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FORMULATION AND EVALUATION OF HERBAL ANTI-ACNE FACE WASH: A BRIEF REVIEW

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1. ABSTRACT

Herbal face washes are utilized for treating acne and pimples, offering a solution that eliminates excess oil while preserving skin nutrients. These face washes feature potent plant-based ingredients like feverfew (Tanacetum parthenium) and neem (Azadirachta indica). Herbal preparations, serving as the foundation of finished herbal medicines, encompass various forms such as comminuted or powdered herbal ingredients, extracts, tinctures, and fatty oils derived from herbal sources. The demand for herbal formulations is witnessing a steady rise in the global market. The development of a herbal face wash utilizing aqueous extracts of neem leaf, tulsi leaf, and orange peel is a commendable effort. Through thorough assessment and evaluation of factors including color, pH, consistency, washability, irritation, and spreadability, the current experiment concluded that the herbal face wash formulation surpassed commercial alternatives in efficacy. Since all ingredients in this composition are herbal in nature, they are considered safe for the skin and reliable.

KEYWORDS: Acne vulgaris, Anti-acne activity, Facewash, Neem, Tulsi, Rosemary

2. INTRODUCTION

Acne manifests as inflammation in hair follicles, resulting in pimples, blackheads, and whiteheads, often triggered by factors such as excessive oil production, dead skin cells, bacteria, and hormonal fluctuations. While commonly associated with adolescence, acne can affect individuals of all ages. Treatment options encompass topical or oral medications, lifestyle adjustments, and adopting good skincare practices, with personalized guidance from a dermatologist for tailored solutions.

The key contributors to acne include increased oil secretion, bacterial proliferation, hormonal shifts, and inflammation, typically afflicting areas like the face, chest, shoulders, and back. Its severity varies from mild, characterized by a few blemishes, to severe, marked by widespread and painful outbreaks. Managing and alleviating acne involves implementing proper skincare routines, lifestyle modifications, and occasionally, medical interventions.

Herbal face washes, formulated with plant-derived ingredients, offer a gentler cleansing alternative by steering clear of harsh chemicals and synthetic additives. They commonly feature soothing, anti-inflammatory, and antibacterial components like aloe vera, tea tree oil, chamomile, and neem. Preferred by individuals seeking natural and potentially less abrasive cleansing options, herbal face washes vary in efficacy and should be chosen based on individual skin sensitivities.

Moreover, herbal face washes tout anti-inflammatory and antioxidant properties, combating skin concerns such as acne, redness, and irritation. The incorporation of herbal ingredients aims to nurture and rejuvenate the skin, promoting a healthier and more luminous complexion. Many opt for herbal face washes to cleanse while preserving the skin's natural oils, fostering optimal skin health. Selecting a suitable herbal face wash should be guided by individual skin requirements and preferences for optimal outcomes.

2.1 TYPES OF ACNE

There exist various types of acne, including:

- **Fungal acne (pityrosporum folliculitis):** This occurs when yeast accumulates in hair follicles, often resulting in itchiness and inflammation.
- **Cystic acne:** Characterized by deep, pus-filled pimples and nodules, cystic acne has the potential to cause scarring.
- **Hormonal acne:** Typically seen in adults, hormonal acne arises from an excess production of sebum, leading to pore blockages.
- **Nodular acne:** A severe variant of acne, nodular acne manifests as pimples on the skin's surface and tender, nodular lumps beneath the skin.

All these acne types can impact self-esteem, with cystic and nodular acne particularly prone to causing permanent skin damage in the form of scarring.

2.2 SYMPTOMS OF ACNE

Common symptoms of acne on the skin comprise:

- **Pimples (pustules):** Bumps filled with pus.
- **Papules:** Small, discolored bumps, usually red, purple, or darker than the surrounding skin.
- **Blackheads:** Pores clogged with a darkened top.
- **Whiteheads:** Pores clogged with a white top.
- **Nodules:** Painful, sizable lumps beneath the skin's surface.
- **Cysts:** Painful, fluid-filled lumps containing pus beneath the skin.

2.3 FACE WASH

A facial cleanser is a skincare product designed to eliminate makeup, dead skin cells, oil, dirt, and pollutants from the facial skin, aiding in unclogging pores and preventing skin conditions like acne. When used in conjunction with a toner and moisturizer, it forms part of a comprehensive skincare regimen.

Advantages of Using a Facial Cleanser:

- It facilitates the removal of dead skin cells, allowing new ones to replace them.
- Regular use promotes fresh and healthy-looking skin, enhancing its radiance.
- By preventing the accumulation of dead skin cells and excess oil, it helps prevent acne, whiteheads, blackheads, and a dull complexion.
- Exfoliating the pores regularly slows down the development of wrinkles by removing dead skin cells.
- The exfoliation process stimulates blood circulation, encouraging skin regeneration and rejuvenation.

Properties of an Ideal Facial Cleanser:

- It should exhibit stability and a pleasing appearance.
- Upon application, it should soften and spread easily without causing drag.
- It should not leave an oily or greasy residue on the skin during or after application.
- After water evaporation, any cream residue should not become viscous.
- Its physical action should focus on flushing the skin and opening pores rather than absorption.
- A thin layer of emollient should remain on the skin post-use.

3. LITERATURE REVIEW

1. Ankita Sehgal et.al; (2023) This study focuses on developing and evaluating a natural anti- acne facial cleanser utilizing aqueous extracts of neem leaves, turmeric, aloe vera, lemon juice, peppermint oil, xanthan gum, and rose water. The main aim is to create an herbal formulation devoid of synthetic additives, aligning with the belief that natural remedies are safer and less likely to cause adverse effects compared to synthetic alternatives. Neem leaves, turmeric, and aloe vera are chosen for their known antimicrobial, antioxidant, and anti-inflammatory properties. Various formulation batches (F1 to F3) were prepared with differing amounts of xanthan gum, and evaluation included assessments of color, consistency, washability, pH, and spreadability. Results from tests related to color, odor, consistency, pH, spreadability, washability, and grittiness indicated satisfactory outcomes for all formulated products (F1 to F3). Batch F2 particularly demonstrated superior spreadability across all formulation studies. The overall success of the herbal face wash containing neem leaves, turmeric, and aloe vera in aqueous extract suggests a promising natural solution for acne treatment. The emphasis on excluding synthetic ingredients aligns with the increasing preference for natural remedies. Further investigation is warranted to compare its efficacy against existing herbal acne treatments available in the market.

2. Mr. Tejas L. Takale et.al; (2023) The widespread belief in the safety of natural remedies compared to synthetic alternatives, attributed to their purportedly fewer side effects, is well- established. There is a noticeable global trend towards the increased demand for herbal blends. This study is centered on the development and evaluation of aqueous extracts for a herbal anti- acne facial cleanser, incorporating Tulsi

leaf extract, hydroalcoholic turmeric extract, and other natural components. Despite the presence of herbal formulations already in the market, our approach advocates for the creation of entirely herbal formulations, devoid of synthetic ingredients. According to literature, plants possess antimicrobial, antioxidant, and anti-inflammatory properties. The Ayurvedic face wash formulation includes ingredients such as Neem leaves, Turmeric Rhizomes, Nutmeg seed, Liquorice root, Honey, Orange tincture, Lemon juice, Xanthan gum, Orange peel extract, Rosewater, Propyl paraben, Methyl paraben, and Sodium lauryl sulfate. Evaluation criteria included parameters such as washability, color, pH, viscosity, spreadability, and irritancy.

3. Martha Srinivas et.al; (2021) Throughout history, individuals have recognized the importance of plants in maintaining healthy and radiant skin. Herbal formulations, renowned for their effectiveness and minimal side effects compared to synthetic drugs, have consistently garnered attention. A significant advantage of herbal cosmetics is their capacity to supply the body with nutrients and vital minerals. Natural facial care emphasizes the utilization of topical cleansers and creams crafted from ingredients sourced from nature, often derived from herbs, flowers, roots, and essential oils. Recent literature reviews underscore the increasing interest in plant-derived components for personal facial care. The market for natural products in personal facial care has demonstrated robust growth, bolstered by clinical and laboratory studies identifying beneficial properties in various natural ingredients. Herbal cosmetics, including facial cleansers, creams, and moisturizing lotions, are widely embraced for daily use. The popularity of herbal cosmetics has surged, garnering significant recognition among consumers in recent times.

4. Vishal Prajapati et.al; (2023) The herbal face wash, derived from hydroalcoholic extracts of turmeric, orange peels, and coffee, is proven to be beneficial without any adverse effects. The plants highlighted in this article possess significant antioxidant, antimicrobial, and anti- inflammatory properties. All the herbal ingredients used in this formulation are easily obtainable in local markets. Since the skin, especially on the face, is a vital and sensitive part of the body, its appearance plays a crucial role in one's overall look. The herbal plants integrated into the face wash not only provide cosmetic benefits but also offer medicinal advantages. Aloe vera, turmeric, and other plants in the blend contribute to softening the skin, eliminating acne, and promoting healing. The evaluation of the herbal formulation includes various parameters such as appearance, color, pH, viscosity, odor, and solubility. This assessment is essential to ensure the safety and effectiveness of the product, thereby avoiding potential adverse effects.

5. Mayur N. Ghotkar et.al; (2018) It is widely acknowledged that natural remedies are generally perceived as safer with fewer side effects compared to their synthetic counterparts. The global market is experiencing heightened demand due to the incorporation of herbal elements. Ongoing research is concentrated on the development and evaluation of herbal anti-acne formulations, incorporating volatile extracts into facial sprays. These formulations include Tulsi leaf extract, hydroalcoholic turmeric extract, black pepper, orange peel, and nutmeg (known for its myristic aroma). While specific local herbal formulas are available, our recommendation advocates for the creation of pure herbal formulations without any artificial ingredients. These plants, well-documented in literature for their antimicrobial, antioxidant, and anti-inflammatory properties, serve as the foundation for these formulations. Several batches (designated as F1 to F5) were produced using xanthan gum, and evaluations encompassed parameters such as color, appearance, stability, pH, and spreadability for each formulation. Comparative analysis with commercially available products revealed that Batch F2 performed exceptionally well across all parameters in the formulation studies.

6. Mrunal Anil Patil et.al; (2023) Due to its delicate nature, facial skin often suffers from dryness and texture loss when exposed to regular soaps. Face wash, a mild cleanser, aims to cleanse without causing irritation. It advertises itself as multifunctional, promising cleansing, anti-aging, anti-acne, moisturizing, and skin-brightening benefits for a youthful and healthy appearance. Traditional face washes in the market, typically available in gel or cream forms and packaged in bulky plastic containers, pose challenges for travel convenience. Additionally, these water-based formulations require preservatives for stability. Current research is directed towards developing herbal face wash tablets to tackle these issues, aiming to reduce costs, packaging size, and the reliance on potentially harmful preservatives. These tablets offer portability. The study evaluated various parameters such as pH, irritability, hardness, friability, thickness, foaming capacity, and accelerated stability for the formulated face wash tablets.

7. Duhan P. et.al; (2023) Herbal face washes are utilized to tackle acne and pimples, formulated to eliminate excess oil while preserving skin nutrients. These face washes integrate plant-based components such as feverfew (Tanacetum parthenium) and neem (Azadirachta indica). Herbal preparations, serving as the cornerstone of finished herbal medicines, include comminuted or powdered herbal ingredients, extracts, tinctures, and fatty oils. The global market is experiencing a surge in demand for herbal formulations. The commendable effort to develop a herbal face wash using aqueous extracts of neem leaf, tulsi leaf, and orange peel reflects a significant endeavor. Through comprehensive assessment of factors like color, pH, consistency, washability, irritation, and spreadability, the current experiment concluded that the herbal face wash surpassed commercial alternatives. With all ingredients being herbal, the formulation is considered safe and dependable for the skin.

8. Mr. Hitendra S Chaudhari et.al; (2023) Acne, a widespread skin concern affecting 85% of adolescents, leads to a preference for natural remedies believed to be safer with fewer side effects compared to synthetic alternatives. Herbal remedies, utilized for centuries worldwide, particularly in Asian cultures, contribute to overall social well-being. The increasing demand for herbal formulations in the global market is noteworthy. This study concentrated on formulating herbal anti-acne face wash gels using polymers like Carbopol and the extract of aegle marmelos (bel patra), known for its antibacterial properties in contemporary herbal medicine. Findings indicated that the gels were non-irritating, stable, and exhibited anti-acne efficacy. The herbal gel demonstrated stability, establishing itself as a promising formulation for acne treatment. Evaluation parameters included color, appearance, consistency, pH, and viscosity.

9. Shraddha Tathe et.al; (2022) The preference for natural remedies arises from their perceived minimal side effects, leading to a growing demand for herbal formulations in the global market. Acne, a skin condition associated with changes in the sebaceous glands, underscores the necessity for a face wash that effectively cleanses without adverse effects. Introducing a herbal face wash designed to offer cleansing, anti-wrinkle, anticancer, and moisturizing properties, the formulation incorporates Pumpkin seed oil, Vetiver root extract, Sweet almond, Lavender, Mustard, Jojoba oil, Babul gum extract, Honey, Orange peel extract, and Saffron extract. These plants are known for their antimicrobial, antioxidant, antiseptic, anti- inflammatory, and antifungal properties. The multiherbal face wash proves to be more efficient compared to existing market alternatives.

10. Niharika Lal et.al; (2021) Acne vulgaris, a common skin disorder, primarily affects teenagers but can also impact individuals aged 20-40 years. Herbal treatments are often perceived as safer alternatives to allopathic medicines for acne management, as the latter may be associated with side effects such as contact allergy, local irritation, scaling, photosensitivity, itching, and redness. The current study aims to evaluate the effectiveness of a foaming face wash formulation containing Curcuma longa, in addition to herbal excipients Aloe vera, Rosa centifolia, and Citrus sinensis. Curcuma longa is recognized for its active phytoconstituents possessing significant antimicrobial properties, making it a promising local remedy for acne.

11. Nitin Yadav et.al; (2021) Facial skin, renowned for its grace, often suffers from dryness and texture loss due to regular soap usage. Face wash, serving as a gentle cleanser, aims to purify without causing harsh effects on the skin. The objective of a face wash is to deliver cleansing, anti-wrinkle, anti-acne, moisturizing, and skin-brightening properties, promoting a youthful appearance. Current face wash products in the market, typically available in gel or cream formulations, are inconveniently packaged in large collapsible tubes or plastic containers, posing challenges for consumers, especially during travel. Moreover, these aqueous face washes necessitate preservatives for stability. The goals of this study include overcoming the limitations of synthetic face washes by developing herbal face wash tablets. These tablets are intended to reduce costs, packaging size, and the dependence on harmful preservatives, ensuring easy portability. The face wash tablet, prepared with varying ingredient concentrations, underwent evaluation for parameters such as pH, irritability, hardness, friability, thickness, foaming capacity, and accelerated stability. The findings indicate that the formulated batch (F6) produces abundant foam and delivers a satisfying face washing experience.

12. Rahul Y. Pagar et.al; (2023) In contemporary times, people are increasingly mindful of their skin health and cleanliness. The facial skin, being delicate, can suffer adverse effects from regular soaps and excessive use of cosmetic products, leading to heightened sensitivity and potential issues such as moisture depletion, clogged oil glands, and the formation of acne. Acne affects a significant portion, approximately

60 to 70%, of the general population. The use of face wash is generally considered safer than harsh soaps, as it helps prevent moisture loss and maintains the skin's vitality. While anti-acne face washes may contain chemicals aimed at deterring acne formation, these substances can occasionally result in skin irritation or redness, prompting many individuals to seek alternative options. Herbal remedies are widely embraced due to their minimal side effects on the skin. This paper highlights numerous herbal plants, mentioned in Vedas, renowned for their antibacterial, anti-aging, and antioxidant properties. These plants include neem, Bael leaf, mint, barks such as Cinnamon, stems like Liquorice, essential oils like lavender oil, and roots such as Turmeric. Possessing antimicrobial properties, these plants effectively inhibit bacteria responsible for acne vulgaris, making them suitable ingredients for anti-acne face wash formulations.

4. METHODOLOGY

The methodology for creating a herbal face wash involves several key steps outlined below:

- **Herbal Ingredient Selection:** Choose herbs renowned for their beneficial properties in skincare, such as aloe vera, neem, tea tree, chamomile, or lavender.
- **Extraction and Processing:** Extract active compounds from the selected herbs using methods like cold pressing, distillation, or infusion. Process these extracts to maintain their beneficial properties.
- **Base Formulation:** Develop a base formulation using natural cleansers like plant-based surfactants or mild soaps to provide effective cleansing action without harsh chemicals.
- **Integration of Active Ingredients:** Incorporate herbal extracts into the formulation, considering their specific benefits such as anti-inflammatory, antioxidant, or antibacterial properties.
- **Preservation:** Utilize natural preservatives to ensure the product's shelf life without compromising its herbal and chemical-free essence.
- **Texture and Fragrance:** Adjust the texture to ensure a pleasing application and incorporate natural fragrances, often sourced from essential oils, for a delightful scent.
- **Testing:** Conduct comprehensive tests for skin compatibility and efficacy to guarantee the product is safe and delivers the intended benefits.
- **Packaging:** Opt for eco-friendly packaging materials to align with the natural and herbal theme, ensuring the product remains uncontaminated and environmentally conscious.

4.1 HERBAL INGREDIENTS USED

S. No	INGREDIENTS	USES
1	Neem Leaves (Azadirachta indica)	Antibacterial, anti-fungal, anti-inflammatory, antiseptic and highly beneficial for oily and acne prone skin.
2	Tulsi (Holy basil)	Antimicrobial (including antibacterial, antiviral, antifungal, antiprotozoal, antimalarial, anthelmintic)
3	Rosemary (Rosemarinus officinalis)	Hepatoprotective, antifungal, insecticide, antioxidant and antibacterial.
4	Honey	Light humectant and nutrient used as a thickening agent to give body to facial masks, creams and lotions
5	Lemon juice	To lighten skin and reduce blemish marks on the skin. It also quite effective for treating acne and pimples and as a natural pH adjuster in cosmetics.
6	Xanthan gum	A gum produced by the pure culture fermentation of a carbohydrate also called Corn Sugar Gum. It is used as a non-toxic thickener and stabilizer.
7	Rose water	Used as solvent; it also has antibacterial and antiseptic properties which eventually cure acne.

4.2 DEVELOPMENT OF FORMULATION

1. Extraction Process:

Neem and tulsi extracts, as well as rosemary extract, were prepared using a soxhlet extraction method. For the neem and tulsi extracts, 50 grams of dried neem and tulsi powder were combined with 500 milliliters of ethanol. Similarly, for the rosemary extract, 50 grams of dried rosemary leaves were mixed with 500 milliliters of ethanol.

2. Formulation Preparation:

- Begin by adding an appropriate amount of xanthan gum into warm rose water and allow it to soak overnight.
- Subsequently, incorporate a sufficient quantity of honey, a few drops of lemon juice, glycerin, and fresh aloe vera into the mixture.
- Then, add the desired amount of herbal extract to the mixture, followed by the addition of an adequate amount of soap, and blend thoroughly.

4.3 EVALUATION OF FORMULATION

1. Physical Evaluation

The physical assessment includes the following examinations:

- Color
- Odor
- Consistency
- Appearance

2. Washability

The herbal face wash is applied to the face and then promptly rinsed off with water, followed by personal examination.

3. pH Test

The pH of the herbal face wash is determined using a pH meter. The procedure involves:

- Activating the digital pH meter.
- Calibration with standard water.
- Measurement of the pH of a 1% aqueous solution of the formulation at a consistent temperature using the calibrated digital pH meter.

4. Irritancy Test

Irritancy tests for skincare products are vital to ensure they do not cause adverse reactions. For the irritancy test, a square centimeter of the face wash is applied to the dorsal surface of the left hand, followed by 1 to 2 hours of observation.

5. Grittiness Test

The grittiness test determines if there are any gritty particles present in the formulation. Application of the herbal face wash to the skin is conducted to check for the presence of gritty particles, with results indicating the absence of any.

6. Foaming Test

During the foaming test, a small amount of the prepared herbal face wash is applied to the face to assess its foaming ability. The application is allowed to interact with water to analyze the formation of foam.

7. Viscosity

The viscosity of the herbal face wash is measured using a Brookfield Viscometer. The steps involved in evaluating the viscosity include:

- Activation of the Brookfield viscometer.
- Selection of an appropriate spindle to gauge the viscosity of the herbal face cleanser.
- Measurement of the viscosity of the herbal face wash.
- Recording of the obtained viscosity values.

8. Spreadability

Spreadability is evaluated by spreading the cream between two slides, totaling approximately 500 mg. The upper slide is loaded with a 100g weight, and excess formulation is removed to adjust the weight. The upper slide is tethered with a non-flexible rope while the bottom slide is affixed to the apparatus's board and loaded with 20g. The time taken for the upper slide to slide off is then recorded.

5. CONCLUSION

The notion that natural remedies are safer and carry fewer adverse effects compared to synthetic counterparts contributes to their widespread acceptance. Herbal cosmetics have witnessed a significant surge in demand within the personal care industry due to their perceived safety and efficacy. Bioactive chemicals present in cosmetics influence the biological activities of the skin, supplying essential nutrients for healthy skin and hair. Plants offer a plethora of beneficial compounds such as vitamins, antioxidants, various oils, essential oils, hydrocolloids, proteins, terpenoids, and other bioactive substances. Among the popular products for acne prevention are herbal face cleansers, which not only cleanse but also moisturize the skin simultaneously. These products are formulated according to the physiological needs of oily and dry skin, providing essential nutrients to maintain optimal skin health and enhance its natural radiance. The global market is witnessing an increasing demand for herbal formulations, showcasing the commendable effort invested in developing herbal face cleansers. This study exemplifies the process of creating herbal formulations, utilizing various botanicals including Neem, rosemary, Tulsi, lemon, Honey, and the soothing agent Xanthan gum. These ingredients offer numerous benefits to the skin. Comprehensive assessments were conducted on various characteristics such as color, pH, consistency,

washability, irritation, and spreadability. Consequently, it was concluded from the present investigation that the herbal face wash formulation proved to be more effective compared to commercially available face washes. Given that all components in this formulation are herbal in nature, they are considered safe and reliable for the skin.

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