



FORMULATION AND PHYSICOCHEMICAL STANDARDIZATION OF A UNANI POLYHERBAL FACE SERUM

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ABSTRACT

Background: Unani medicine offers a rich repository of medicinal plants for dermatological care, emphasizing the concept of Itidl-e-Mizaj (humoral balance) and Tanqiyat-e-Jild (skin purification) for skin health.

Objective: To formulate a stable, cosmetic-grade Polyherbal face serum based on Unani principles and to establish its physico-chemical fingerprint for standardization.

Materials and Methods: The serum was formulated using ingredients mentioned in classical Unani texts for their Mulattif (emollient), Muqawwi-e-Barat (skin tonic), and Muhallil (anti-inflammatory) properties: Arq-e-Gulab (Rose water), Sandal Safaid (*Santalum album* L.), Aloe vera gel, Roghan-e-Badam (*Prunus dulcis* oil), and Gul (*Rosa damascena* essential oil). The formulation was subjected to organoleptic, physico-chemical (pH, viscosity, refractive index, spreadability), and accelerated stability testing as per International Council for Harmonisation (ICH) guidelines.

Results: The serum was a light-pink, homogenous emulsion with a characteristic floral aroma. Key parameters were: pH (5.8 ± 0.1), viscosity (2150 ± 50 cP), refractive index (1.401 ± 0.002), and excellent spreadability (18.2 ± 0.4 g.cm/s). It remained stable under accelerated conditions ($40^\circ\text{C} \pm 2^\circ\text{C} / 75\% \pm 5\% \text{ RH}$ for 3 months) with no phase separation, significant change in pH, or microbial growth.

Conclusion: A stable Unani-based face serum was successfully developed. The established physico-chemical standards ensure batch-to-batch reproducibility and form a vital foundation for subsequent pharmacological and clinical studies to validate its skin rejuvenating claims.

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Keywords: Unani Cosmetics, Itidal-e-Mizaj, Tanqiyat-e-Jild, Polyherbal Formulation, Stability Testing, Sandal Safaid, Arq-e-Gulab.

INTRODUCTION

Skin health and aesthetics, termed Hifzan-e-Sehat-e-Jild in Unani medicine, are intricately linked to the

balance of the four Akhlat (humours) and the overall Mizaj (temperament) of an individual. Classical scholars like Hakim Ibn Sina (980-1037 AD) in Al-

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Qanun fi al-Tibb and Hakim Jalinus (Galen) elaborated on dermatological principles, attributing skin ailments such as Khushunki (dryness) and Tajaweef (wrinkles) to disturbances in Akhlat and Mizaj [1]. Topical formulations, known as Zimad (paste) or Marham (ointment), were designed to correct these imbalances using naturally derived Mufradat (single drugs) with properties like Barid (cooling), Rutubat (moisturizing), and Muhallil (anti-inflammatory) [2].

The Department of Ilmul Saidla wa Murakkabat (Pharmaceutics & Cosmeticology) specializes in transforming classical Unani formulations into stable, standardized products, while the Department of Jild wa Tanzniyat (Dermatology & Venereology) provides the clinical and anatomical rationale for their use. In contemporary times, there is a growing global demand for natural, evidence-based cosmetic products. While Unani literature is abundant with skincare descriptions, there is a paucity of scientific research that translates these textual formulations into standardized, shelf-stable cosmetic products [3]. Standardization is a critical step to ensure safety, efficacy, and quality control, bridging traditional wisdom with modern regulatory requirements [4].

This interdisciplinary study, therefore, aimed to develop a stable, polyherbal face serum based on specific Unani drugs with documented dermatological benefits. The primary objective was to formulate the serum and establish a comprehensive physico-chemical profile through rigorous standardization protocols.

2. Materials and Methods

2.1. Selection and Authentication of Raw Materials

Ingredients were selected based on their recurrent mention in classical texts for facial care and their actions relevant to Jildiyat (dermatology) [1,2,5]:

1. Arq-e-Gulbb (Rose water, *Rosa damascena* Miller): Used as the aqueous base for its Qabiz (astringent), Mulattif, and Muqawwi-e-Dimagh (cephalic tonic) properties, beneficial in Hararat (inflammatory) conditions of the skin.

2. Sandal Safaid (White Sandalwood, *Santalum album* L. heartwood powder): For its Muhallil and Mujaffif (drying) actions on subtle Waram (inflammation) and its role in Tanqiyat (purification).

3. Aloe vera gel, (*Aloe barbadensis* Miller): A renowned Murattib (moisturizer), Mulaem (demulcent), and wound healer, directly addressing Yabusat (dryness) of the skin.

4. Roghan-e-Badam (Sweet Almond oil, *Prunus dulcis* (Mill.) D.A. Webb): A primary Rutubat-inducing emollient (Murawwiq), used for nourishing dry and wrinkled skin.

5. Gul (Rose essential oil, *Rosa damascena*): Added for its Lazzat (fragrance) and its Qawi-e-Dimagh (cephalic tonic) effect, which indirectly influences skin vitality.

Botanical authentication was performed by a plant taxonomist. Voucher specimens were deposited in the departmental herbarium.

2.2. Formulation Development

The serum was formulated as an oil-in-water (O/W) emulsion, a preparation type relevant to modern Saidla (pharmaceutics).

Composition (% w/w):

Phase A (Aqueous): Arq-e-Gulbb (73%), Sandal Safaid paste (2% w/v infusion, filtered), Aloe vera gel gel (15%).

Phase B (Oily): Roghān-e-Bādām (6%), Gul oil (0.5%), Beeswax (1.0% as natural emulsifier and skin protector).

Phase C (Additives): Glycerin (2% as humectant), Potassium sorbate (0.1% as preservative).

Method of Preparation: (As per Unani Pharmaceutical Techniques): Phase B was gently heated to 65°C in a Karahi. Phase A was separately warmed to 68°C. Phase B was gradually added to Phase A with continuous manual stirring using a glass rod until emulsification commenced, followed by homogenization for 5 minutes. The mixture was cooled to room temperature, and Phase C ingredients were incorporated with slow stirring until a smooth, homogenous Rutubat (emulsion) was obtained.

2.3. Physico-Chemical Standardization

The freshly prepared serum (Batch No. US-01/2024) was evaluated in triplicate (n=3).

1. Organoleptic Properties: Colour, odour, consistency, and feel.

2. pH: Measured using a calibrated digital pH meter at 25°C.

3. Viscosity: Determined using a Brookfield viscometer.

4. Refractive Index: Measured using an Abbe refractometer.

5. Spreadability: Calculated using the parallel plate slide method.

6. Accelerated Stability Study: Conducted as per ICH Q1A(R2) guidelines [6].

7. Microbial Limit Test: Performed as per USP <61> [7].

3. Results

The formulated serum (US-01/2024) was a smooth, non-greasy, light-pink emulsion with a pleasant floral-woody odor, meeting the Jildiyat criterion of being non-irritant and pleasant.

Table 1: Physico-Chemical Parameters of the Unani Polyherbal Face Serum.

Parameter	Result (Mean ± SD, n=3)	Reference/Acceptable Range
Physical State	Homogenous, smooth emulsion	Homogenous, free from lumps
pH	5.8 ± 0.1	4.5 - 6.5 (Skin compatible)
Viscosity (cP)	2150 ± 50	Suitable for serum application
Refractive Index	1.401 ± 0.00	
Spreadability (g.cm/s)	g.cm/s 18.2 ± 0.4	Higher value indicates better spread

Table 2: Accelerated Stability Data (40°C ± 2°C / 75% ± 5% RH)

Time (Days)	Appearance	Phase Separation	pH	Viscosity (cP)
0	Light pink, homogenous	None	5.8	2150
30	No change	None	5.7	2100
60	No change	None	5.8	2080
90	Slight darkening	none	5.9	2050

No microbial growth was observed within the prescribed limits.

4. Discussion

The developed serum, termed skin elixir in Unani terminology, integrates principles from both Ilmul Saidla (for formulation) and Ilmul Jild (for therapeutic rationale). The pH (5.8) is optimal for the skin's acid mantle, supporting barrier function and commensal microflora, aligning with the Unani concept of Hifz-e-Sehat (preservation of health) [8].

From an Unani pharmacological (Ilmul Advia) perspective:

- Arq-e-Gulab (Barid, Latif) and Sandal Safaid (Barid, Khashin) counteract Hararat and Waram, common in aging or stressed skin [1].
- Roghan-e-Badam (Barid, Ratb) and Aloe vera gel (Barid, Ratb) provide essential Rutubat, combating Yabusat, a key pathogenic factor (Asbab-e-Maddi) in wrinkle formation (Tajaweef).
- The combination aims to promote Itidal-e-Mizaj (equilibrium) in the skin, which is the primary goal of Unani treatment.

The stability data confirms the formulation's robustness, a key concern in Saidla. The slight darkening observed at day 90 is acceptable and common in natural formulations. This study successfully demonstrates the collaboration between Jibb-e-Jild (Dermatology) and Saidla (Pharmaceutics) in advancing Unani cosmetic sciences.

5. Conclusion

A stable, skin-compatible polyherbal face serum based on Unani principles was successfully formulated through interdisciplinary expertise. The comprehensive physico-chemical profile established herein serves as a primary standard for quality control. Future Directions: This study paves the way for advanced analytical profiling, in vitro bioactivity assays relevant to skin aging, and controlled clinical trials within the Department of Jild wa Tanzniyat to validate the rejuvenating and Muqawwi-e-Balat (skin strengthening) efficacy.

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