



INTERNATIONAL JOURNAL OF PHARMACEUTICAL AND HEALTHCARE INNOVATION

journal homepage: www.ijphi.com



Review Article

A Review on Formulation Development of Herbal Face Wash

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Article Info

Abstract

Article history:

Manuscript ID:

IJPHI2904100518052026

Received: 29-APR -2026

Revised : 10-MAY -2026

Accepted: 18-MAY -2026

Available online: MAY-2026

DOI:

[doi:10.62752/ijphi.v3i2.261](https://doi.org/10.62752/ijphi.v3i2.261)

Keywords:

Herbal Face Wash,
Skin Care,
Herbal Cosmetics,
Natural Cleansing

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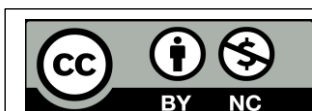
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Our skin is constantly exposed to environmental pollutants, dust, microbes, UV rays, and harmful chemicals that can cause acne and dryness, irritation, pigmentation, and premature aging. Proper cleansing is important for maintaining healthy skin. Face wash formulations are utilized to eliminate dirt, oil, sweat, dead skin, and other impurities from the surface of the skin. Herbal face wash formulations are gaining increasing popularity because of the growing awareness of the harmful effects of so-called "beauty" products. These include synthetically prepared cosmetic products containing parabens, sulfates, alcohols, and other artificial chemicals. Herbal face wash products are made using natural ingredients with cleansing, antioxidant, antimicrobial, anti-inflammatory, and moisturizing properties. They are gentle on the skin and have no side effects.

The herbal ingredients naturally cleanse, nourish and protect your skin effectively. The present review article presents an overview of the development of herbal face wash formulations. It includes the role of herbal cosmetics in skincare, the herbal ingredients used in formulations, preparation methods, evaluation parameters, advantages, limitations, and future scope of herbal face wash products. The review also demonstrates the growing need for herbal-based cosmetics, as they are safe, biodegradable, eco-friendly, and therapeutic. Herbal face wash formulations provide a natural and safe method for cleansing the skin without any unwanted side effects, which are observed with synthetic face washes.

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Introduction



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Our body's biggest organ is skin and the skin is also the most important organ of the body. The skin protects against environmental pollutants, harmful microorganisms, ultraviolet rays, chemicals, and physical damage to the skin. Healthy skin is a reflection of not only good health but also of personal appearance, confidence, and quality of life. Currently, lifestyle factors expose the skin to dust, dirt, pollution, over-oily secretion, stress, chemical-based cosmetics, and different climatic conditions. All these factors cause different skin problems, including acne, pimples, dryness, irritation, pigmentation, blackheads, and premature aging [1]. Maintaining healthy, clean, and glowing skin requires proper cleansing and skincare. Face wash preparations are skincare products designed to remove dirt, excess oils, sweat, dead skin cells, makeup, and environmental pollutants from the skin's surface. Regular cleansing of the face helps maintain skin hygiene, prevents clogging of skin pores, and is beneficial for skin texture [2]. Moreover, it prevents microbial infections and acne formation. Reputed over-the-counter face wash products typically contain synthetic detergents, sulfates, parabens, alcohols, artificial fragrances, preservatives, and other harsh chemicals that can damage the natural skin barrier and trigger irritation, dryness, allergies, and long-term skin issues [3]. The continuous use of chemical-based skincare products may disrupt the natural pH and moisture balance of the skin, particularly for sensitive skin [4]. Owing to the increasing number of eco-conscious consumers and the potential harmful effects of synthetic cosmetic products, consumers are now opting for safer, environmentally friendly, biodegradable, and skin-friendly herbal and natural cosmetic formulations. Creams made from natural plant extracts increase the beauty of the skin. Because of their negligible side effects, they are created and used in a variety of products because they provide natural cleansing, nourishment, hydration, antioxidant protection, and healing effects. Herbal face wash formulations that contain ingredients such as neem, aloe vera, turmeric, tulsi, cucumber, sandalwood, honey, rose water, tea tree oil, and essential oil have anti-microbial, anti-inflammatory, antioxidant, soothing, and moisturizing properties that are beneficial for the skin. Neem is a well-known antioxidant and anti-acne agent antiseptic [5]. Aloe vera can provide cooling, hydrating, and healing effects [6]. Turmeric has antioxidant and anti-inflammatory properties that reduce acne and skin irritation. Honey is a natural humectant that helps retain moisture and makes the skin soft. Similarly, rose water and cucumber extracts refresh the skin, keeping

it hydrated. Formulations of herbal face wash will not only cleanse the skin but also nourish and protect the skin naturally. Herbal face washes are gentler on the skin and do not disturb the natural oil balance and pH levels of the skin, which reduces irritation and dryness. The use of natural ingredients rich in antioxidants shields the skin from oxidation caused by pollution and UV rays, preventing premature aging [7]. The demand for herbal skincare products has increased in recent years as consumers now prefer safe long-term usage that will not harm the environment. Herbal ingredients, selection of techniques, and evaluation studies are other important areas that require active attention during the development of face wash formulations [8]. They will assess the stability, safety, texture, spreadability, cleansing efficiency, skin feel, and compatibility of the product. The quality of the final product is determined through the evaluation of various parameters, such as pH, viscosity, foamability, spreadability, stability, irritancy, and cleansing action. Consequently, herbal cosmetics have gained popularity in recent years [9]. In addition, there are many uses of herbal cosmetics, such as face washes, shampoos, oils, and more. The main objective of the present review is to discuss the formulation development of herbal face wash. Furthermore, we present the importance of herbal cosmetics in skin care, commonly used herbal ingredients, formulation development, evaluation parameters, advantages, limitations, and future scope. Herbal face wash formulations are an effective and natural way to keep the skin healthy, clean, refreshed, and glowing without adverse effects and without chemical residues [10].

Anatomy and Physiology of Skin

The skin is the largest organ of the human body. It acts as a barrier between internal body organs and the external environment. In the body, the skin protects humans from external injuries and infections through its immune system. The skin encases the entire body surface and constitutes approximately 15% of the total body weight in adults. Healthy skin is not just important to protect your body, it also helps you to look good and feel good[11]. Knowing the skin's anatomy and physiology is important for the formulation and development of skin preparations like herbal face wash due to their direct application to the skin and their effect on the skin. The skin is anatomically composed of three main layers: the epidermis, dermis, and hypodermis or subcutaneous tissue. The epidermis is the outermost layer of the skin. It serves as the first layer of

defense against environmental pollutants, microorganisms, UV radiation, and harmful chemicals. The outer skin or epidermis is composed of keratinized stratified squamous epithelial cells or keratinocytes. It has several sublayers, including the outer layer or stratum corneum [12]. The stratum corneum, the outermost layer, consists of dead keratinized cells that prevent excessive water loss and protect against damage. Melanocytes in the epidermis are responsible for producing melanin pigment, which is responsible for the color of the skin and provides protection from harmful UV rays. The epidermis constantly replaces cells made in the basal layer by pushing them to the surface and replacing dead cells. The dermis, which is present beneath the epidermis, is a thicker connective tissue layer of the skin. The dermis contains collagen and elastin fibers, blood vessels, lymphatic vessels, nerve endings, hair follicles, sebaceous glands, and sweat glands. The skin's structural support and firmness arise from collagen, while flexibility and elasticity are due to elastin. The dermis has sebaceous glands that secrete the oily substance sebum, which lubricates and moisturizes the skin and hair. When the skin type produces too much sebum, the skin becomes oily and can develop acne. However, when it produces too little, the skin becomes dry and irritated. The glands that secrete sweat help in cooling the body by evaporation. The dermis has sensory receptors that detect touch, pressure, pain, heat, and cold sensations. The dermis has blood vessels that help provide essential nutrients and oxygen to skin tissues. It also helps monitor and control temperature [13]. The hypodermis can be defined as the layer of the skin found below the dermis. The hypodermis is also known as the subcutaneous layer and is mainly composed of connective and fat tissues. This layer serves as an energy reserve. It also acts as an insulator. It is also a shock absorber. Also, it protects muscles and organs that are below it. This protection is from mechanical injury. The skin performs physiologically important functions that are required to maintain health and homeostasis. Protection against physical, chemical, microbial, and ultraviolet damage is one of the functions of the skin. The skin barrier protects against the entry of pathogens and toxins and minimizes water loss from the body. The skin helps maintain body temperature by regulating heat loss through sweating and constricting or dilating blood vessels. Sensation is another crucial function of the skin, as specialized nerve endings allow the body to react to stimuli. Our skin is responsible for defending us against infection through the immune cells present in our skin. Regularly

cleansing the skin is essential to remove dirt, sweat, excess sebum, old skin cells, pollens, and other impurities that might have settled on the skin surface. This might block pores and cause acne and/or infections. Herbal face washes are created in such a way that they gently clean the skin without altering the natural process while keeping it hydrated. To develop a potential herbal formulation for skin, it is necessary to understand skin anatomy and physiology to gain better insight into how the skin works and to maintain healthy skin[14].

Common Skin Problems

From all ages skin problems are the very common health and cosmetic issue among people. As the skin is constantly in contact with environmental pollutants, noxious microorganisms, ultraviolet rays, toxins, stress, and climate changes, it becomes prone to a large variety of disorders and diseases that affect its outer appearance and skin health. Skin problems result from improper skin treatment, poor hygiene, hormonal changes, unhealthy diets, overuse of cosmetics, and genetic factors. If these conditions are not managed effectively, they can cause discomfort, irritation, diminished self-confidence, and chronic skin damage. It is imperative to recognize and understand common skin problems to formulate an herbal face wash that helps in the natural cleansing, protection, and maintenance of healthy skin. Acne is a common skin issue caused by the clogging of hair follicles and sebaceous glands by excess sebum, dead skin cells, and bacteria. Acne typically refers to the skin condition that affects those with oily skin. This condition occurs as a result of the skin's oil glands secreting a waxy substance that blocks pores. If not treated properly, acne may cause scarring, pigmentation, and psychological stress [15]. Excessive production of oil and bacteria leads to acne development. Dry skin or xerosis occurs when the skin loses moisture, with the dead outer skin obstructing skin surface moisture retention. Dry skin may feel rough to the touch and look flaky and dull in tone. It may also itch and crack in severe cases, becoming irritated and sore. Wintery weather, dehydration, soap, excessive washing, and age cause skin to dry out. Oily skin conditions affect many people as they occur due to active sebaceous glands producing excess sebum. People with oily skin have shiny and greasy skin, which is more prone to acne, blackheads, and enlarged pores. Effective cleansing is key for oily skin management and pore blockage prevention. Pigmentation and dark spots are issues most commonly caused by excessive melanin production due to UV exposure, acne

scars, hormonal imbalance, inflammation, old age, and environmental pollution. Unwanted pigmentation, tanning, freckles, or dark patches on the skin which make the skin tone unevenness [16]. Extended exposure to sunlight without wearing sunscreen can lead to sunburn and ultraviolet damage to the skin. The sun's ultraviolet rays can damage skin cells and result in faster aging. It also causes redness, irritation, and tanning. It can even cause wrinkles and skin cancer in extreme cases. One of the most common skin problems lately that we come across is premature aging. It causes wrinkles, fine lines, sagging, and the skin losing elasticity. When the collagen and elastin fibers of our skin undergo oxidation due to pollution, UV lights, smoking, and wrong eating, we suffer from premature aging. Sensitive skin refers to a condition in which one's skin gets reactive to cosmetic products, chemicals, weather changes such as heat or cold, as well as allergens. The skin will show symptoms of redness, itching, burning sensation, as well as irritation. Many synthetic skincare products that contain harsh chemicals aggravate sensitivity and damage the skin's barrier. Infections like bacteria, fungus, and viruses may affect the health and appearance of the skin. Infections including fungus, boils, and dermatitis can result from poor hygiene, excessive sweating, and a decrease in immunity [17]. Reactions to certain cosmetics, environmental allergens, chemicals cause allergic reactions and inflammation development. It leads to redness, swelling, itching, irritation, etc. Stress and hormonal fluctuations can worsen a lot of skin ailments. Using the right products for cleansing and care can prevent these skin issues. These herbal face wash formulations that contain natural ingredients such as neem, aloe vera, turmeric, honey, tulsi, cucumber, and tea tree oil have antimicrobial, anti-inflammatory, antioxidant, and moisturizing actions. Moreover, they help to gently cleanse your skin without disturbing its natural balance. Consumers favor herbal products because they tend to be safer, less irritating, and suitable for prolonged use. For herbal formulations to be able to produce effective face washes that would lead to healthy, clean, smooth, and glowing skin, understanding the common skin problems is important [18].

Role of Herbal Cosmetics in Skin Care

In contemporary skin-care systems, herbal cosmetics are not only acceptable but also ideal because they afford a better and efficient way of allowing one to achieve skin that is healthy without the harmful side effects which come with cosmetics. Skin is constantly exposed to environmental

pollutants, UV radiation, microorganisms, stress, dust, and harmful chemicals that may damage the skin barrier and lead to various skin problems, such as acne, dryness, irritation, pigmentation, inflammation, and premature aging [19]. Thus, taking proper care of the skin is essential to protect, nourish, and maintain its natural balance. Many conventional skincare products contain irritants, such as parabens, sulfates, artificial fragrances, alcohols, preservatives, and other synthetic ingredients, which can cause irritation, allergic reactions, dryness, and long-term skin damage, especially for those with sensitive skin. Because of the growing awareness of these dangers, consumers are now favoring herbal cosmetics that mainly use plant-derived ingredients with medicinal and cosmetic purposes. Herbal cosmetics are preparations made from all-natural ingredients, including herbs, essential oils, natural waxes, fruits, and flowers, to cleanse, moisturize, protect, and rejuvenate the skin. These products are preferred because they are biodegradable, seed-friendly, economical, and generally safe for longer use. Herbs are key ingredients in the skincare formulations of many brands today [20]. However, did you know that various traditional systems of medicine have been using herbs and herb extracts in their formulations for centuries? Ayurveda, Unani, Siddha, and Traditional Chinese Medicine are just some of the systems that have extensively used plants for healing and beautification. Bioactive substances, such as flavonoids, phenolic compounds, vitamins, minerals, alkaloids, tannins, and antioxidants, present in herbal cosmetics provide multiple benefits to the skin. Cleansing and purifying the skin is one of the key roles of herbal cosmetics in skincare. Herbal products, such as face washes, scrubs, and cleansers, help remove dirt, excess oil, sweat, dead skin cells, and impurities without disturbing the natural moisture balance of the skin. Neem, tulsi, tea tree oil and turmeric have antimicrobial properties. These help in reducing bacterial action to prevent acne and infections. Another important function of herbal cosmetics is moisturizing and hydrating. Ingredients, such as natural aloe vera, honey, cucumber, almond oil, and coconut oil, are known to retain moisture. These ingredients deeply nourish the skin while protecting it from dryness and irritation. Herbal cosmetics provide antioxidant protection to the skin against the harmful effects of pollution and ultraviolet radiation. Environmental exposure produces free radicals that damage collagen and skin cells, resulting in wrinkles, fine lines, and premature aging [21]. Free radicals are neutralized by the antioxidants found in herbal

ingredients, which help keep the skin youthful and healthy. Essentially, a study found that herbal cosmetics play an effective role in reducing inflammation, redness, and irritation. Most plant extracts have anti-inflammatory and soothing properties that help keep the skin calm. Aloe vera, sandalwood, rose water, and chamomile are beneficial for soothing irritable skin and healing damaged tissues. Another key function of herbal cosmetics includes skin lightening and complexion improvement. The natural extracts of turmeric, saffron, beetroot, lemon, and papaya lighten pigmentation, tanning, and dark spots. Skin regeneration and enhanced blood flow occur with herbal products, leading to healthy, glowing skin. Furthermore, herbal cosmetics help maintain the natural pH balance and protective barrier of the skin, thereby preventing moisture loss and skin infections. Herbal cosmetics have gained immense popularity in recent years. This has forced the cosmetic industries and researchers to make innovative herbal formulations [22]. They are working on formulations that are effective, stable and user-friendly. Herbal face wash formulations have gained huge popularity for their ability to cleanse the skin gently while nourishing and protecting it. Consequently, herbal cosmetics naturally offer various therapeutic actions, such as cleansing, moisturizing, antioxidant, anti-inflammatory, healing, and rejuvenation, with minimum side effects that help the skin to get an added advantage and overcome the disadvantages of various synthetic cosmetics [23].

Herbal Ingredients Used in Face Wash Formulation

Herbal face wash formulations consist of various natural ingredients that provide cleansing, moisturizing, antimicrobial, antioxidant, soothing, and skin-protecting effects. More and more face wash products are bringing herbal ingredients into the fold. This is because they are considered safer, eco-friendly, biodegradable, and less harmful than synthetic chemical-based face cleansers. Herbal ingredients enable us to use natural ingredients, which are rich in bioactive compounds such as flavonoids, vitamins, phenolic compounds, alkaloids, tannins and essential oils. These will help maintain healthy, clean and glowing skin. The components found in different herbal face washes have a specific function in the formulation. It could be cleansing, hydration, anti-acne, brightening or soothing. Neem oil is extracted from the seeds of the neem tree (*Azadirachta indica*). Scientific research has proven its antibacterial, antifungal, and anti-inflammatory activities. It has a long history of use as a cosmetic ingredient. And,

herbal ingredient in face wash formulations. It possesses strong bactericidal and topical anti-inflammatory properties. Using neem removes bacteria that cause acne, reduces the outbreak of pimples, keeps excess oil secretion in control, and prevents other skin infections. Aloe vera is another widely used ingredient because of its ability to moisturize, soothe, cool, and heal. Aloe vera moisturizes the skin, decreases irritation, and allows damaged skin to heal. It works particularly well for those with dry and sensitive skin [24]. Natural skin care formulations benefit from the antioxidant, antimicrobial, and anti-inflammatory properties of turmeric. It helps fade acne, blemishes, redness, and skin irritation and enhances the skin tone. Holy basil (*Ocimum sanctum*), or Tulsi, is found in face wash products because of its antimicrobial and antioxidant activities. Tulsi purifies the skin, helps with acne, and protects the skin from pollution. Natural humectant honey helps to attract and retain moisture in the skin to keep it soft and supple. It also heals and fights bacteria, which is beneficial for acne and damaged skin. Cucumber extract is cooling, refreshing, and soothing while helping to minimize skin dryness and puffiness. Rose water refreshes, hydrates, and soothes the skin [25]. It is used as a toner and fragrance enhancer. It also helps maintain the pH balance of the skin. Sandalwood has a cooling effect while also possessing anti-inflammatory and antiseptic properties. This helps in reducing irritation, acne, and redness on the skin. Moreover, it helps improve the texture and complexion of the skin. Tea tree oil, lavender oil, and peppermint oil are essential oils included in small amounts in the formulation because of their antimicrobial, refreshing, and relaxing effects. Tea tree oil is especially effective against acne-causing bacteria and helps reduce oily skin. Lemon extract and orange peel extract are infused with vitamin C and natural acids. They help brighten the skin and lighten tanning with the oil. The enzymes in papaya extract cause skin exfoliation and sloughing off of dead skin cells, thus making the skin smoother and glowing. Inclusion of other herbal ingredients, such as multani mitti, green tea extract, chamomile, licorice, etc., can also be done for their cleansing, antioxidant, anti-inflammatory, and skin-lightening properties. Natural gelling agents, surfactants, such as xanthan gum or plant-based cleansing agents, are incorporated to provide a suitable consistency and foam formation in the formulation. The blend of natural herbs helps detoxify and clear away impurities from the skin while nourishing it. Within the formulation of the herbal face wash products, therefore,

herbal ingredients play an important role. Moreover, these products help maintain healthy, refreshed, soft, and glowing skin with minimal side effects [26].

Importance of Herbal Face Wash

An herbal face wash is essential for healthy, clean, and glowing skin. It provides effective cleansing while protecting and nourishing the skin with natural ingredients. The skin of the current population is constantly exposed to dust, dirt, pollution, sweat, excess oil, microbes, cosmetics, and harmful ultraviolet radiations, which can lead to a plethora of skin issues, such as acne, pimples, dryness, dullness, irritation, and pigmentation. There should be proper facial cleansing in order to remove impurities and maintain hygiene. In the market, there are various face wash products that are made using synthetic detergents, sulfates, alcohols, artificial fragrances, and preservatives. These can damage the skin barrier and cause dryness, irritation, and allergic reactions. Additionally, they can also cause long-term damage. Owing to the growing awareness of the harmful effects of chemical-based skincare products, herbal face wash formulations have become popular because they are safe, eco-friendly, biodegradable, and skin-friendly [27]. The key benefits of herbal face washes include their gentle cleansing action. A herbal face wash not only removes dirt, excess sebum, sweat, dead skin cells, and pollutants but also retains the natural moisture of the face. Unlike harsh synthetic cleansers, herbal formulations help reduce skin dryness and irritation. Ingredients that help prevent acne from herbal products, such as neem, tulsi, tea tree oil, and turmeric, have antimicrobial and antibacterial properties. These ingredients can reduce acne-causing bacteria and prevent skin infections. Herbal face washes are particularly advantageous for oily and acne-prone skin. Herbal face wash can also provide moisture and hydration to skin. Aloe vera, honey, cucumber, almond oil, rose water, etc., provide hydration, softness, and smoothness to the skin while preventing it from drying or becoming rough. These natural ingredients feed the skin and facilitate a healthy skin texture [28]. Herbal face washes are important for fighting off oxidative stress and protecting the skin from environmental damage. Plants possess antioxidants, such as flavonoids, phenolic compounds, and vitamins, that can neutralize free radicals from pollution and UV rays. The skin cells and collagen fibers are damaged by free radicals which cause premature aging and dullness. The antioxidant benefits offered by herbals help in the protection of the skin from any such

damage and keeps it youthful and glowing. Herbal face wash formulations have anti-inflammatory and soothing properties that can reduce redness, irritation, itching, and inflammation. Ingredients such as aloe vera, sandalwood, cucumber, and chamomile help calm and cool irritated or sensitive skin [29]. Another essential benefit of herbal face wash is the enhancement of skin complexion and texture. Ingredients such as turmeric, lemon extract, papaya extract, and sandalwood reduce pigmentation, tanning, and dark spots. Moreover, they enhance the skin's natural brightness. Herbal face washes can help unclog pores and improve blood circulation to the skin for a fresh appearance. Furthermore, herbal products are relatively safer for the long-term owing to the lesser presence of harsh chemicals and synthetic additives. They are appropriate for all skin types, including the most delicate. Herbal face washes are made from biodegradable materials, which helps to reduce pollution [30]. Herbal cosmetics are in great demand all over the world. Therefore, herbal cosmetic formulation is one such innovative herbal skin care product, which provides cosmetic as well as therapeutic effect. Regular use of a herbal face wash can keep the skin clean, fresh, hydrated, soft, and appearing well, thus reducing the risk of skin problems. Modern face washes are essential in skincare because they help cleanse, nourish, protect, moisturize, and rejuvenate the skin without causing hazardous effects, such as those of cosmetic products [31].

Materials Used in Herbal Face Wash

The herbal face wash formulation consists of different types of natural ingredients that have cleansing, moisturizing, antimicrobial, antioxidant, soothing, and skin-protective effects. Choosing the right materials is one of the most crucial steps in the creation of an effective herbal face wash, as each ingredient has a particular function. This function ameliorates the quality, stability, texture, and therapeutic efficacy of the product. Herbal face wash formulas are better than synthetic cleansers because they use plant-derived ingredients that are safer for the skin, biodegradable, eco-friendly, and less likely to irritate or cause allergies. Herbal face-wash formulations generally contain herbal extracts, cleansing agents, moisturizing agents, gelling agents, preservatives, fragrance enhancers, and solvents [32]. Neem extract is a key ingredient in most herbal face washes owing to its strong antibacterial, antifungal, and anti-inflammatory activities. Neem oil kills the bacteria that cause acne. It regulates the output of excess oil from the skin. It also protects the skin from infections.

Another important ingredient commonly used is aloe vera gel, which has moisturizing, soothing, cooling, and healing effects. It aids skin moisture and reduces irritation, redness, and other issues. Turmeric extract is added to many herbal face washes for its antioxidant and antimicrobial properties, which help fight acne and other skin concerns, such as pigmentation, inflammation, and enhance skin glow. The antimicrobial and antioxidant properties of tulsi extract purify and protect the skin naturally. Honey serves as a natural humectant that retains moisture as well as makes skin soft and smooth. It also has healing and antibacterial properties, which are beneficial for acne-prone and damaged skin [15]. Cucumber extract and rose water are frequently employed on the skin because of their refreshing, cooling, and soothing effects. Furthermore, they help maintain skin hydration and pH levels. The inclusion of other oils, such as tea tree, lavender, and peppermint oil, in small amounts helps improve the fragrance and serves antimicrobial and refreshing purposes. Tea tree oil helps fight two causes of acne: bacteria and oily skin. Lemon extract, orange peel, and papaya extracts are used for skin brightening by exfoliating dead skin. The above ingredients help reduce tanning, pigmentation, and dead skin cells, and improve skin texture and complexion [33]. In addition to herb extracts, suitable cleansing agents or surfactants are required in face wash formulations to effectively remove dirt and grease. Mild surfactants, such as sodium lauryl sulfate alternatives, coco glucoside, or herbal cleansing bases, are often used to provide foam formation and cleansing action with mildness. The formulation is provided with the appropriate consistency and viscosity using suitably selected gelling agents, such as carbopol, xanthan gum, or guar gum. These agents help maintain the smooth texture and spreadability of the face wash. Distilled water is typically used as the solvent or base medium for dissolving and mixing [34]. Vitamin E oil and a few essential oils can be used as natural preservatives to enhance the shelf life and stability of a formulation by preventing oxidation and microbial growth. Fragrance enhancers and natural colorings may also be incorporated to improve consumer acceptability and the aesthetic appeal of the product. The ability of a material to deliver a benchmark product depends on its quality and purity. It also affects the safety, efficacy, texture, and stability of products. The herbal face wash formulation ingredients are responsible for yielding a safe, effective, and skin-friendly cosmetic preparation capable of maintaining healthy and radiant skin naturally [35].

Formulation Methodology

The preparation of a herbal face wash requires the systematic selection of appropriate herbal ingredients. The selection is followed by preparing and mixing them to ensure a stable product. The purpose of preparing a herbal face wash is to prepare a cleansing formulation that removes dirt, excess oil, sweat, dead skin cells, and other impurities from the skin surface and nourishes and protects the skin naturally. The proper formulation method must have certain properties, such as pleasant therapeutic and aesthetic properties. Moreover, it also includes the ability to spread, foam, and stabilize. Formulations for herbal face wash preparations are usually made using herbal extracts plus cleansing agents, gelling agents, moisturizers, preservatives, and fragrances. The formulation process begins with the selection of high-quality herbal ingredients, such as neem, aloe vera, turmeric, Tulsi, cucumber, honey, rose water, tea tree oil, essential oil, etc. The herbal materials are cleaned and dried to obtain extracts or powders, which are added to the formulation. Extraction of herbal compounds may be carried out using water, ethanol, or hydroalcoholic methods, depending on the properties of the active ingredient. Once extraction is complete, filtering is performed to obtain a clear extract [36]. Next, we take the required amount of distilled water in a clean container. We then slowly disperse gelling agents, such as carbopol or xanthan gum, in the water with continuous stirring to avoid lump formation. The mixture is adequately hydrated to develop a suitable viscosity and consistency. Mild cleansing agents or surfactants are then gradually added with gentle stirring to minimize excessive bubbling during preparation. Owing to their chemical structure, surfactants provide oily cleaning action and dirt removal from the skin. Neem, aloe vera, turmeric, Tulsi, and other herbal extracts are added to the base mixture and mixed well to achieve uniformity. To maintain skin hydration and prevent dryness after cleansing, honey, glycerine, or aloe vera gel may be added to the facewash. The fragrance may be enhanced, and antimicrobial and soothing properties may be added by including a small number of essential oils, such as tea tree, lavender, or rose oil. Cucumber extract and/or rose water may also be present for comfort, refreshment, and cooling. Natural preservatives and antioxidants, such as vitamin E oil, may be included to enhance stability and shelf life by preventing spoilage from oxidation and microbes [37].

The formulation uses pH-adjusting agents to adjust the pH of the formulation so that it matches the natural pH of the skin, which is between 5 and 7. A proper pH is crucial because highly acidic or alkaline formulations can be skin irritants, causing damage to the barrier. The blended mixture was continuously stirred until a smooth gel without lumps was obtained. The preparation process was performed under maintained hygienic conditions to prevent contamination of the product [38]. After the formulation process, the herbal face wash is placed in clean, dry containers or tubes that are appropriate for filling. The quality and efficacy of the prepared formulation are estimated by evaluating its pH, viscosity, spreadability, foamability, stability, irritancy, and cleansing efficiency. Stability studies can be conducted under various storage conditions to note any changes in color, Odor, consistency, or microbial growth. Thus, formulation methodology is critical in the successful development of herbal face wash formulations that ensure cleansing, nourishment, moisturizing, and protection of the skin to maintain its health and natural glow [39].

Evaluation Parameters

Printed foils are utilized for packaging trusted gum products that provide information about the product, ingredients, and usage, which helps guide the customer in making the right choice. Face wash preparations are applied directly to the skin and must possess suitable physical, chemical, and biological properties for safe and effective use. Different tests are performed to evaluate the appearance, texture, pH, viscosity, spreadability, foamability, cleansing ability, stability, and skin compatibility of the formulation. Proper evaluation helps the herbal face wash to cleanse, nourish, and not be irritating or harmful [40]. The color, odor, appearance, texture, characteristics, and consistency of the formulation were evaluated organoleptically, which is one of the evaluation parameters. A good herbal face wash should have an attractive appearance, pleasant fragrance, smooth texture, and uniform consistency that does not contain any lumps or phases. These features are important for customer satisfaction and product acceptability. Another important parameter is pH determination. The pH of the face wash should correspond with the natural pH of the skin, which is between 5 and 7. If the pH is improper, it can cause irritation, dryness, and disturbance of the skin barrier. Usually, the pH is measured using a digital pH meter [41].

The thickness and flow characteristics of the formulation can be assessed using viscosity. An important viscosity makes it easy to apply and spread the face wash on the skin. If a formulation is too thick, it may be difficult to spread, which could lead to an unsuitable thickness. In contrast, a very thin formulation may not remain on the skin long enough for adequate cleansing action. Spreadability is another important parameter that indicates how easily the product can be spread uniformly on the skin. Good spreadability improves the application and comfort of use [42]. Furthermore, foamability and foam stability assessments are conducted because consumers are thought to prefer face washes that foam. The foam volume and persistence were measured by shaking a fixed amount of the formulation with water. Foam formation for cleansing problem solution has commercial importance. One of the most important evaluation parameters is the cleansing ability, as the main purpose of a face wash is to efficiently remove dirt, grease, sweat, and impurities. The cleansing property was determined by observing how well the oil or dirt on the skin surface was removed. Skin irritation or patch testing are critical evaluation parameters for establishing the safety of a formulation. A small amount of the face wash was applied to the skin to check for any signs of redness, itching, burning, swelling, or allergic reactions. The best herbal face wash should be free from irritation and suitable for frequent use, especially for sensitive skin types. The ease with which this product can be removed using water was tested. It should wash off the skin with a minimum of residue [43]. Stability studies are conducted to determine the physical and chemical stability of a formulation under different temperatures, humidity levels, and light conditions. The parameters, including color, odor, consistency, pH, phase separation, and microbial growth, are observed to change over time. Studies on the stability of products help to determine shelf lives and storage conditions for the product. Sometimes, an examination for microorganisms may also take place to verify that the formulation is microbiologically harmless and remains microbiologically stable during storage. Consumer acceptability trials can be conducted to evaluate user satisfaction with the texture, scent, cleansing efficiency, and skin feel post-use. Consequently, assessment parameters help to ensure the quality, safety, efficacy, and stability of herbal face wash formulations intended to maintain healthy, clean, and glowing skin [44].

Advantages of Herbal Face Wash

The increasing awareness among buyers regarding the detrimental impact of using synthetic cosmetic products containing harsh chemicals, sulfates, parabens, artificial fragrances, and preservatives has propelled the demand for herbal face wash products in recent years. Notably, the use of these products does not cause any side effects. Herbal face washes are considered safer, eco-friendly, biodegradable, and better for the skin. This makes them useful for everyday skin care. The gentle cleansing action of herbal face washes is a key advantage. Using an herbal face wash helps remove dirt, excess oil, perspiration, dead skin cells, pollutants, impurities, and other harmful attributes from the surface of the skin without damaging the skin's natural protective barrier. Unlike harsh chemical cleansers that may strip away natural oils and cause dryness or irritation, herbal formulations help keep the skin nourished and balanced [45]. The other key benefit of herbal face wash is that it can be safely used on different skin types, including but not limited to oily, dry, combination, acne-prone, and sensitive. Ingredients that benefit the skin include neem, aloe vera, turmeric, tulsi, cucumber, honey, and sandalwood, all of which have therapeutic properties. Neem and tea tree oils are antibacterial and antimicrobial in nature, helping to remove acne-causing bacteria and pimple infections. Aloe Vera, combined with cucumber, helps soothe, cool, and hydrate dry, irritated, or red skin. Honey is a natural humectant that retains moisture in the skin, making it soft and smooth. Herbal face wash formulations provide antioxidant effects because they contain phytochemicals, vitamins, flavonoids, and other compounds. Antioxidants in vitamin C help fight free radicals generated by pollutants and UV rays. It protects the skin from premature aging, wrinkling, and dullness [46]. The regular use of herbal face washes enhances skin texture, complexion, and appearance. Ingredients such as turmeric, lemon extract, papaya extract, and sandalwood help reduce pigmentation, tanning, dark spots, and uneven skin tone, while keeping the skin healthy and glowing. Regular use of herbal face wash can help eliminate clogged pores and control the secretion of excess oil. Moreover, it improves blood circulation, which keeps the skin looking fresh and rejuvenated. Another advantage is that most herbal formulations have fewer side effects than chemical skincare products. Since herbal face washes contain fewer chemicals and artificial additives, they do not cause allergies, irritation, or damage the skin in the long run. They can be used without limitations and regularly [47]. Herbal face wash items are also beneficial to the

environment because they use natural and biodegradable components that help reduce environmental pollution. The use of natural herbal ingredients contributes to cosmetic sustainability. In addition, many herbal ingredients have anti-inflammatory and healing properties that soothe and repair damaged or irritated skin. Natural herbal face wash preparations are usually inexpensive and easily made from available natural products. The natural fragrances they offer are pleasant, and their refreshing effects elevate satisfaction. The consumer preference for natural and organic products is increasing, prompting researchers and the cosmetic industry to develop herbal face washes with improved quality and therapeutic characteristics. Thus, herbal face wash is a useful and valuable product with the ability to cleanse the skin without harming it, moisturize the skin, provide antioxidant protection, reduce acne, rejuvenate the skin, be environmentally sustainable, be safe, be good for the skin, and promote health with every use [48].

Conclusion

The present review on the formulation development of herbal face wash highlights the growing importance of herbal cosmetics in today's scenario and their effectiveness in maintaining healthy and attractive skin. The skin is consistently subjected to harmful microorganisms, ultraviolet rays, excessive oil, and chemical cosmetics, which could lead to acne, dryness, irritation, pigmentation, and premature aging. We must perform the proper cleansing to maintain skin hygiene and skin health. Herbal face wash formulations are made from plant-derived ingredients that have therapeutic and cosmetic benefits and provide a safe, natural, and effective alternative to synthetic cleansers. Neem, aloe vera, turmeric, tulsi, cucumber, honey, rose water, sandalwood, and essential oils have amazing antimicrobial, antioxidant, anti-inflammatory, moisturizing, and soothing properties that help clear, nourish, protect, and rejuvenate the skin naturally. Herbal face washes rinse off impurities, dirt, excess sebum, dead skin cells but do not disturb the natural pH and moisture balance of skin. Herbal formulations are less problematic than their synthetic counterparts, which contain harmful chemicals and surfactants. Therefore, they are safe for sensitive skin and acne-prone skin. The antioxidant capacity of herbal ingredients protects the skin from oxidative stress and pollution and ultraviolet-induced premature aging. Different evaluation studies, such as pH determination, viscosity, foamability, spreadability,

stability testing, cleansing efficiency, and skin irritation studies, ensure the quality, safety, and efficacy of the final formulation. Herbal skincare preparations have become remarkably popular worldwide because of the rising demand for natural, environmentally safe, and biodegradable cosmetic products. Despite the difficulties regarding shorter shelf life and formulation stability, ongoing research and modern formulations may further enhance the quality and commercial value of herbal face wash products. Thus, an herbal face wash can be envisaged as a potentially beneficial cosmetic formulation that would naturally cleanse, nourish, moisturize, protect, and rejuvenate the skin while minimizing the side effects caused by synthetic cosmetic products and ensuring clean, refreshed, and glowing skin.

Informed Consent: Not applicable.

Funding: No funding was received for this study.

Conflict of Interest: The authors declare no known competing financial interests or personal relationships that could have influenced the work reported in this paper. The authors declare no conflict of interest among themselves. The authors are responsible for the content and writing of this article alone.

Financial Interests: The authors declare that they have no financial interests.

Human and Animal Rights: NA

Ethics approval and consent to participate: Not applicable.

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