, contribute to acne as a disease. Additionally, the presence of microorganisms like Propionibacteriaium acnes, Propionylococcosis epidermidis, and other elements might contribute to acne. New ideas are being created in order to comprehend the genesis of acne better. Changes in biological markers, target cell sensitivity, neuroendocrine responses, hereditary factors, and environmental influences are a few examples of these ideas. Numerous synthetic and botanical substances have been seen to significantly reduce acne.

There are various mechanisms such as:

- Regulating sebum secretion.
- Antibiotics that prevent the development of two key acne-causing bacteria.
- Both Propionibacterium acnes (PBA) and Staphylococcus epidermidis can be the example for bacteria causing acne.
- keratolytic agents, which are in responsible of removing the stratum corneum and stopping the secretion of sebum from beneath the skin.
- Anti-inflammatory activity to lessen inflammation-related redness and the discomfort it causes[6].



FACE WASH

Face washes are products for washing the face that are used to get rid of makeup, oil, dirt, and other impurities from the skin. It facilitates pore cleaning and guards against skin conditions like acne. Face wash can be included in the skincare routine in addition to a toner and a moisturizer.

Benefits of using a face wash: -

- It promotes healthy, clean skin.
- It illuminates the skin.
- When dead skin cells and excessive oil combine, the resultant pore blockage can lead to acne, white heads, black heads, and a fatigued appearance. All of the skin issues mentioned above can be prevented with regular pore exfoliation.
- Exfoliation stimulates blood flow. It stimulates the production of new skin cells and eliminates dead skin cells.
- It encourages skin renewal and regrowth.
- In addition, since it removes dead skin cells, the aging process of the skin is slowed down.

Properties of face wash:

- ✓ Upon application, the skin tends to start feeling softer.
- ✓ This product should be designed with stability and aesthetic appeal in mind.
- ✓ It should be easy to apply, spread uniformly, and leave behind no creamy residue that is no longer viscous after evaporation.
- ✓ When applied, it shouldn't be greasy and should leave a thin, emollient coating on the skin.
- ✓ The product's physical effect should be to cleanse the skin and open the pores, not to absorb.

Herbal cosmetics have several advantages over synthetic ones.

These treatments are growing in popularity since most women nowadays prefer natural cosmetics over synthetic ones for their own personal beauty care because they nourish the body, promote health, and offer satisfaction. Compared to synthetic cosmetics, these items are free of synthetic chemicals and have less negative side effects.

Various herbs used in cosmetics:

- **Neem**: One of the plants used in Ayurveda medicine, it is highly prized for its therapeutic qualities, which include antibacterial, antifungal, and antiviral capabilities.

- **Aloe vera**: It has been used to treat a variety of skin problems in traditional Ayurvedic treatment, including burns, cuts, insect bites, dermatitis, and more. Due to its antiseptic, antibacterial, and wound-healing qualities, aloe vera is used to treat stomach issues in addition to skin damage.
- **Turmeric**: It is known to moisturize and nourish the skin and to speed up the process of exfoliation. When applied to the skin, it can aid in easing the symptoms and indications of skin conditions including eczema.
- **Rosehip oil**: It is regarded as the best oil for preventing symptoms of aging since it has high amounts of antioxidants that help to seal in moisture in the skin's deep layers and boost the creation of collagen[7][8].

Function of skin:

- Protects body from getting damage.
- It provides a protective barrier against mechanical thermal and physical injury.
- Prevents loss of moisture.
- It reduces harmful effects of UV radiation.
- It also helps to regulate temperature.
- It is an immune organ to detect infections.
- It also helps to protect body against pathogens. Langerhans cells in the skin are part of the immune system.
- It provides water resistance by preventing nutrients from being washed from the body[9].

AIM AND OBJECTIVE

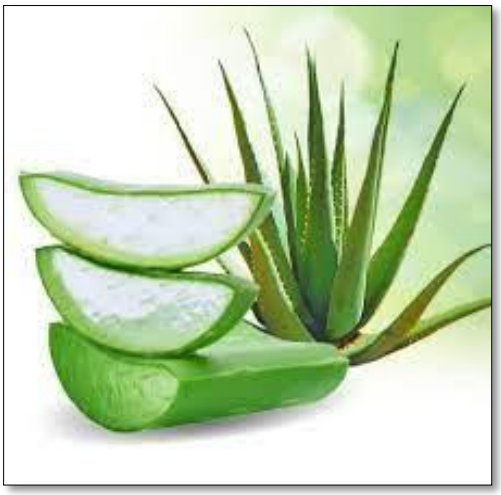
AIM: To prepare and assess a herbal foaming face wash for acne.

OBJECTIVES:

- ❖ Identification and collection of diverse herbal plants are the goals.
- ❖ To extract herbal constituents free of the use of chemical preservatives.
- ❖ To create and assess a foaming herbal anti-acne face wash.
- ❖ To conduct tests for foaming face wash evaluation.
- ❖ In accordance with ICH requirements, an expedited stability study of the prepared foaming face wash will be conducted.

Plant profile:

A. Aloe vera

	Scientific name: Aloe vera.
	Order: Asparagus.
	Family: Asphodelaceae
	Subfamily: Asphodeloideae.
	Kingdom: Plantae
	Family: Vincaceae
	Botanical name: Aloe barbadensis miller

Uses:-

- It possesses anti-inflammatory qualities that aid in lowering pain, swelling, and discomfort in wounds and encourage collagen creation and release.
- It is an effective treatment for fungal and bacterial infections.
- It possesses anti-oxidant qualities that aid in healing UV damage and slow down the skin's aging process.
- By cooling, it heals sunburns and rashes.
- Additionally, it speeds up wound healing[10].

B. Turmeric

	Scientific name: Turmeric
	kingdom: Plantae
	Division: Magnoliophyta
	Class: Liliopsida
	Order: Zingiberales
	Family: Zingiberaceae
	Botanical name: Curcuma longa

Uses:

- Turmeric is a potent substance that can be utilized to give the skin a natural glow.
- It is well renowned for its efficiency in treating acne
- It also aids in the management of atopic dermatitis.
- It helps treat psoriasis[11].

C. Neem oil:

	Scientific name: Azadirachta indica
	Order: Rutales
	Suborder: Rutinae
	Family: Meliaceae
	Subfamily: Melioideae
	Genus: Azadirach
	Species: indica

Uses:-

1) To minimize scarring.
2) To cure fine wrinkles and dry skin.
3) To calm down itchy and inflammatory skin.
4) To correct an uneven skin tone.
5) To counteract various early aging symptoms[12].

D. Rosehip oil:-

	Scientific name: Rosa canina L
	Kingdom: Plantae
	Family: Rosaceae
	Order: Rosales
	Genus: Rosa
	Species: Rosa canina
	Botanical name: Rose hip

Uses:-

- It decreases inflammation.
- It safeguards against sun damage.
- It also reduces Hyperpigmentation Reduces Scars and Fine Lines.
- It boosts the immune system of the skin[13].

METHODOLOGY AND MATERIALS

EXTRACTION PROCESS:

PLANT MATERIALS: Aloe vera, turmeric, neem oil, and rosehip oil are all the substances used in the formulation. We extract from the processes described below:

EXTRACTION OF ALOE VERA:

Cut two medium-sized raw aloe vera leaves into pieces. scope out the jelly. The gel should be added to the mixer grinder. To avoid clumping, filter the juice.

EXTRACTION OF NEEM OIL:

To make a powder, combine 20 grams of dry neem leaves. Mix the powder with 100 milliliters of olive oil. Immerse the mixture into a water bath and boil for 30 minutes. Filter any solid residue with cheese cloth.

EXTRACTION OF ROSEHIP OIL:

Weigh out sample (rosehip seeds) of 30 grams and Using a funnel, pour the sample into a 24-ml extraction jar. Next, insert the wool plug on top of the vessel. The sample will compress when it is tamped with the tamping rod. The vessel must be sealed when the void volume has been filled. The material should be extracted in accordance with the instructions for extraction. The collection vial should be taken out, and any remaining oil moisture should be dried in a dry oven at 105°C.

FORMULATION STEPS INVOLVED IN PREPARATION:

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

Stage A consists of the base ingredients

Stage B consists of the main ingredients

Stage C consists of the excipients

Stage D consists of the preservatives

Stage E consists of the fragrance of the formulation.

FORMULATION TABLE:

Sl.no	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	2gm	2gm
5	B	Neem oil	5ml	4ml	3ml
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

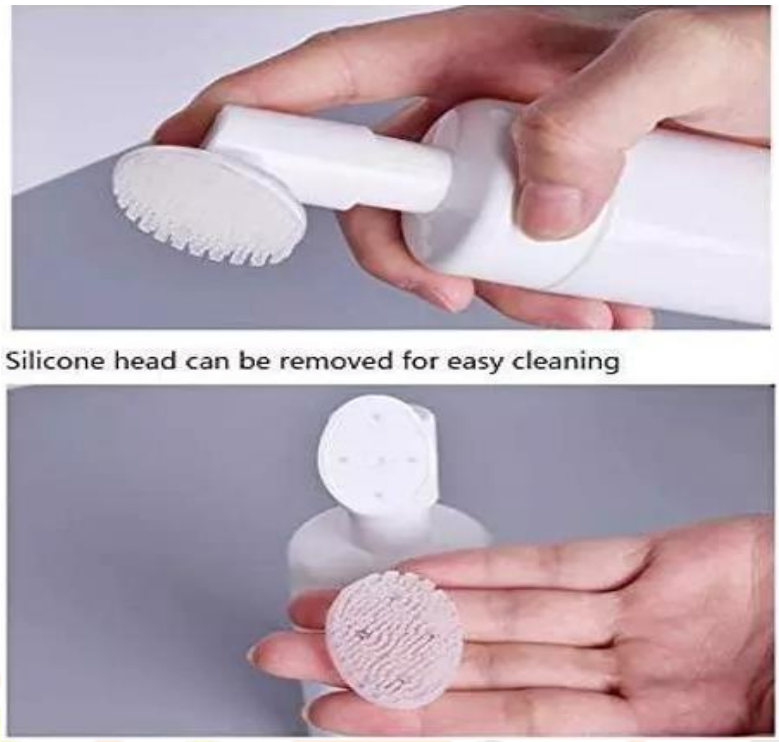
Method of preparation:

The method of preparation is as follows:

- The Stage A components are weighed before being introduced to the beaker in accordance with the formulation table.
- In comparison to distilled water, more glycerine is utilized. To get desirable consistency in the formulation.
- The Stage B elements are subsequently carefully blended for two minutes to ensure uniformity in the formulation
- Subsequently stage C component, ie 30 ml of sodium lauryl ether sulphate, followed by elements of stage D which comprises of 0.5 ml of sodium benzoate, and 0.25 ml of sorbic acid were added.
- lastly ingredients of stage E are added to enhance the aroma of the formulation. The distilled water is then added to get the appropriate volume.

PACKAGING AND STORAGE CONDITIONS: -

The product is housed inside a cylinder-shaped container with a silicon brush. This brush makes it easier for the formulation to penetrate the skin and has a more focused therapeutic impact.



Massaging the face helps to remove the fluid from the lymphatic nodes, and thus the silicon brush provides a soft facial massage to the face, which facilitates the circulation of blood on the face, since the lymphatic nodes are present on the face and neck. Therefore, promoting the circulation of essential nutrients and oxygen to the skin.

The product is designed to meet safety standards, and the packaging is simple to use. As a result, the formulation boosts the therapeutic impact of the medicine. Keep the product in a cool, dry place away from direct sunlight.

EVALUATION

- Visual examinations were performed on physical criteria such as colour, fragrance and uniformity.
- **Colour:** The colour of the foaming face wash was visually examined.
- **Odour:** The formulation's odour was evaluated by smelling it.
- **Consistency:** The consistency of the composition was individually affirmed.
- **pH measurement:** The pH strip was used to determine the pH of the formulated face wash formulation. To determine the colour change, dip a pH paper into the designed face wash solution of 1% water at a constant temperature.
- **Spreadability:** The formulation's spreadability was achieved by having the formulation on hand and spreading it with fingers.

- **Washability**: it is determined by applying the appropriate amount of sample to both hands and monitoring them under running water.
- **Foamability:** The consistency of foam created by the face wash composition is referred to as foamability. Apply a small bit of face wash to the skin and rub it in with your palm.It was discovered that the formula produced consistent foam.
- **Accelerated stability:** it is achieved by storing the prepared herbal foaming face wash in an airtight, sealed container in a cool, dry atmosphere.

RESULTS AND DISCUSSION

The developed formulation performed well in terms of color, odor, consistency, 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
07	Foamability	achieved	achieved	achieved

Based on the research, it is determined that integrating extracts of aloe vera, turmeric, neem, and rosehip oil in various concentrations results in multipurpose effects on the skin such as anti-bacterial, anti-aging, anti-wrinkle, and sunscreen effects.It is obvious that the efficacy of individual plant extracts cannot be improved; but, by mixing the numerous natural components, the efficacy of the extracts can be boosted. To that purpose, we mixed aloe vera, turmeric, neem oil, and rosehip oil extract to boost the cosmetic benefits of the finished products. The viscosity and pH of the formulation increased with the concentration of the extract, as did its yellowish green color. The pH of the product fluctuated between 5.9 and 7.0. The anti-acne foaming face wash was discovered to stop the growth of bacteria and thus which leads to inhibit acne formation, and all formulations proved the same activity.

CONCLUSION:-

According to the research results of a study on the Formulation and Evaluation of Anti-Acne Foaming Face Wash, the developed product is both safe and effective in its therapeutic function. Herbal elements have enabled the development of cosmetics that have no negative side effects and can provide the required qualities to treat skin issues while being less expensive than synthetic goods. Herbal drugs are thought to be better for treating acne than allopathic pharmaceuticals because allopathic medications might cause contact allergies, local irritations, photosensitivity, itching, and skin redness.

Lastly, it can be claimed that the development of the product, which is prepared using Aloe vera, Neem oil, Turmeric, Rose hip oil, Glycerine, and SLES, will show a significant improvement and successful therapeutic response to skin conditions and diseases, including acne.

REFERENCES:

1. https://www.researchgate.net/publication/280741097_Anti-acne_Synergistic_Herbal_Face_Wash_Gel_Formulation_Evaluation_and_Stability_studies by Harsharan Pal Singh, Neeraj Samnhotra, Sumeet Gullaiya and Ishpreet Kaur.
2. https://benthamscience.com/article/118500 Formulation and standardization of Anti-acne Herbal Foaming Face Wash using *Curcuma longa* along with *Aloe vera, Rosa centifolia*, and *Cit – rus sinensis* by Niharika Lal, Maharabi Rana, Bhanu P.S. Sagar and Navneet Verma.
3. https://in.docworkspace.com/d/sIHyAtr4wmcyhqAY?sa=e1&st=0t Formulation and Development of Skin Whitening Face Wash by Gadegone S, Misar K and Kale R.
4. https://www.researchgate.net/publication/322063118_Anatomy_Skin_Integument_Epidermis by Sandeep Sharma and Yousef Hani.
5. https://www.medicalnewstoday.com/articles/best-face-wash-for-acne#about-acne-and-face-wash by Suzy Davenport and Hayley Osborne
6. https://www.ijnrd.org/papers/IJNRD2301135.pdf Formulation and Evaluation of Herbal Anti-acne face wash by Nathe Pranjal Sahebrao and Satpute Soniya Sukdev
7. https://www.researchgate.net/publication/370102824_FORMULATION_AND_EVALUATION_OF_ANTI-ACNE_HERBAL_FACEWASH By Ankita Sehgal, Maneesh Banyal Jyoti Gupta and Swati Joshi
8. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3425021/ Cleansing Formulations That Respect Skin Barrier Integrity by Russel M. Walters, Guangru Mao, Euen T.Gunn and Sidney Hornby.
9. https://www.hse.gov.uk/skin/professional/causes/structure.htm functions of Skin by health and safety executive.
10. https://www.academia.edu/83840564/To_Formulate_and_Evaluate_Aloe_Vera_Face_Wash
11. https://ijdvl.com/turmeric-a-condiment-cosmetic-and-cure/
12. https://www.vedantu.com/biology/scientific-name-of-neem
13. https://www.google.com/url?q=https://www.medicalnewstoday.com/articles/326931%23uses&usg=AOvVaw0ZKhigAzVF-Kx2BmWLZJkV&hl=en-US plant profile of Rosehip oil.

14. https://journals.sagepub.com/doi/full/10.1177/1091581819883820 properties of glycerine.
15. http://www.greenmedinfo.com/blog/11herbsusedtraditionalacneremedies
16. https://www.nlm.nih.gov/medlineplus/antioxidants.html
17. http://www.ingredientstodiefor.com/category/Thickeners_Polymers_RheologyModifiers/c
18. https://storify.com/ASEEM_SOOD/benefitsofherbalfacewash.
19. Harsharan Pal Singh, Anti-Acne Synergistic Herbal Face Wash Gel , World Journal of Pharmaceautical Research , 2015:1261-1273
20. Ashish Baldi , Herbal Cosmetics : Used for skin and hair , inventi rapid journals, 2012