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DESIGN AND CHARACTERIZATION OF A HERBAL FACE MASK SHEET INFUSED WITH *ILLICIUM VERUM* EXTRACT

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ABSTRACT

Skincare plays a vital role in maintaining overall health, with the face requiring special attention due to constant exposure to environmental factors like sun, sweat, and pollutants. Natural face serums and sheet masks offer effective, hassle-free solutions to nourish and protect the skin. Among natural ingredients, *Illicium verum* (star anise) has shown promising potential in skincare due to its rich antioxidant and phytonutrient profile. This study explores the development of an herbal serum-infused face mask sheet using star anise to combat signs of aging, including wrinkles and reduced skin elasticity. Star anise is abundant in flavonoids, polyphenols, anethole, and tannins, which contribute to its ability to reduce oxidative stress, fade blemishes, tone the skin, and promote a youthful appearance. The lightweight and potent nature of serums enhances the efficacy of active ingredients, while sheet masks provide a simple and effective method for application. The project aims to harness the therapeutic benefits of star anise in a practical skincare format to support anti-aging treatment and skin rejuvenation.

KEYWORD: Skincare is a vital component of personal hygiene and overall wellness.

1. INTRODUCTION

Skincare is a vital component of personal hygiene and overall wellness. With growing awareness and demand for effective beauty routines, the facial cosmetics industry has seen a surge in innovative products focused on exfoliation, deep pore cleansing, detanning, moisturizing, and rejuvenation. Time constraints and the desire for quick results have driven consumers toward skincare solutions that are not only fast-acting but also safe and natural. This demand has spurred the evolution of face masks and face packs, which now come in various formulations tailored to different skin types and concerns.

In particular, there is an increasing preference for products containing bioactive and herbal ingredients over synthetic chemicals. Bioactives such as vitamins, minerals, proteins, probiotics, and plant-derived compounds are being incorporated to enhance the therapeutic properties of skincare products. Among these, *Illicium verum* (star anise) stands out due to its high concentration of antioxidants, flavonoids, and polyphenols. Known for its anti-aging, toning, and healing properties, star anise can help combat oxidative stress, reduce wrinkles, fade blemishes, and improve overall skin elasticity.

This study focuses on the development of an herbal serum-infused face mask sheet utilizing star anise as a primary active ingredient. The aim is to provide an effective, natural anti-aging solution that aligns with modern skincare demands for convenience, efficacy, and safety. The formulation combines the lightweight, fast-absorbing nature of serums with the targeted delivery system of sheet masks, offering a potent and user-friendly skincare experience.

Some of the well known types of facial masks are

Rinse-off masks

Peel-off masks

Hydrogel masks

Sheet masks

Fig. 1: Sheet Mask.

1.1 Sheet Mask

Skincare has become an essential aspect of modern personal care, with increasing emphasis on effective, time-saving solutions. The rise of facial cosmetics has led to the innovation of products like face masks and packs, focusing on exfoliation, deep cleansing, moisturizing, and rejuvenation. Among these, sheet masks have gained rapid popularity due to their convenience, ease of application, portability, and ability to deliver visible results in just 10–20 minutes. Originating from South Korea, sheet masks differ from traditional paste-based masks in that they do not dry out, allowing prolonged hydration and skin nourishment.

Sheet masks are typically made from materials such as non-woven fabric, microfiber, cotton, lyocell, cupra, hydrogels, and biocellulose, all capable of carrying and delivering active ingredients. These thin, face-shaped sheets are infused with serums rich in nutrients like vitamins, minerals, probiotics, and therapeutic compounds such as cannabidiol (CBD), tailored to address various skincare needs including hydration, soothing, brightening, and balancing.

In alignment with the growing consumer preference for natural and chemical-free products, this study explores the development of an herbal serum-infused sheet mask using *Illicium verum* (star anise) as a key bioactive. Known for its rich antioxidant profile, star anise offers potent anti-aging, anti-inflammatory, and skin-rejuvenating properties. The formulation leverages its flavonoids, polyphenols, anethole, and tannins to combat oxidative stress, reduce wrinkles, enhance elasticity, and diminish blemishes.

The project aims to harness the therapeutic benefits of star anise through a practical and modern skincare approach, merging the fast-absorbing nature of serums with the efficient delivery system of sheet masks to create an effective, natural, and user-friendly anti-aging skincare solution.

Fig. 2: Face Sheet Mask.

1.2 Disease Profile

Wrinkles, a natural part of aging, are most prominent on sun-exposed skin, such as the face, neck, hands and forearms. Although genetics mainly determine skin structure and texture, sun exposure is a major cause of wrinkles, especially for people with light skin. Pollutants and smoking also contribute to wrinkling.

Fig. 3: Types Of Wrinkles.

2. PLANT PROFILE

2.1 ILLICIUM VERUM (STAR ANISE)

In skincare, these properties make *Illicium verum* a valuable ingredient for combating oxidative stress, reducing the appearance of wrinkles, enhancing skin elasticity, fading dark spots, and promoting an even skin tone. Anethole, the primary active compound in star anise, contributes to its soothing and toning effects on the skin, while tannins help tighten and firm the skin's appearance.

Its natural composition makes it an ideal ingredient for modern cosmetic formulations, especially in products targeting aging and sensitive skin. When used in a serum or incorporated into a sheet mask, *Illicium verum* helps deliver therapeutic benefits directly to the skin, supporting regeneration and promoting a youthful glow.

Fig. 4: Illicium Verum.

3. MATERIALS AND METHODS

3.1: Materials Required For Preparation Of Herbal Serum Face Mask Sheet

- Herbal extract- 15 ml
- Glycerine – 7 ml
- Vitamin C oil-2 ml
- Hyaluronic acid -1ml
- Distilled water -5ml

3.2 Extraction Of Star Anise

The different methods of extracting the star anise oil shows that the extraction rate are: soxhlet extraction method > ultrasonic extraction method > steam distillation extraction

method. In summary, it can be seen by soxhlet extraction method and the best solvent is 99.7% ethanol.

Soxhlet Extraction: A mixture of 18g star anise powder and 500ml organic solvent (Ethanol) was stirred under 60v.when mixture is close to colourless, stop heating. Vacuum distillation with rotary evaporator will steam out a lot of solvent. The distillation ends when no condensation drops. After cooling, the mass of the product was weighed and the extraction rate was calculated. Extraction process will be continued for 6-7 hours until the concentrated herbal extract is obtained.

Fig. 5: Soxhlet Extraction.

Simple Distillation: The components in a sample mixture are vaporized by the application of heat and then immediately cooled by the action of cold water in a condenser. By simple distillation the excess amount of solvent in the extract will be removed and a pure concentrated extract will be obtained.

Fig. 6: Simple Distillation.

3.3 Methodology

Preparation of herbal serum face mask sheet. Filter the herbal extract and Take 15 ml of herbal extract and add 7ml of glycerine. Then add 1 ml of hyaluronic acid to the extract. And then add 2 ml of vitamin C oil and finally add 5ml distilled water and make up volume up to 30ml. Stir well to get uniform consistency of serum. Then take dry face mask sheet and immerse separately into the obtained herbal serum. The dry face mask sheet absorb the sufficient quantity of the herbal serum and then it was packed in the air tight package.

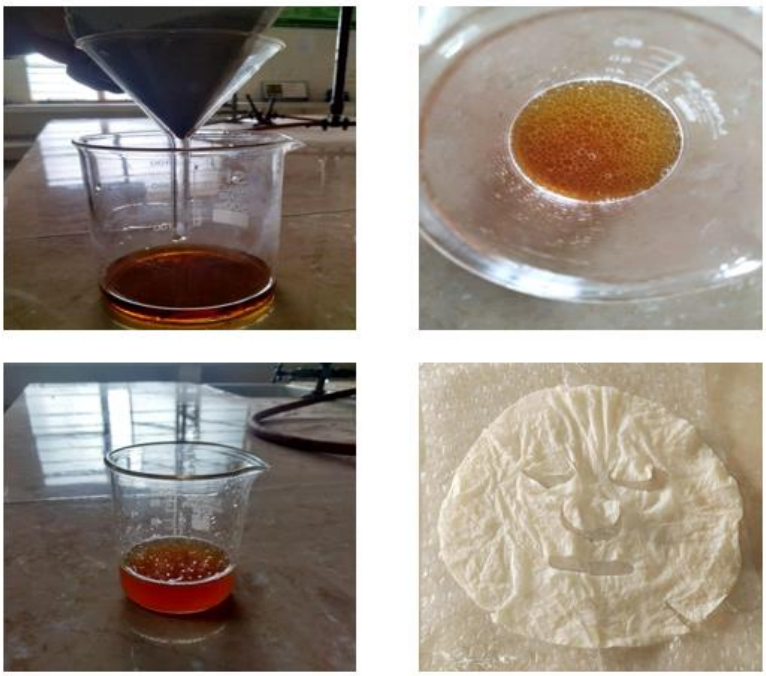

Fig. 7: Herbal Serum With Face Mask Sheet.

3.4 Confirmatory Test For Anethole

Salkowski Test Was Used To Detect Terpenoids: Extract (5 ml) was mixed with chloroform (2 ml), and concentrated sulphuric acid (3 ml) was carefully added to form a layer. A reddish brown coloration of the inter face was formed to show positive results for the presence of terpenoids.

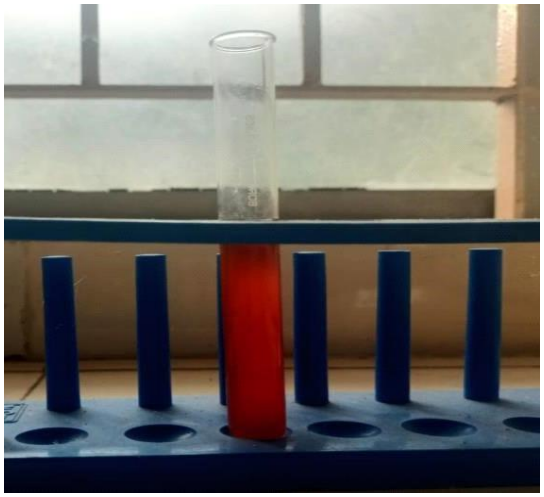

Fig. 8: Presence Of Terpenoids.

3.5 Evaluation Parameters Of Herbal Serum Face Mask Sheet:

Physical Evaluation: The Colour and appearance of the formulation was observed visually. The formulation procedure uniform distribution of extracts. This test was confirmed by visual appearance and by touch.

PH: A pH meter was calibrated using a standard buffer solution. Nearly 1 ml of the face serum was properly weighed and dissolve in 50 ml of distilled water and finally its pH was calculated. The skin has an acidic range and the pH of the skin serum should be in the range of 4.1-6.7

Viscosity: Viscosity is a critical parameter for topical formulation. Topical solutions with low viscosity have faster clearance than viscous solutions. In addition, highly viscous solutions can have an undesirable effect on the skin.

Spreadability: 2 gm of serum sample was placed on a surface. A slide was attached to a pan to which 20 gm weight was added. The time (seconds) required to separate the upper slide from surface was taken as a measure of Spreadability.

Stability Studies: Formulation and development of a pharmaceutical product is not complete without proper stability analysis carried out on it to determine physical and chemical stability and thus safety of the product. The stability studies is carried out as per ICH guidelines. Short term accelerated stability study was carried out for the period of few months for the prepared formulation. The samples were stored at different storage conditions of temperatures such as 3-5^{o}C, 25^{o}C, RH=60% and 40^{o}C±2% RH=75%

4. RESULTS AND DISCUSSION

4.1 Physio - Chemical Evaluation

Table 1: Evaluation Parameter.

S.NO	PARAMETER	OBSERVATION
1	Color	Orange Yellow
2	Odour	Characteristics Odour
3	Texture	Smooth Homogenous
4	Homogenicity	Good
5	Viscosity	13759 Pas
6	pH	5
7	Test For Anethole	Presence Of Terpenoids
8	Spreadability	6cm

4.2 Stability Studies

The formulation was undertaken stability studies for physical and chemical changes. No considerable variations in properties of the formulation were observed. There is no phase separation. Good homogeneity is observed.

DISCUSSION

The formulated herbal serum face mask sheet incorporating *Illicium verum* extract was evaluated based on key physical, chemical, and stability parameters. The choice of ingredients—including glycerine, hyaluronic acid, and vitamin C oil—supported the aim of developing a serum with moisturizing, anti-aging, and skin-brightening benefits.

The star anise extract, obtained via Soxhlet extraction using 99.7% ethanol, proved effective in concentrating bioactive compounds. Among these, anethole—a key component with antioxidant and anti-aging properties—was confirmed via the Salkowski test, which indicated the presence of terpenoids through a positive reddish-brown interface.

Physicochemical evaluation of the serum revealed ideal topical characteristics. The serum was orange-yellow in color, had a characteristic odor, smooth and homogenous texture, and a

suitable pH value of 5, aligning well with the skin's natural pH range (4.1–6.7). The measured viscosity (13759 Pas) ensured a balanced consistency, ideal for absorption without being overly sticky. A spreadability result of 6 cm indicated adequate application ease on the skin's surface.

Furthermore, the face mask sheet effectively absorbed and retained the herbal serum, demonstrating compatibility with the delivery system. Stability studies conducted under various temperature and humidity conditions (3–5°C, 25°C/60% RH, and 40°C/75% RH) over a short-term period showed no phase separation or changes in texture, appearance, or homogeneity, suggesting good physical and chemical stability.

5. CONCLUSION

The study successfully formulated and evaluated a herbal serum face mask sheet utilizing *Illicium verum* extract. The Soxhlet extraction method proved to be the most efficient for obtaining a concentrated herbal extract rich in anethole and other terpenoids. The developed serum demonstrated favorable physical and chemical properties, including optimal pH, viscosity, and spreadability, suitable for topical application. The herbal serum-infused sheet mask proved stable and effective as a skincare product aimed at addressing signs of aging such as wrinkles, dryness, and loss of elasticity. With the increasing consumer demand for natural and chemical-free skincare solutions, this formulation offers a promising alternative to synthetic cosmetic products. The study highlights the potential of *Illicium verum* as a valuable natural ingredient in anti-aging skincare formulations, bridging traditional herbal knowledge with modern cosmetic applications.

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