

Formulation and Evaluation of Poly-Herbal Anti-Ageing Face Gel in Modern Pharmaceutics

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ABSTRACT

Background: Skin aging is the result of a continual deterioration process because of damage to cellular DNA and protein. The ageing process is classified into two distinct types; i) sequential skin aging and ii) Photo-ageing.

Both types have distinct clinical and historical features.

Aim: The research aims to develop and assess the efficacy of an herbal anti-ageing face cream within modern pharmaceutics, focusing on texture, stability, and antioxidant activity.

Material and Method: The herbal anti-ageing face cream was formulated using a blend of saffron, tulsi, turmeric, rose petals, olive oil, cetyl alcohol, methylparaben, glycerine, distilled water, and vanilla essence. The cream efficacy was evaluated through comprehensive methods in modern pharmaceutics.

Result: The formulated herbal anti-ageing face gel demonstrated significant effectiveness in improving skin hydration and elasticity, suggesting its potential as an efficacious cosmetic formulation in modern pharmaceutic.

Conclusion: In conclusion, the formulated herbal anti-ageing face cream demonstrates promising efficacy and safety within modern pharmaceutics, offering a natural and effective solution for combating skin ageing. Its potent blend of herbal ingredients presents a viable alternative for individuals seeking skincare products with beneficial anti-ageing properties.

History:

The quest to combat skin ageing dates back to ancient times, evolving through scientific discoveries. Understanding the underlying causes, such as inflammation, has led to advancements like the combination of eggshell membranes and retinol. Traditional herbal remedies have been integral, with civilizations utilizing plants' healing properties. This historical evolution has paved the way for modern anti-ageing formulations.

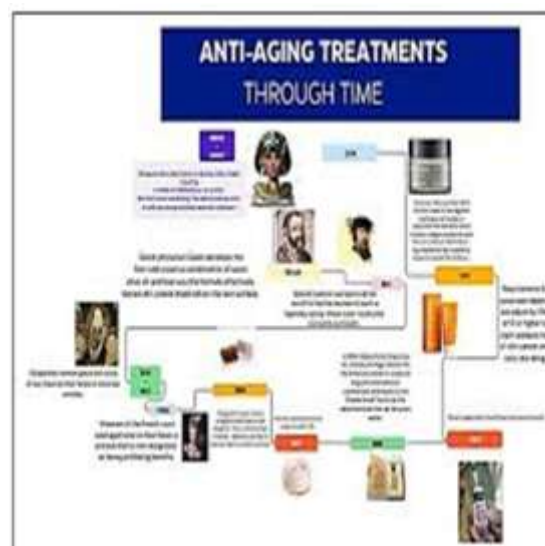


Fig 1: History of Anti-ageing Treatments

I. INTRODUCTION

Skin ageing is a multifaceted process stemming from cellular DNA and protein damage, categorized into sequential skin ageing and photo-ageing, each with distinct clinical features. While sequential ageing involves physiological changes like decreased lipid formation leading to dryness and wrinkles, photo-ageing is induced by UV exposure, resulting in skin disorganization. Herbal ingredients have gained prominence in complementary medicine, offering potential in cosmetic formulations to combat ageing signs and protect against environmental damage.

Polyherbal Formulations:

Polyherbal therapy, recognized worldwide for its medicinal value, blends various herbs for therapeutic purposes. India leads in polyherbal research, focusing on treating various ailments, with diabetes being a prominent target. Traditional medicine, rooted in ancient practices, continues to influence modern pharmacological advancements, emphasizing the significance of herbal remedies.

Herbal Cosmetics:

Herbal cosmetics, formulated with botanical extracts, offer distinct advantages, including antioxidant and antimicrobial properties.

The demand for natural products has surged, driven by concerns over chemical-based cosmetics' potential harm. Regulations ensure the safety and efficacy of herbal cosmetics, meeting consumer preferences for natural alternatives in skincare.

Herbal Gels:

Herbal gels, designed for topical application, leverage the benefits of botanical ingredients for therapeutic and cosmetic purposes. These formulations, categorized as oil-in-water or water-in-oil gels, target various dermal disorders and provide moisturization. Traditional medicine's integration with modern cosmetic technology yields safe and effective products meeting diverse skincare needs.

Human Skin:

Human skin comprising multiple layers with distinct functions serves as vital protective barrier. Factors like aging, UV exposure, and smoking contribute to skin deterioration, leading to wrinkles and pigmentation. Understanding skin structure and function is crucial for developing effective anti-ageing strategies.

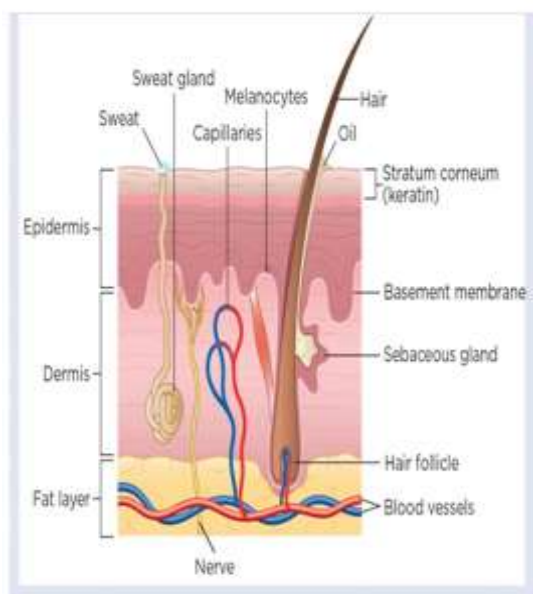


Fig 2: Human Skin Structure

Wrinkles:

Wrinkles, a natural consequence of ageing, result from intrinsic and extrinsic factors like genetic predisposition and environmental exposures. The skin's reduced elasticity and collagen production lead to fine lines and sagging. Preventive measures, including sun protection and

lifestyle modifications, play a pivotal role in managing wrinkles.

Anti-Ageing:

Aging involves complex cellular processes influenced by genetic and environmental factors. Micronutrients and biologically active substances offer potential anti-ageing benefits by targeting intracellular pathways. Understanding the molecular mechanisms of ageing aids in developing effective anti-ageing interventions, mitigating age-related diseases, and promoting longevity.

MATERIAL

1. Saffron (*Crocus sativus*):

- **Biological Source:** Saffron is derived from the stigma of the *Crocus sativus* flower.
- **Family:** Iridaceae.
- **Pharmacological Activities:** Saffron exhibits antioxidant & anti-inflammatory, properties. It also has potential benefits in promoting skin health by reducing oxidative stress and inflammation.

2. Tulsi (Holy Basil) (*Ocimum sanctum*):

- **Biological Source:** Tulsi is obtained from the leaves of the *Ocimum sanctum* plant.
- **Family:** Lamiaceae.
- **Pharmacological Activities:** Tulsi possesses antioxidant, offers several benefits for the skin, including promoting a brighter complexion, reducing acne and blemishes, and providing a soothing effect for irritated skin.

3. Turmeric (*Curcuma longa*):

- **Biological Source:** Turmeric is obtained from the rhizome of the *Curcuma longa* plant.
- **Family:** Zingiberaceae.
- **Pharmacological Activities:** Turmeric contains curcumin, which possesses antioxidant, anti-inflammatory, and antimicrobial properties, contributing to a variety of benefits like brightening skin, reducing acne, fading dark spots, and even anti-ageing effects. Its active compound, curcumin, is particularly effective in addressing skin concerns.

4. Rose Petals (*Rosa spp.*):

- **Biological Source:** Rose petals are derived from various species of the *Rosa* genus.
- **Family:** Rosaceae.
- **Pharmacological Activities:** Rose petals exhibit antioxidant, anti-inflammatory, antimicrobial, and astringent properties. They help soothe irritated

skin, reduce redness and inflammation, promote collagen production, and improve skin texture.

5. Olive Oil (*Olea europaea*):

- **Biological Source:** Olive oil is extracted from the fruit of the *Olea europaea* tree.
- **Family:** Oleaceae.
- **Pharmacological Activities:** Olive oil contains monounsaturated fatty acids, polyphenols, and vitamins, which contribute to its antioxidant, anti-inflammatory, and skin-nourishing properties. It helps moisturize and soften the skin, protect against UV damage, reduce inflammation, and promote wound healing.

6. Almond oil:

- **Biological Source:** Almond oil, obtained from the kernels of *Prunus amygdalus* (almond tree).
- **Family:** Rosaceae.
- **Pharmacological Activities:** It's rich in vitamins and fatty acids that nourish the skin, helping with dryness, reducing the appearance of scars and stretch marks, and even improving complexion.

6. Aloe Vera (*Aloe barbadensis* Miller):

- **Biological Source:** Its biological source is the dried juice extract from the leaves of the plant.
- **Family:** Liliaceae
- **Pharmacological Activities:** Aloe vera's pharmacological activities make it beneficial for skincare, including wound healing, soothing irritated skin, and potentially reducing inflammation and acne. It's known for its moisturizing properties and can help with conditions like sunburn, eczema, and psoriasis.

CHEMICALS

1. Glycerine: Glycerine is a humectant that attracts moisture to the skin, keeping it hydrated and supple. It helps prevent dryness and maintains the skin's natural moisture balance.

2. Rose Water: Distilled water serves as a solvent and diluent in the formulation, helping to dissolve and disperse other ingredients evenly throughout the gel.

3. Vanilla Essence: Vanilla essence is added to provide a pleasant fragrance to the face gel,

enhancing the overall sensory experience of using the product.

4. Methyl paraben: Methylparaben is primarily used in skincare as a preservative to prevent microbial growth and extend the shelf life of products. It helps protect products from spoilage and ensures they remain safe and effective for longer periods.

METHOD

Extraction of all API by using (The maceration process of extraction)

Maceration

Maceration is one of the simplest extraction techniques in which coarse and powdered plant material is soaked in solvents such as methanol, ethanol, ethyl acetate, acetone, hexane, etc. It is one of the popular and inexpensive techniques used for the extraction of different bioactive compounds from plant material. However, the maceration procedure has certain limitations such as low extraction yield, lower efficiency, and use of large amounts of solvents which have some health hazards. Furthermore, the selection of an appropriate solvent is important in the methodology for the extraction of a particular plant extract.

Extraction of all API

- The maceration process consists of powder from all APIs (Saffron, Tulsi, Turmeric Powder, and Dry Rose Petal powder).
- We take powder from all APIs because we need smaller particles to increase the surface area for easy mixing with solvent and efficient extraction of compounds.
- The principle of soaking Saffron Dry and others in powder form by using a suitable irradiation solution with several stirring times at room temperature.
- Saffron and other powder extraction by maceration method using water with a ratio of 1:10 for 6 x 24 hours, then macerated, and then filtered.
- The liquid extract from each extraction method was evaporated in a water bath until a viscous extract was obtained.



Fig 3: Saffron and other APIs in powder from



Fig 4: APIs in Hydro alcoholic solution



Fig 5: Filtration

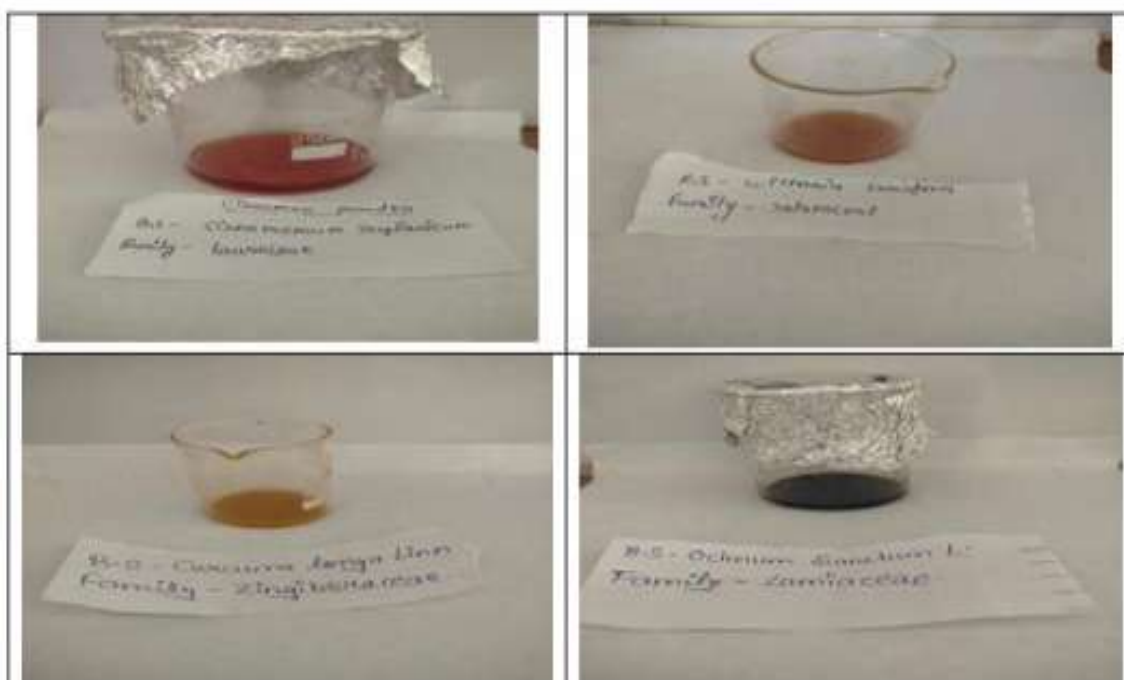


Fig 6: Extract

FORMULATION OF POLYHERBAL ANTI-AGEING FACE GEL

- **Herbal Extract Preparation:** Extracts of saffron, tulsi, turmeric, and rose petals are prepared using suitable extraction methods.
 - **Base Gel Preparation:** Olive oil, methylparaben, and rose water glycerine are mixed thoroughly in appropriate proportions to form a base gel.
 - **Herbal Extract Incorporation:** The prepared herbal extracts are added to the base gel mixture and stirred until homogeneity is achieved.
 - **Final Adjustments:** Rose water is added gradually to attain the desired consistency.
- Vanilla essence is added for fragrance.**
- **Homogenization:** The mixture is homogenized to ensure uniform distribution of ingredients.
 - **Quality Control:** The gel is subjected to quality control tests including pH measurement, viscosity assessment, stability testing, and microbial analysis.
 - **Packaging:** The final gel is packaged in suitable containers under sterile conditions to maintain its quality.
 - **Evaluation:** The formulated gel is evaluated for its anti-ageing properties.

Procedure

Aloe vera gel & rose water were dissolved together to create a liquid dispersion with slight swelling. Saffron extract and other active pharmaceutical ingredients (APIs) were added to this dispersion. In a separate container, the oil phase consisting of Almond oil, Olive oil &

glycerine was melted using a heating mantle. The liquid dispersion was then added to the oil phase mixture. Methylparaben was incorporated into the mixture, followed by trituration of all ingredients for 30 minutes. This process resulted in the formation of a polyherbal anti-ageing gel.

EVALUATION PARAMETERS

- **Visual Evaluation:** The prepared formulations were assessed for their physical characteristics including appearance, color, scent, and consistency.
- **pH Measurement:** The pH meter underwent calibration using a standard buffer solution. A sample of 0.5g of gel was dissolved in 50.0 ml of distilled water, and its pH level was determined using pH paper.
- **Spreadability Assessment:** The ability of the system to spread evenly on the skin surface was evaluated, ensuring optimal absorption for an effective healing response.
- **Washability Test:** Removal of the applied gel from the skin was conducted by gentle washing under tap water, ensuring minimal force to effectively cleanse the skin.
- **Irritation Study:** Examination of the gel revealed no signs of redness, irritation, swelling, or inflammation during irritation tests, indicating their safety for skin application.

II. RESULTS

The herbal anti-ageing gel was prepared and evaluated.

Table 1: Composition of Polyherbal Anti-Ageing Face Gel

| Composition | Quantity for 100 gm (in%) |
|---------------|---------------------------|
| Saffron | 5% |
| Tulsi | 2.5% |
| Turmeric | 1.5% |
| Rose Petals | 2% |
| Olive oil | 6% |
| Aloe vera gel | 5% |

| | |
|------------------------|-------------|
| Almond oil | 2.5% |
| Glycerine | 2.5% |
| Rose Water | Q.S |
| Methyl paraben | 2% |
| Vanilla essence | 1.5% |



Fig 8: Formulated Polyherbal Anti-Ageing Face Gel

Table 2: Result Of Evaluation Parameter Of Polyherbal Aloe Saffron Skin Gel

| Sr. No | Parameters | Observations |
|--------|----------------------|-----------------------|
| 1 | Colour | Dost Beige |
| 2 | Odour | Floral |
| 3 | Consistency | Good |
| 4 | pH | 6 |
| 5 | Spreadability | 10.23 g.cm/sec |
| 6 | Homogeneity | Good |
| 7 | Irritability | Non-irritant |
| 8 | Washability | Washable |

Irritation Test:

| Test | Duration(minute) | Result |
|------|------------------|--------|
| T1 | 30 | No |
| T2 | 30 | No |
| T3 | 30 | No |
| T4 | 30 | No |

III. CONCLUSION:

The formulation and evaluation of the polyherbal anti-ageing face gel yielded promising results. Through meticulous assessment of visual appearance, pH levels, spreadability, washability, and irritation potential, it was determined that the gel exhibited desirable characteristics suitable for skincare applications. The absence of adverse reactions in irritation tests further confirmed the safety and efficacy of the formulated gel. Overall, these findings suggest that the developed polyherbal gel holds the potential as a viable solution for addressing the signs of aging while ensuring skin safety and comfort.

REFERENCES

- [1]. Hannah M. A brief history of Anti -Aging. <https://www.harpersbazaar.com/beauty/skincare/a14980/history-of-anti-aging>. Vol 14; 2016. (Accessed Date; 02/03/2024).
- [2]. Retrieved from Alfaro Danilo, what are herbs;2022. <http://www.thesproceed.com>. (Accessed Date;02/03/2024).
- [3]. Surya MP, Santhos MA, Gulshanm MD, Raghavamma STV, Nadendla, Rao R. Formulation and evaluation of antiaging poly Herbal Cream Int. J PharmSci Rev Res, 24(2). January-February 2014;22:133-136.
- [4]. Shahzad A, MD, Syarhabil A, MD, Salam Faridah N. Review on polyherbal formulation. Syst Rev Pharm.2016;7(1):35-34.
- [5]. Sumit K, Sujata S, Ashish B, Vivek S. Herbal Cosmetics: Used for Skin; May 2014.
- [6]. Davkhar, Somnath S, Bhandari, Aarti S, Sanjivani AA. Multipurpose Herbal Cream; 2023.
- [7]. Nishino Ko I, Nayar SK. The appearance of humans. Skin. 2007.
- [8]. Reviewed by a Cleveland Clinic medical professional article. Accessed 7/27/2022. <https://my.clevelandclinic.org/health/articles/10984-wrinkles>
- [9]. Saul L, Nussbaum C. Martha Reflection on Wrinkles. Vol 18; 2023.
- [10]. Limin G, Peisen WP, Zheng S, Qu Z. The Review of Anti-ageing Mechanism; 2021.
- [11]. Jon J. What are the health benefits of saffron? <https://www.medicalnewstoday.com/articles/327017>; 2019.
- [12]. Rodrigues F, Pimentel FB, Oliveira MBPP. Olive by-products: challenge application in the cosmetic industry. Industrial Crops and Products. 2015;70:116-124. doi:10.1016/j.indcrop.2015.03.027.