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FORMULATION AND EVALUTION OF LIQUORICE BODY WASH

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Abstract:

The present study aimed to formulate and evaluate a herbal liquorice-based body wash enriched with multiple botanicals possessing antioxidant, anti-inflammatory, antimicrobial, and skin-rejuvenating properties. Liquorice extract was selected as the primary active ingredient due to its proven skin-soothing, depigmenting, and anti-inflammatory effects, complemented by aloe vera, tulsi, neem, eucalyptus oil, almond oil, glycerine, rose essence, and multani mitti. The formulation was prepared by sequentially blending the extract–oil phase with a mild Castile soap base, followed by incorporation of the aqueous phase and aromatic agents. The final product was evaluated for organoleptic properties, homogeneity, pH, viscosity, spreadability, washability, and skin irritation potential.

The formulated body wash exhibited an aesthetically acceptable pinkish-brown color, pleasant odor, and smooth consistency with good homogeneity. The pH (7.2) was within the desirable range for topical cleansing formulations, ensuring compatibility with the skin. Spreadability and washability results confirmed ease of application and removal, while viscosity measurements (29,970 cps at 20 rpm) indicated optimal thickness and flow characteristics essential for consumer acceptability. No signs of redness, irritation, or discomfort were observed during skin irritation studies, demonstrating the safety of the formulation. Overall, the herbal liquorice body wash showed excellent stability, favorable physicochemical characteristics, and beneficial cleansing properties, making it a promising natural alternative for daily skincare and potential use in conditions associated with inflammation or dryness.

KEYWORDS: *Liquorice extract; Herbal body wash; Glycyrrhiza glabra; Cosmetic formulation; Skin care; Aloe vera; Tulsi extract; Multani mitti; Eucalyptus oil; Physicochemical evaluation; Topical herbal product; Natural cleanser.*

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INTRODUCTION:

Clinical Spectrum and Global Burden of Psoriasis

Psoriasis is a chronic, immune-mediated dermatological disorder that presents with multiple clinical variants, each with distinct morphological features and therapeutic challenges. The main subtypes—plaque, guttate, inverse, pustular, erythrodermic, and scalp psoriasis—reflect the disease's complex phenotypic expression. According to Sarac et al., psoriasis manifests through sharply demarcated erythematous plaques with silver scales, while less common forms such as pustular and erythrodermic psoriasis present with severe systemic symptoms and require prompt clinical attention. From a global health standpoint, psoriasis exerts a significant socioeconomic and psychological burden. Urban et al. demonstrated that the prevalence and disability associated with skin diseases—including psoriasis—have increased in Asia over the past few decades, emphasizing disparities linked to socioeconomic status. Long-term epidemiological data reported by Danielsen et al. show that psoriasis prevalence has steadily risen over a 30-year period, highlighting a growing need for effective therapeutic interventions and improved public health strategies.

Immunopathogenesis and Genetic Basis of Psoriasis

Recent advances have clarified that psoriasis is driven by a dysregulated interaction between the innate and adaptive immune systems. Aberrant activation of dendritic cells, macrophages, and neutrophils leads to overexpression of cytokines such as IL-17, TNF-α, and IL-23, promoting keratinocyte hyperproliferation. Harden et al. provided a comprehensive overview of the immunogenetic mechanisms underlying psoriasis, noting that genetic susceptibility loci—particularly HLA-Cw6—play central roles in disease development.

The role of innate immune cells, as reviewed by Sato et al., further illustrates how inflammatory cascades amplify chronic skin lesions. These immunological insights not only enhance the understanding of disease mechanisms but also support the development of targeted biological therapies that inhibit specific cytokine pathways.

Clinical Manifestations and Management Approaches

Psoriasis exhibits diverse clinical presentations that require condition-specific diagnostic and treatment strategies. For example, guttate psoriasis often follows streptococcal infection and benefits from phototherapy, as described by Chalmers et al. Inverse psoriasis, characterized by smooth erythematous lesions in flexural areas, presents diagnostic difficulty due to its resemblance to fungal infections. Micali et al. highlight the importance of topical anti-inflammatory agents and careful skin-barrier management for this subtype. Severe clinical variants such as pustular and erythrodermic psoriasis involve systemic inflammation and may be life-threatening. Benjegerdes et al. and Singh et al. emphasize the need for rapid systemic therapy to reduce morbidity. Likewise, scalp psoriasis—a common yet difficult-to-treat variant—requires specialized therapeutic approaches, including keratolytics, antifungals, and biologics, as outlined by Mosca et al. Additionally, the association between psoriasis and psoriatic arthritis is clinically significant. Merola et al. reported that psoriatic arthritis incidence increases with greater psoriasis severity, underscoring the importance of early screening and comprehensive disease management.

Conventional and Emerging Therapeutic Strategies

Traditional psoriasis treatment includes topical corticosteroids, vitamin-D analogues, phototherapy, and systemic agents. However, conventional therapies may have limitations such as poor skin penetration, systemic toxicity, or low patient compliance. Kim et al. highlighted the need for individualized treatment plans based on disease severity and comorbidities.

Recent developments in drug delivery systems offer improved therapeutic outcomes. Nanotechnology-based formulations—such as nanoemulsions, liposomes, and microemulsion gels—enable better penetration of active agents into psoriatic plaques. Bahadur and Sharma reviewed the advantages of liposome-based carriers, noting enhanced drug stability and targeted delivery. Other advanced formulations include nanoemulgels, as shown in studies by Bhardwaj et al. and Sharma et al., and microemulsion gels such as indirubin-loaded systems, which demonstrate strong anti-psoriatic potential.

Licorice (*Glycyrrhiza glabra*): Phytochemistry, Therapeutic Importance, and Dermatological Applications

Liquorice has a long history of use in traditional medicine and has been extensively studied for its rich phytochemical profile. Fiore et al. traced its therapeutic applications in Europe, while modern investigations by Wahab et al. and Pastorino et al. describe its diverse bioactive compounds, including glycyrrhizin, liquiritin, isoliquiritigenin, and glabridin. These constituents exhibit antioxidant, anti-inflammatory, antimicrobial, and depigmenting properties, making liquorice particularly valuable in dermatology. Rizzato et al. explored the complex licorice metabolome, revealing numerous secondary metabolites that

contribute to its biological activities. Its skin-beneficial effects have garnered attention in cosmeceutical science. Cerulli et al. emphasized the use of extracts from G. glabra, G. uralensis, and G. inflata in formulations targeting hyperpigmentation, inflammation, and oxidative damage.

Relevance of Licorice in Anti-Psoriatic and Topical Formulations

The anti-inflammatory and antioxidant potential of liquorice provides a strong scientific basis for its incorporation into anti-psoriatic formulations. Compounds such as glabridin and glycyrrhizic acid modulate inflammatory pathways involved in psoriasis, including TNF-α and IL-17 signaling. Gaur et al. demonstrated the bioactivity of isoliquiritigenin and liquiritigenin derivatives in in-vivo studies, supporting their relevance in chronic inflammatory disorders.

Modern topical delivery systems—such as gels, emulgels, nanoemulgels, and microemulsions—enhance the skin absorption and therapeutic efficacy of herbal compounds. Desai et al. developed karanjin-loaded emulgel for psoriasis, while He et al. reported potent anti-psoriatic effects from indirubin-loaded microemulsion gels. Such systems improve drug permeation across hyperkeratotic psoriatic lesions and reduce dosing frequency. Licorice extract can be integrated into similar delivery systems to achieve synergistic benefits, achieving anti-inflammatory action, soothing effects, and improved moisturization—essential parameters for psoriasis management.

Analytical Approaches for Quality Control and Standardization

Characterizing herbal ingredients and topical formulations requires robust analytical techniques. Gas chromatography (GC) and GC–MS remain crucial tools for profiling volatile compounds and confirming phytochemical identity. Cao et al. highlighted their utility in quality control of traditional medicines. Similar analyses have been applied to other plant-based extracts; for example, Sarikurkcu et al. evaluated the GC/MS profile of Phlomis bourgaei to determine antioxidant potential. These techniques ensure consistency and efficacy in herbal-based formulations, including liquorice-containing products.

DRUG AND EXCIPIENTS

Liquorice

Kingdom: Plantae
Botanical name: Glycyrrhiza glabra
Genus: Glycyrrhiza
Species: G. glabra
Family: Leguminosae (Fabaceae)

BENEFITS OF LIQUORICE:

- Liquorice root contains over 300 chemical compounds and flavonoids. Glycyrrhizin, the most active chemical compound found in liquorice, has been studied for its medicinal properties. This powerful phytochemical has been proven to reduce body fat, heal stomach ulcer and fight infections.
- **Against microbes**:
  Many laboratory studies suggest that liquorice extract might be a potential treatment against bacterial infection. Liquorice extract has shown promising results against Candida albicans and Staphylococcus aureus infections.
- **For inflammation:**
  Inflammatory illnesses are becoming common and have a significant impact on daily life. Flavonoids found in liquorice can be used as a potential medication for inflammation. Liquorice extract has shown anti-inflammatory benefits to manage various diseases, like acute kidney disease. ISL has shown anti-inflammatory benefits in kidneys.



ALOE VERA



Kingdom: Plantae
Botanical Name: Aloe barbedensis miller
Genus: Aloe
Species: A. vera
Family: Liliaceae
Pharmaceutical name: Herba Aloes
Properties: Bitter Cold
Toxicity: Chronic long-term toxicity

BENEFITS OF ALOE VERA:

- It has antioxidant and antibacterial properties.
- It accelerates wound healing.
- It reduces dental plaque.
- It reduces constipation.
- It may improve skin and prevent wrinkles.

- It lowers blood sugar levels.

TULSI

Synonyms: Holy basil, Sacred basil.

Biological source: Tulsi consists of fresh and dried leaves of Ocimum sanctum Linn.

Family: Lamiaceae.

Chemical constituents:

Tulsi leaves contain bright, yellow colored and pleasant volatile oil (0.1-0.9%). the oil contain of the drug varies depending upon the type, the place of cultivation and seasons of its collection.

The plant is also reported to contain alkaloids, glycosides, saponin, tannins, and appreciable amount of vitamin C, and traces of maleic, citric and tartaric acid.

Seeds contain fixed oil with good drying properties.

Uses:

- The fresh leaves, its juice and volatile oil are used for various purposes.
- The oil is antibacterial and insecticidal.
- The leaves are used as stimulant aromatic.
- The juice is used as antiperiodic and as a constituent of several preparation for skin diseases and also to cure ear-ache.

4. MUTANI MITTI



Benefits of Multani Mitti:

- Multani mitti also known to have many medicinal properties.
- These include-Anti-acne property, Anti-inflammatory property Astringent property, Absorbent property, Anti-microbial property Skin brightening property.

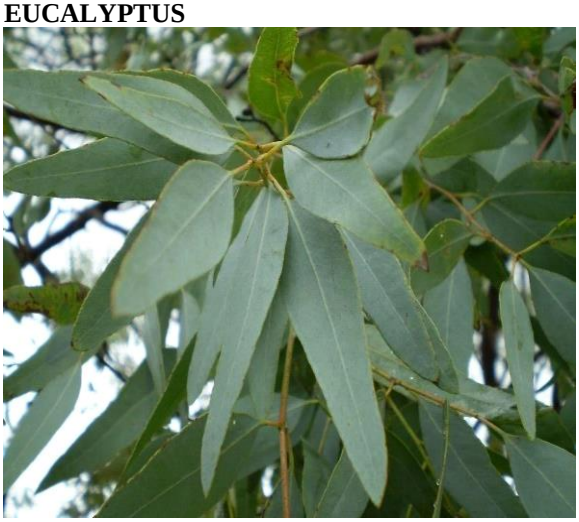
FOR SKIN:

- Multani mitti can help tone the skin. As a result, wrinkles, loose skin, and other signs can't be reversed
- multani mitti achieves this by increasing skin elasticity and making it more robust.
- It is a cooling herb with a skin-soothing effect.
- Multani mitti is an excellent remedy for skin bothered by hot temperature sand sun burns. This cooling effect occurs quickly and lasts for a long time.
- Multani mitti is often used to improve the complexion.
- It is useful to erase scars.
- It also helps to prevent suntan and pigmentation.

FOR ACNE:

- Multani mitti is an effective home remedy for pimples or acne, as well as marks left by healed acne.
- This clay should be used daily to keep the skin clean and healthy.
- Multani mitti absorbent properties aid to eliminate excess oil from the skin and prevent pimples.
- This also has a cleansing effect and helps to remove debris and pollution particles from the skin.

EUCALYPTUS



Synonyms: Lemon gum tree, Dinkum oil.

Biological source: Eucalyptus oil is the volatile oil obtained by the distillation of the fresh leaves of Eucalyptus globulus and other species of Eucalyptus.

Family: Myrtaceae.

Color: it is colorless or pale-yellow liquid.

odor: Aromatic and camphoraceous.

Taste: Pungent and camphor us followed by the sensation of cold.

Chemical constituents:

It is soluble in 90 per cent alcohol, fixed oils, and fats and in paraffin, but it is insoluble in water.

Eucalyptus oil chiefly contains cineole, aloe known as eucalyptol (about 80%).

Uses:

- Eucalyptus oil is used as counter-irritant, an antiseptic and expectorant.
- It is used to relieve cough and chronic bronchitis in the form of inhalations.

- It is an ingredient of several liniments and ointments.

ALMOND OIL



Synonyms: Badam tail, bitter almond oil.
Biological source: It is a fixed oil obtained by expression of seeds of Prunus Amygdalus and /or prunus Amygdalus var. amara (bitter almond) or mixture of both.
Family: Rosaceae.
Color: colorless to pale yellow colored liquid.
Oduor: characteristics.
Taste: bland and characteristics, may be bitter or sweet, depending on variety.
Solubility: Insoluble in alcohol and soluble in chloroform, solvent ether and petroleum ether.

Chemical constituents:

Both the varieties of almond contain 40-50% of fixed oil.
20% protein and mucilage.
-The fixed oil contains majorly unsaturated fatty acids such as 62-68% of linoleic acid.

Uses:

- Used commercially for many toiletry preparations such as soap, shampoo, hail oil.
- Sweet oil of almond is nutritive and mild laxative.
- Volatile oil of almond is used as flavoring agent.

INGREDIENT	USES
LIQUORICE EXTRACT	SKIN SOOTHING AND LIGHTENING
ALMOND OIL	STIMULATE THE PRODUCTION OF NEW SKIN CELLS ANDSMOOTH FINE LINES, EMOLLIENTS
GLYCERINE	EMOLLIENTS
MULTANI MITTI (FULLER EARTH)	SKIN LIGHTENING
EUCALYPTUS	VASODILATOR NATURE
TULSI EXTRACT	ANTI-INFECTIVE
ALOE VERA	ANTIOXIDANT

PREPARATION PROCEDURE

Step 1: Preparation of the Extract–Oil Phase

In a clean mixing vessel, combine the almond oil, glycerine, and all herbal extracts, including liquorice, neem, tulsi, and aloe vera. Stir the mixture gently using a glass rod or mechanical stirrer until a uniform blend is obtained.

Step 2: Incorporation of the Surfactant Base

Slowly add the Castile soap base to the prepared extract–oil mixture.
Mix carefully and avoid vigorous stirring to prevent excessive foaming and air entrapment.

Step 3: Addition of Aqueous Phase and Fragrances

Introduce the required volume of demineralised water into the mixture.
Next, add eucalyptus oil and rose essence to impart aroma and additional therapeutic properties.
Continue gentle mixing until a homogeneous solution forms.

Step 4: Packaging and Storage

Transfer the final formulation into a clean pump bottle or squeeze container.
Store the product in a cool, dry, and dark environment to preserve its stability and fragrance.
Shake the bottle gently before each use to ensure uniform dispersion of ingredients.

EVALUATION AND FORMULATION

Organoleptic properties:

Color- The color of preparation of body wash was checked.

odor- The odor of formulation was checked.

Consistency-The consistency of the formulation and particles were used to check the texture and homogeneity of preparation on the skin such as stiffness, grittiness, greasiness effect.

Homogeneity and texture: - Homogeneity & texture was evaluated.

Washability

The wash ability test was performed by applying on the skin and results werechecked.

pH

pH of 1% aqueous solution of formulation was evaluated.

Viscosity

For Viscosity measurement, Brookfield viscometer "Heelpath" Spindle used, andresult were evaluated.

Spreadability

Spread ability of the formulations was evaluated.
Skin irritation Skin evaluation test was performed.

DISCCUSION AND CONCLUSION:

- The formulated herbal body wash was evaluated at different parameters. All the organoleptic properties were checked visually such as color, odor, consistency, homogeneity and texture.
- As a result, color observed as pinkish brown, no bad smell occurred from formulation.
- The consistency of the formulation found

suitable as required to apply on skin.

- Particles were used to check for the texture and homogeneity of preparation on skin found good and satisfactorily as the preparation show grittiness, greasiness properties on skin.
- Wash ability properties found good, as it is easily removed by washing with normal water. pH of the formulation checked and found7.2 means suitable for skin.
- Spread ability quality also tested with the help of glass plates and found that preparation having good consistency and easily spreadable.
- No irritation, redness, edema and any dermatological effects observed on skin.
- Viscosity testing is a very important parameter for quality control.
- Manufacturers can predict how products will behave once they are in the hands of the consumer.
- Viscosity was checked and result found as 29970 cps at 20 rpm.
- Drug absorption from topical product is highly affected by product viscosity.
- Flow rate of material during manufacturing process can influence the selection of mixing equipment.
- It gives best results, cleans body make the skin glowing and healthy.

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