

(RESEARCH ARTICLE)



Formulation and evaluation of herbal scrub soap

Rekha Goukonde *, Jagruti Rajput, Bhakti Bansod and Gajanan Sanap

Late Bhagirathi Yashwantrao Pathrikar College of Pharmacy, Pathri, Chhatrapati Sambhajnagar, Maharashtra, India.

World Journal of Biology Pharmacy and Health Sciences, 2024, 18(03), 354–370

Publication history: Received on 02 May 2024; revised on 28 June 2024; accepted on 30 June 2024

Article DOI: <https://doi.org/10.30574/wjbphs.2024.18.3.0351>

Abstract

Scrubbing Soap are the agents which are use to remove the dead cell from skin, pigmentation and blackheads, white heads and make skin glowing, smooth, soft and healthy. Scrubbing soap can be directly applied onto the skin by gently massage is recommended on application of the scrubbing soap which helps to improve blood circulation and increase oxygen supply to all surface of the skin. Due to some environmental factors many people face some problem like pigmentation and uneven skin tone. Solution for this problem is use of scrubbing soap which consist ingredients which increases cleansing, softening, moisturizing, fairness of skin. In this preparation neem, tulsi and poppy seeds are use as main active ingredients. Other ingredients like glycerin base, essential oil and rose water, ritha powder, alovera, turmeric vitamin E are use in the formulation. Thus, the developed formulation can be used as an effective scrubbing soap for using it to bear a healthy and glowing skin.

Ayurvedic cosmetics are also known as the herbal cosmetics the natural content in the herbs does not have any side effect on the human body most herbal supplement are based on several botanical ingredients with long histories of traditional or folk medicine usage. Among the numerous botonical ingredients available in the market today. Numerous chemical toxins microorganism present in the atmosphere may cause chemical infection and damage to skin cosmetics alone are not sufficient to take care of skin and body parts. Neem (*Azadirachta indica*) tree has attracted worldwide prominence owing to its wide range of medicinal properties, neem leaves and its constituents have been demonstrated to exhibit anti-inflammatory, antihyperglycemic, antiulcer, antimalarial, antifungal, antibacterial, antimutagenic and anticarcinogenic properties. This study was conducted to evaluate the effect of aqueous, ethanolic and ethyl acetate extract from neem leaves.

Keywords: Pigmentation; Blackheads; Whiteheads; Dead Cells; Polyherbal Soap; Antimicrobial; Hand Sanitizer

1 Introduction

Cosmetics are defined as “the products used for the purposes of cleansing, beautifying, promoting attractiveness or alternating the appearance of body”. Body scrub ingredients can be made from synthetic and natural ingredients. On regular use of scrubs, skin become glowing, smooth, soft and healthy because dead cells of skin are removed and exposing new skin cell. Different evaluations tests are carried out for the prepared herbal this formulation, such as appearance, Spreadability, irritability, PH, washability, etc. Thus, the prepared formulation of body scrub was effective for healthy, clear and glowing skin.

Herbal soap preparation is a drug or medicines it contain Antibacterial & antifungal agents which ismainly uses of part ofplant similar as like leaves, stem, roots & fruits to treatment for a injury or diseaseto achieve good health(1). This preparation retain antimicrobial property are administered topically and available toapply in various forms like creams, embrocation, gel, soap, solvent extract or ointment the variety of creams & soaps have been used to treatvarious skindiseases(2). mostly skin infection are caused by fungi, streptococcus species(1). Crudedrug of adulatoryplant are

* Corresponding author: Rekha Goukonde

suitable to soften the skin epidermis enhance greater penetration and cleaning acne and also promote healing and resolution in quickly in time. In this research article herbal soap containing neem, tulsi, aloe vera and reetha as natural plant ingredients and this content gives or shows antibacterial antifungal & anti-inflammatory activity. In this soap, neem is the main ingredient, and shows medicinal properties. Neem leaf and its extract exhibit immunomodulatory, anti-ulcer, anti-malarial, antifungal antibacterial antioxidant, anticarcinogenic property. Tulsi has got the top medicinal value. Tulsi to be effective for diabetes they reducing blood glucose position tulsi also used in severe acute respiratory pattern. Juice of its leaves gives relief in cold fever bronchitis and cough. Tulsi reduce stress, enhance stamina relief inflammation and also shows antifungal activity so tulsi is also used as main compound in this herbal soap. The main antifungal activity of Tulsi serves to be beneficial in soap formulation (3). Reetha is an exceptional cleanser. Hence it's a perfect cover for soap and face wash due the presence of saponin. It's also good for use on sensitive skin. Reetha prevents the skin from drying and keeps it soft and supple it also helps to treat eczema and psoriasis.

Throughout history, plants have served as remedies in traditional medicine. Ayurveda, with a heritage spanning 5000 years, relies on plant-based treatments for human health. Recently, there has been a significant increase in the utilization of herbal plants for both medicinal and cosmetic purposes. Cosmetics play a role in enhancing skin tone, texture, cleansing, reducing wrinkles, combating oiliness, acne, blackheads, pimples, and dark circles. Ayurveda attributes skin issues to impurities in the blood. (4) Face scrubs, cosmetic products containing fine exfoliating particles, work by removing surface dead cells and promoting cell renewal in the sub-epidermal layer.

The herbal exfoliating scrub helps diminish age-related changes and counteracts damage from environmental factors [5]. It effectively removes dirt, grime, and oils from the face, contributing to clean and clear pores, which is beneficial for skin health.

1.1 Soap

Soap a familiar cleansing agent, has been defined in various ways by different authors. Warra (6) describes it as any cleaning substance derived from reacting sodium or potassium salts of natural fatty acids, while it can also be understood as water-soluble salts of fatty acids with eight or more carbon atoms. Soaps serve diverse purposes, including washing, bathing, and medicinal use. (7) Their cleansing action is attributed to the negative ions on the hydrocarbon chain attached to the fatty acids' carboxylic group, making them effective with water for cleaning (8).

In addition to the primary ingredients, supplementary substances are incorporated to enhance soap's functionality. For instance, medicated soaps include medicinal ingredients for specific purposes (9). Moreover, metals like calcium, magnesium, and chromium are utilized to create metallic insoluble soaps, not for cleaning but for other applications (9). The soap's properties, such as hardness, depend on the metallic element present in the salt. For example, sodium salt-based soaps are relatively softer than potassium salt-based ones, provided the same fat or oil is used (10). These differ from soaps made from divalent metals like magnesium, calcium, aluminum, or iron, which are not water-soluble. Soaps find utility in laundry and cleaning, with reports even mentioning the use of calcium soap in animal feed formulations (11).

The general process of soap production involves saponification, where a triglyceride (fat or oil) reacts with a strong alkali such as potassium or sodium hydroxide to yield glycerol and fatty acid salts.

2 Literature survey

Telange- Patil P.V et al, 2022 " Bacterial skin infection are most common among people, taking significant attention for treatment and also to maintain healthy skin some herbal factory excerpt have antibacterial exertion" (12)

R.Margret Chandira et al, 2022 " Herbal cleaner has been used traditionally for treating several epidermal dysfunctions, similar as eczema, psoriasis, and acne and helps to boost vulnerable response in towel of affected skin area." (13)

Patel Anu et al, 2022 " Herbal cleaner was prepared using coconut oil painting, castor oil painting, neem oil painting, lavender oil painting, rose oil painting, and NaOH(lye) and different excerpts were included into introductory saponification response." (14)

Bothe Saurav et al 2022 " Ayurvedic cosmetics are also known as the herbal cosmetics the natural content in the sauces doesn't have any side effect on the mortal body most herbal supplement are grounded on several botanical constituents with long histories of traditional or familial drug operation. Among the multitudinous botanical constituents available in the request moment" (15).

(Debbarma Dona, Moharana PK, Mishra Baidyanath, Ramana Vivekananda and W Dimple: Clinical Review of deep cleansing apricoat scrub: An Herbal Formulation, International Journal of Bioassays 2015;4(9):4251-4253) Incorporating exfoliation into your skincare routine aids the natural shedding process of the skin, promoting healthier, smoother, and more even-toned skin, with significant beauty benefits like acne prevention, minimized pores, and wrinkle reduction. Herbal medicines have seen extensive use in addressing chronic and lifestyle-related disorders in recent years. The Deep Cleansing Apricot Scrub is a proprietary and patented polyherbal formulation crafted to deeply cleanse the skin, leaving it healthy and radiant. Exfoliation entails removing the oldest superficial dead skin cells from the skin's outermost surface. This can be achieved through mechanical or chemical means. Mechanical exfoliation involves physically scrubbing the skin with abrasives(16)

Pooja Dave ET AL, 2022 "Formulation and Evaluation of Herbal Face Scrub containing *Coffea arabica* Linn, *Myristica fragrans*, and *Lens culinaris* as an Antioxidant and Antiseptic Activity" Face scrubs, cosmetic product containing fine exfoliating particles, work by removing surface dead cells and promoting cell renewal in the sub-epidermal layer. The herbal exfoliating scrub helps diminish age-related changes and counteracts damage from environmental factors (17).

2.1 Objective

The main objective of present study was to prepare a herbalscrub soap. In this formulation of herbalscrub soap, we used neem as a active ingredient and tulsii, reetha powder, poppy seeds, vitamin E, rose water, aloe vera, turmeric etc are other ingredients used in this scrub soap formulation. Active ingredients shows antifungal activity and used to treat fungal infection, acne, pigmentation. Different evaluations tests are carried out for the prepared herbal scrub soap formulation, such as organoleptic character, pH, foam height etc. Prepared formulation passes all the given evaluation tests. Thus, the prepared formulation of herbal scrub soap was effective for healthy, clear and glowing skin.

2.2 Skin

Understanding the structure and function of human skin is crucial for healthcare professionals. Skin, also known as the cutaneous membrane, covers a surface area ranging from 1.2 to 2.2m² in adults. It exists in two types: hair-bearing skin, which covers much of the body, and hairless skin, such as that on the palms of hands and soles of feet.[18] Skin is highly exposed to sunlight and environmental pollution, and it also provides some protection against pathogens. Understanding the structure and basic functions of the skin and its appendages, as well as knowledge of natural or herbal remedies for skin issues, can enhance the importance of herbal cosmetics. The skin possesses innate capabilities for continuous repair to sustain its normal functions. Common skin problems in youth include oily skin and acne, while aging often leads to dryness. To improve skin health, it's crucial to comprehend its functions and take appropriate measures for maintenance. Skin types are categorized into four groups, and utilizing suitable ingredients for each type helps preserve its natural functionality.(Table-1) [19-20]

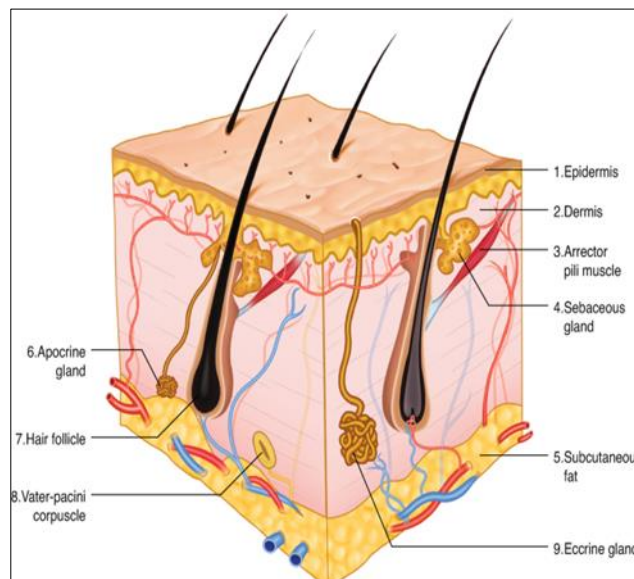


Figure 1 Skin anatomy

Table 1 Skin Types and Their Care

| Skin type | Features | Herbal | Essential oils |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| Normal | Has even tone, soft, smooth texture, no visible pores or, blemishes and no greasy, patches or flaky areas. Has a clear, fine, textured, supple and, smooth surface which is, neither greasy nor dry. | Pomegranate leaves, juice, Herbal Face Pack, Gingili Oil | Chamomile Fennel, Geranium, Lavender, Lemon, Rose, Sandal Wood, Patchouli |
| Dry | Low level of sebum and, prone to sensitivity. Has, a parched look, feels, “tight.Chapping and, cracking are signs of, extremely dry, dehydrated skin. | Aloe Vera, Olive Oil, Calendula Comfrey | Chamomile Fennel, Geranium, Lavender, Lemon, Rose, Sandal Wood, Patchouli, Almond, Avocado |
| Oily | oily skin has coarse pores and pimples and other embarrassing blemishes. Prone to black heads | Horsetail, Oat Straw, Thyme, Lavender, Lemon Grass, Liquorice, Rose Buds, Witch Hazel Cucumber, Cedar Wood | Geranium, juniper, Lavender, Lemon, Sage Evening Primrose |
| Combination | Some parts of your face are dry or flaky, while the center part of your face, nose, chin, and forehead (called the Tzone) is oily. Combination skin can also describe | Witch Hazel, Menthol, Aloe Vera, Turmeric, Wheat Germ, Sweet Flag | Citrus Oils, Jasmine Oil, Sandal Wood O |

2.3 Common skin disease

Most common skin disease are Eczema, Acne, Rashes, Psoriasis, Allergy, dry skin, Fungal infection, Bacterial infection, pigmentation, Blackheads, White heads etc.

| | |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|  |  |
| Eczema | Acne |



2.4 Advantages and disadvantages

2.4.1 Advantages

- Soap are eco- friendly and bio degradable.
- Pure and organic ingredients Free from side effects.
- Easily available & found in large variety & quantity.
- No synthetic additives No animal testing
- Easy to manufactures and chief in cost.
- Body scrubs remove dead skin cells, and so provide several benefits.
- They unclog pores and prevent ingrown hairs.
- They leave your skin smoother and more even.

2.4.2 Disadvantages

- Herbal drugs have slower effects as compare to allopathic dosage forms.
- It requires long term therapy.
- Manufacturing process are time consuming & complicated.
- No pharmacopeia defines any specific procedure or ingredients to be used in any of herbal cosmetics.
- Soaps are not suitable in the hard water.
- Hard scrubbing motions and hard scrubbing chemicals may cause skin irritation including redness, inflammation.
- Over scrubbing can result in open pores which are exposed to pollution and UV rays at the same time.

3 Content of the soap

3.1 Neem



Figure 3 Neem

- Botanical name: *Azadirachta indica*.
- Biological source:
- Neem consist of almost all the part which are used as drug of *Azadirachta indica*. It is belong to family *Meliaceae* It is also known as, margosa, indian Lilac and *Azadirachta indica*.
- Part typically used: Leave.
- Geographical source:

India is native of *Azadirachta* It is also cultivated in Nepal Pakistan Bangladesh and SirLanka. Neem is a fast growing tree that can reach a height of 15-20m, rarely to 35-40m. It is evergreen.

- Macroscopic properties:
- Macroscopy of leaf:
- Apex: Ovate – Lanceolate
- Base: Unequal
- Color: Smooth and dark green.
- Odour: Typical
- Test: Bitter
- Constituents: flavonoids, Alkaloids, Azadirone, nimbin, nimbidin, terpenoid, steroids, tannic acid and saponins.

3.2 Tulsi

- Synonym: Sacred basil
- Biological name: *Ocimum tenuiflorum*
- Commonname: Holy basil
- Family : lamiaceae

Chemical Constituents: eugenol, germacrene, terpens, volatile oil (0.8%) eugenol, nerol, eugenol methyl ether, caryophyllene, terpinene-4-ol-decylaldehyde

- Part Typical used: Leaves
- Colour: Green
- Geographical source:

It is a herbaceous, much branched annual plant found throughout India, it is considered as sacred by Hindus. The plant is commonly cultivated in gardens and also grown near temples. It is propagated by seeds. Tulsi nowadays is cultivated commercially for its volatile oil.

- Macroscopic properties:
- Apex: Acute or obtuse
- Odour: Aromatic
- Taste: Pungent



Figure 4 Tulsi

3.3 Alovera



Figure 5 Alovera

- Synonym: Aloe Vera, burn plant.
- Common name: *Aloe barbadensis* Miller.
- Biological source: Dried latex of leaves of it also known as cape aloe.
- Family: Liliaceae
- Odour: similar like rotten garlic or onion
- Taste: Bitter

- Chemical constituents:- vitamin, enzyme, minerals, sugars, lignin, saponin, salicylic acid and amino acid, aloe emodin.
- Part typically used:- leaves
- Color:- clear to slightly yellow or translucent gold
- Uses: heals burns and clears acne

3.4 Turmeric



Figure 6 Turmeric

- Synonym: *Curcuma longa*
- Biological source: It consists of dried rhizomes of *Curcuma longa*
- Family: Zingiberaceae
- Microscopy:
- Colour: Yellow
- Odour: Aromatic
- Taste: Bitter
- Chemical constituents: Curcumin, Curcuminoids
- Uses:- Reduce acne, Glowing skin, Lightens skin

3.5 Ritha



Figure 7 Ritha

- Biological name: *Sapindus mukorossi*
- Biological source: *Sapindus mukorossi* Gaertn., a member of the family Sapindaceae, is commonly known by several names such as soapnut, soapberry, washnut, reetha
- Parts typically used: Seeds
- Geographical source: Reetha is found in the hilly regions of the Himalayas in India.

- Macroscopy:-
- colour:- Brownish
- odour:- pleasanttaste: bitter
- constituents:- The major constituents present in Reetha are saponins, sugars and mucilage

3.6 Lavender oil



Figure 8 Lavender oil

Characteristics:

- Antioxidant protection
- Used as a diabetes natural treatment
- Promotes healthy skin and hair
- Improve sleep
- Relieves pain

3.7 Poppy Seeds



Figure 9 Poppy seeds

- Biological name: *Papaver somniferum* L
- Biological source: *Papaver somniferum*, commonly known as the opium poppy or breadseed poppy, is a species of flowering plant in the family Papaveraceae.
- Parts typically used: Seeds
- Geographical source: Turkey, India, Australia, France, Spain, and Hungary.
- Macroscopy:-
- Colour: yellowish white
- Odour:- Mild nut like aroma

- Taste: mild,nutty
- Chemical constituents:- fat, dietary fibre, mainly its insoluble fraction, and protein,morphine

3.8 Rose water



Figure 1o Rose Water

3.8.1 Characteristics

- Antibacterial
- Nutrient rich
- Astringent
- Safe for skin

3.9 Vitamin E



Figure 11 Vitamin E

Characteristics:

- Rejuvenates and restores dehydrated skin
- Moisturizes the skin
- Reverses premature skin aging
- Lightens dark spots
- Acts as a cleansing agent
- Prevent wrinkles

3.10 Glycerine Soap Base



Figure 12 Glycerine Soap Base

3.10.1 Characteristics

- Glycerine soap bases are transparent and have a high glycerine content.
- They are known for their excellent moisturizing properties and gentle cleansing abilities.
- Glycerine soap bases are suitable for all skin types.

4 Method of preparation

4.1 Collection and measuring raw material

Collect and weight of all ingredients like neem, tulsi, poppy seeds, turmeric, reetha powder, aloe vera, rose water, lavender essential oil.

4.2 Method of extraction



Figure 12 Neem leaves



Figure 13 Tulsi leaves



Figure 14 Extraction of Neem and Tulsi

First of all collect the neem branches from the local area of Aurangabad (Pathri) leaves are separated from the branches and wash it. tulsi leaves are also collected and wash it. Leaves pour in the grinder and add sufficient amount of distilled water and grind it. after the grinding neem and tulsi extract is filter using the filter paper then this extract collect in a suitable container and store it.

4.3 Preparing the base

The glycerine base (50 gm) was cut into the small piece and then put into the beaker for double boiling method and heat the glycerine cubes until its completely melt.



Figure 15 Preparing the base

4.4 Adding of raw material

After glycerine cubes was completely melt then add ingredients one by one and stirr solution.



Figure 16 Adding of raw material

4.5 Consistency

Once desired consistency acquired turn off flame then add lavender essential oil for fragrance and wait for 1-2 minutes at room temperature.



Figure 17 Lavender oil and formulation

4.6 Pouring

Once desired consistency is removed the solution is pour into the moulds.



Figure 18 Formulation is pour in mould

4.7 Cooling

The moulds are kept at room temperature for 30 minutes then remove soap from mould.



Figure 19 Prepared soap

4.8 Formulation of herbal soap

Table 2 Ingredients and Quantity

| Ingredients | Quantity |
|------------------------|-----------|
| Neem | 10ml |
| Tulsi | 5ml |
| Aloevera | 3g |
| Turmeric powder | 0.5g |
| Vitamin E | 2 capsule |
| Glycerine soap base | 50g |
| Rose water | 5ml |
| Lavender essential oil | 1ml |
| Poppy seeds | 2g |

Table 3 Chemical and Source

| Chemical | Source |
|------------------------|--------------------|
| Lavender essential oil | Laboratory reagent |
| Rose water | Laboratory reagent |
| Glycerine soap base | Laboratory reagent |

4.9 Activity of ingredients

- Neem – Antibacterial properties treat acne.
- Aloevera – Moisturizer or sunburn.
- Turmeric – Antimicrobial agents
- Tulshi – Antimicrobial agents.
- Rose water – Cooling agent emollient.

4.10 Evaluation parameter

4.10.1 Determination of Organoleptic Characteristics:

Clarity and colour was checked by naked eyes against the white background, and the odour was smelled.[21]

4.10.2 Weight determination:



Figure 20 Weight of soap

The weight was determined by using a Digital weighing balance[22].

4.10.3 Foam Height

0.5gm of the sample of soap was taken and dispersed in 25 ml of distilled water. Then, transferred it into 100 ml measuring cylinder; the volume was made up to 50 ml with water. 25 strokes were given and stand till aqueous volume was measured up to 50 ml and measured the foam height. Foam height is increase upto 20 then total foam hight is upto 70.[23]

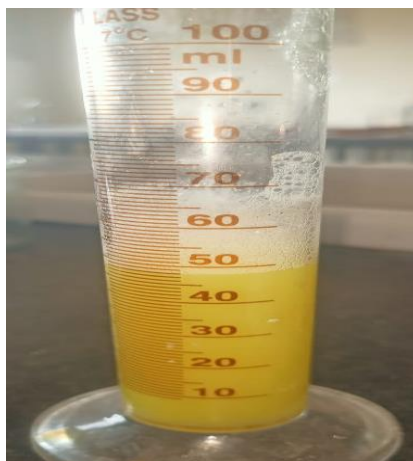


Figure 21 Foam Hight

4.10.4 Foam Retention:

Prepared the 25 ml of the 1% soap solution and transferred it into the 100 ml measuring cylinder. Then the cylinder was shaken 10 times. The volume of foam was recorded at 4 to 5 minutes.[24]

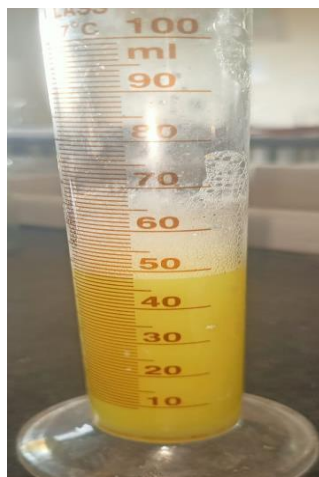


Figure 22 Foam Retention

4.10.5 pH test

The pH is measured by using pH paper and it found basic in nature.

5 Results

Table 4 Parameters and Result

| Sr.No | Parameter | Result |
|-------|---------------|------------------|
| 1 | Colour | Dark green |
| 2 | Odour | Aromatic |
| 3 | PH | Basic in nature |
| 4 | Irritability | Non irritant |
| 5 | Stability | Stable |
| 6 | Consistency | Semisolid |
| 7 | Spreadability | Uniform |
| 8 | Washability | Easily washable |
| 9 | Removal | Easily removable |

6 Conclusion

The scrubbing soap was prepared and evaluated. The main aim of these project is to remove the pigmentation and dead cells from the skin and help to make skin glowing. The above evaluation test show that the scrubbing soap are non irritant and having the gritty particles which help to remove the dead cells from the skin. The chemical constituents in these scrubbing soap help to make skin glowing. This soap superior in antifungal activity because of neem is used as active ingredient. It also helps skin glowing.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Reference

- [1] Kareru,P.G.,Keriko,J.M., Gachanja, A.N.,&Mukiira,H. N.(2010).Antimicrobial activities of skincare preparations fromplantextracts. African Journal of Traditional, Complementary and Alternative Medicines, 7(3).
- [2] Bandyopadhyay, U., Biswas, K., Sengupta, A.,Moitra,P.,Dutta, P., Sarkar, D.,... & Banerjee, R. K. (2004). Clinical studies on the effectofNeem(Azadirachta indica)bark extractongastric secretion and gastroduodenal ulcer. Lifesciences, 75(24), 2867-2878.
- [3] Kapoor,V.P.(2005).Herbal cosmetics for skinandhair care.4(4). 306-315.
- [4] Sandhya l. Borsea, meghawati r. Badwara, dr. Laxmikant b. Borseb, dr. Anil g. Jadhav. Formulation and Evaluation of Two Layered Soap Containing Orange Peel Extract
- [5] Pooja Dave, Gira Patel, Devanshi Patel, Binkal Patel, Rupal Jani. Formulation and Evaluation of Herbal face pack containing Coffea arabica Linn, Myristica Fragens and Lens Culinaris as an antioxidant and antiseptic activity.
- [6] Warra, A. A. (2013) Soap making in Nigeria using indigenous technology and raw materials, African Journal of Pure and Applied Chemistry, 7(4): 139-145
- [7] Okeke, S. U. N. (2009) Home economics for schools and colleges, Onitsha: Africana First publishers Plc Nigeria
- [8] Adaku, U. and Melody, M. (2013) Soap Production Using Waste Materials of Cassava Peel and Plantain Peel Ash as an Alternative Active Ingredient, Implication for Entrepreneurship, IOSR Journal of VLSI and Signal Processing,3(3): 2319 - 4197

- [9] Antezana, W., Calve, S., Beccaccia, A., Ferrer, P., Blas, C. D., Rebollar, P. G. and Cerisuelo, A. (2015) Effects of nutrition on digestion efficiency and gaseous emissions from slurry in growing pigs: III. Influence of varying the dietary level of calcium soap of palm fatty acids distillate with or without orange pulp supplementation, *Animal Feed Science and Technology*, 209: 128-136
- [10] Phanseil, O. N., Dueno, E. and Xianghong, W. Q. (1998) Synthesis of exotic soaps in the chemistry laboratory, *Journal of Chemistry Education*, 75(5): 612
- [11] Kuntom, A., Siew, W. L. and Tan, V. A. (1994) Characterization of Palm acid oil, *Journal of American Oil and Chemical Society*, 71: 525-528
- [12] Formulation and Evaluation of Herbal Soap Patel Anu*, Patel Anar, Patel Jahanvi and Bhavsar Hemal, *IJSRR* 2022, 11(2), 42-72, ISSN: 2279-0543
- [13] Sumit K, Vivek S, Sujata S, Ashish B. Herbal cosmetics: used for skin and hair. *Inventi J* 2012; 3:1-7.
- [14] Varsha M Chaudhari Department of Microbiology, Studies on antimicrobial activity of antiseptic soaps and herbal soaps against selected human pathogens 5(6): 201-204 2016.
- [15] Kareru, P. G., Keriko, J. M., Kenji, G. M., Thiong'o, G. T., Gachanja, A. N., and Mukiira, H. N. (2010). Antimicrobial activities of skincare preparations from plant extracts. *African Journal of Traditional, Complementary and Alternative Medicines*, 7(3).
- [16] <https://www.healthline.com/health/beauty-skin-care/how-often-should-you-exfoliate-your-face>
- [17] Dave P, Patel G, Patel D, Patel B, Patel D, Chakraborty G S, Jani R. Formulation and Evaluation Herbal Face Scrub containing *Coffea arabica* Linn, *Myristica fragrans*, And *Lens culinaris* as an Antioxidant and Antiseptic Activity. *International Journal of Drug Delivery Technology*. 2022;12(3):1183-1186.
- [18] Hughes, G.R., *J.Soc. Cosmet. Chem.*, 1959, X, 159.
- [19] Charaka Samhita, Handbook on Ayurveda, Editor, Gabriel Van Loon, 2002-2003 Vol 1.
- [20] Prashant, L., Kole et al, Cosmetics potential of herbal Extracts, *natural Product Radiance*, Vol 4(4), 2005, p 315-321.
- [21] Saad A. H, Gamil S. N, Kadhim R. B, Samour R, Formulation and Evaluation of Herbal Hand Wash from *Matricaria chamomilla* Flowers Extracts, *International Journal of Research in Ayurveda and Pharmacy* 2011;2(6):1811-1813.
- [22] Londhe J, Jagpat S. D, Doshi C, Formulations of Herbal Hand Wash with Potential Antibacterial Activity, *International Journal of Research in Advent Technology*, 2015: 21:11-12
- [23] Rangari V. D, *Pharmacognosy and phytochemistry*, 2nd edition reprint. career publication; Nashik; May 2012, 115.
- [24] Majekodunmi S. O, Essien A. A, Development and evaluation of antimicrobial herbal formulations containing the methanolic extract of *Cassia alata* for skin diseases, *Journal of Coastal Life Medicine*, 2014; 2(11): 872-875.