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DEVELOPMENT AND EVALUATION OF *GHAZA* - A UNANI COSMECEUTICAL FORMULATION FOR SKINCARE

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ABSTRACT

Natural remedies are more acceptable in the belief that they are safer with fewer side effects than the synthetic ones. Demands of herbal cosmeceutical formulations are growing in the world market. In Unani system of Medicine, numerous cosmeceutical formulations for skincare are found which contain all natural ingredients. *Ghaza* is one of them. It is a Unani cosmeceutical dosage form for skincare and enhancement of skin complexion. The present work deals with the development and evaluation of *ghaza.* The fourteen (14) ingredients were selected after an exhaustive search of Unani classical literature. They possess the *jali* (detergent) and *tehseen-e-laun* (complexion enhancer) properties. In the current literature, all ingredients have been reported as having significant anti-microbial and anti-oxidant activity. The *ghaza* was evaluated by a battery of physico-chemical tests, viz., organoleptic characteristics, feel or consistency, ph, particle size, solubility, bulk density and tapped density, Hausner's ratio (hr), compressibility index, loss of weight on drying, ash value, moisture content, volatile oil content, determination of crude fibres, skin sensitivity, qualitative analysis and heavy metal analysis. Based on the observations and results of the undertaken study, it is concluded that *ghaza* based on Unani single drugs is a best Unani cosmeceutical formulation for skincare.

KEYWORDS: Ghaza, Unani cosmeceutical formulation, *jali, tehseen e laun.*

INTRODUCTION

It is a well-known fact that non-conventional streams of medicine always played significant role in meeting the global healthcare needs. The World Health organization (WHO) has defined these streams as traditional medicines in terms of "the health practices, approaches, knowledge and beliefs in corporation plant, animal and mineral-based medicines, spiritual therapies, manual techniques and expertise, applied singularly or in combination to treat, diagnose and prevent illness or maintain well being" [1]. Unani system of medicine is one of them. Unani system of medicine is based on the knowledge of achieving perfect physical, mental and social health. The primary goal of Unani system of medicine is the maintenance or promotion of good health and prevention or restriction of disease(s). The vast diversity of Unani drug dosage forms (UDDFs) has no parallel in any stream of medicine even in the conventional medicine of today. It is interesting to note that in spite of the popular Unani drug dosage forms (UDDFs), a separate class of UDDFs had also been designed and developed for external use or for the purpose of cosmetic.

The *ashiya-e-muzayyana*/cosmetics are the utility products used extensively throughout the world for maintaining and improving general appearance for face and other parts of body. The concept of maintaining health and beauty, i.e., *Zeenat wa araish* (cosmetics) are also mentioned in the Unani manuscripts and celebrated writings of great Unani physicians, where they wrote about the natural ways and measures for the purpose of cosmetics. Contrary to the common belief that the cosmetics and perfumery belong to the modern times, as a matter of fact, well before the coinage of the word cosmetics, from the Greek language **kosmeticos** meaning adorn or embellish (for making more attractive, beautiful & decorated)[10], the Arab physicians had laid foundation of a new branch of knowledge in the form of ***Ilm-ul-zeenah*** (science of beauty), i.e. nothing but cosmetology.

In Unani system of Medicine, numerous cosmeceutical formulations for skin care are found which contain all natural ingredients. *Ghaza* is one of them. It is a fine powder of drugs that is applied on the face and body for enhancing complexion. Its possible English equivalent is face powder[2, 11, 12,13]. It is a Unani cosmeceutical dosage form for skincare and enhancement of skin complexion.

The present study is based on the design and development of a Unani cosmeceutical formulation for skin care along with its Standard Operating Procedure (SOP). The formulation was designed as *ghaza*, a Unani conventional cosmeceutical formulation for

skincare and improving skin complexion. The fourteen (14) ingredients were selected after an exhaustive search of the Unani classical literature. They possess *jali* (detergent) and *tehseen-e-loan* (complexion enhancer) properties. In the current literature all ingredients have been reported as having significant anti-microbial and anti-oxidant activity.

MATERIALS AND METHODS

The ingredients of *ghaza* were procured from Khari Baoli market, old Delhi. These were authenticated by CSIR-NISCAIR and Shree Krishna Laboratories, New Delhi. The following ingredients were used in the test formulation *ghaza*:

Table 1: List of ingredients included in the test formulation *ghaza*

S. No.	Name of Ingredients	Scientific Name	Part Used
1.	Adas	*Lens culinaris*	Seeds
2.	Badam talkh	*Prunus amygdalus Batsch*	Kernel
3.	Baqla	*Vicia faba*	Seeds
4.	Darchini	*Cinnamomum zeylanicum*	Bark
5.	Hulba	*Trigonella foenum*	Seeds
6.	Jao	*Hordeum vulgare*	Seeds
7.	Jaiphal	*Myristica fragrance*	Fruit
8.	Kharpaza	*Cucumis melo*	Seeds
9.	Mamiran	*Coptis teeta*	Root
10.	Neem	*Azadirachta indica*	Leaves
11.	Nukhood	*Cicer arietinum*	Seeds
12.	Sangtara	*Citrus reticulate*	Peel
13.	Turb	*Raphanus sativus*	Seeds
14.	Gil-e-multani	*Multan clay*	Clay

1. Foreign matter separation: All ingredients were inspected with unaided eyes for the presence of impurities and foreign matter, and which were removed.

2. Drying: All drugs were dried under shade to remove the moisture.

PREPARATION OF *GHAZA* AS PER S.O.P: *Ghaza* was prepared by the following standard operating procedures (SOP):

I. All ingredients were taken 30 grams each in quantity.
II. The total quantity of ingredients was 420 grams.
III. Before powdering each sample, the mortar, pestle and grinder were properly cleaned.
IV. All ingredients were pounded in mortar and pestle before grinding.
V. All ingredients were powdered in a mixer grinder and sieved through 100 mesh size [2].
VI. The grinding and sieving was repeatedly done up to complete sieving of powder

ingredients.

VII. Finally, 320 grams of powder was obtained.

VIII. The finished product consisted of all ingredients was named as *ghaza* which was packed in the sterilized closed container.

PHYSICO-CHEMICAL EVALUATION

The physico-chemical study was carried out on test formulation *ghaza*. The following parameters were undertaken to standardize the formulation:

1. Organoleptic Characteristics

a) Appearance: Appearance was recorded according to the state of consistency whether semisolid, solid or liquid.

b) Determination of Color: The color of the test formulation *ghaza* was recorded under the sunlight.

c) Determination of Odor: A small portion of the sample was examined by slow and repeated inhalation of air.

2. Feel or Consistency: The feel and consistency of the test formulation *ghaza* was noticed by rubbing the formulation between two fingers. Its smoothness or grittiness was also observed and recorded.[7]

3. Determination of pH

pH of 1% solution- 1 gram of test formulation *ghaza* was dissolved in 100 ml of water, filtered and pH was checked with a standardized glass electrode [5].

pH of 10% solution-10 grams of test formulation *ghaza* was dissolved in 100 ml of water, filtered and pH was determined with a standardized glass electrode.[5]

4. Particle size analysis: This parameter was carried out by using microscope.

5. Solubility: 100 ml of distilled water was taken in a *Nessler cylinder* and test formulation *ghaza* was added up to saturation. After 1 minute, it was filtered. The solution using Hirsch funnel, evaporated the filtrate which was dried at 105 °C to constant weight and calculated the solubility of the drug in water (wt. in mg/100ml).[6]

6. Determination of bulk density and tapped density

Bulk Density: A clean, dry bottle (25 ml) was filled with 10 ml of distilled water and marked the water level, got the bottle emptied, rinsed with acetone and dried. The bottle was filled

with the test formulation *ghaza* which was allowed to settle overnight and again adjusted the level up to the mark and weighed.[5]

Tapped density: The tapped density is an increased bulk density attained after mechanically tapping a container containing the test formulation *ghaza*. The tapped density was obtained by mechanically tapping graduated measuring cylinder or vessel containing the test formulation *ghaza*. After observing the initial volume or mass of the test formulation *ghaza*, the measuring cylinder or vessel was mechanically tapped, and volume or mass readings are taken until little further volume or mass change was observed.[5]

7. Hausner's Ratio (HR) and Compressibility Index/Carr's index: The compressibility index is also known as Carr's index. The Carr's index is used as an indirect method of quantifying flowability from bulk density. It was calculated by the following equation:

Carr's Index (%) = [(Tapped density - Bulk density) x100]/ Tapped density

Hausner's Ratio (HR): Hausner's Ratio was calculated by the following equation:

(Hausner's Ratio)HR= Tapped density/Bulk density

8. Loss in weight on drying at 105^0C temperature: Three grams of test formulation *ghaza* was spread uniformly and thinly in shallow petri dish and heated at a regulated temperature of 105 ± 1 °C till constant weight and cooled in desiccators, weighed and calculated the percentage loss with respect to test formulation *ghaza*.[5]

9. Determination of ash values

(a) Total ash: Three grams of test formulation *ghaza* was incinerated in tarred silica dish at a temperature not exceeding 450 °C until free from carbon, cooled and weighed and the percentage of ash with reference to the air-dried test formulation *ghaza* was calculated [5].

(b) Determination of acid-insoluble ash: The ash obtained was boiled for 5 minutes with 25 ml of dilute hydrochloric acid and the insoluble matter was collected on an ashless filter paper, washed with hot water and ignited to constant weight. The percentage of acid-insoluble ash with reference to air dried test formulation *ghaza* was calculated [5].

(c) Determination of water-soluble ash: Total ash was boiled for 5 minutes with 25 ml of water and the insoluble matter was collected on an ash less filter paper, washed with hot water, and ignited for 15 minutes at a temperature not exceeding at 450 °C. The weight of the insoluble matter was subtracted from the weight of the ash. The difference in weight

represented the water-soluble ash. The percentage of water-soluble ash with reference to the air-dried test formulation *ghaza* was calculated [5].

10. Determination of moisture content (Toluene distillation): The moisture content of the test formulation *ghaza* was determined by the Toluene distillation method. 10 grams of test formulation *ghaza* was taken in a flask of the apparatus and 75 ml of distilled toluene was added to it. Distillation was carried out for 5 hours. The volume of water collected in receiver tube (graduated in ml) was noted and the percentage of moisture was calculated with reference to the weight of the air-dried test formulation *ghaza* taken. The readings were carried out in triplicate and average value was recorded.[8]

11. Volatile oil content: The test formulation *ghaza* was placed in the flask, a few pieces of porous porcelain were added and the condenser was joined to the apparatus. Water was introduced by tube until it reached to a certain level. Stopper was removed and introduced the appropriate volume of xylene using a graduated pipette and placing its tip at the bottom of tube. Stopper was replaced and the liquid was heated in the flask until it began to boil and the distillation rate was adjusted to 2–3 ml per minute. The heating was stopped after 30 minutes and waited for at least 10 minutes and then the volume of solvent (xylene) collected in the graduated tube was recorded.[4].

12. Determination of crude fibers: Fifteen grams of test formulation *ghaza* was weighed, and the material was extracted first in volatile ether (100 ml) for the removal of fats and waxes which being immiscible in aqueous solution, prevented penetration of acid and alkali into the test formulation *ghaza* particles. After that, 200 ml of boiling sulphuric acid (1.25%) was added. The mixture of acid and test formulation *ghaza* was cooled and then heated to boiling and then the flame was adjusted for slow steady boiling for 30 minutes. The time was noted when the mixture started to boil and not from the time when it is kept on flame. Acid insoluble residue was collected on a filter and washed with water to remove the acid, the residue was put into the flask with 200 ml of boiling 1.25% sodium hydroxide solution (70 ml of recently standardized carbonate 1N sodium hydroxide was dissolved in 200 ml distilled water). The mixture was boiled for 30 mints under the refluxed condenser, then filtered and washed with hot water to remove all the alkali, after drying the residue at 100°C, until constant weight. The percentage of crude fibres was calculated with reference to the amount of test formulation *ghaza* was taken. This procedure was repeated three times. The mean value and standard deviation was calculated.[5]

13. Skin Sensitivity / Patch Test: Skin sensitivity and non-irritancy of the test formulation *ghaza* was evaluated by patch test. It was performed by application on the volunteers to evaluate its safety. Though the test formulation *ghaza* contained all natural ingredients, which are in use for skin care since long time, but for the safety point of view, the following three parameters were done, i.e., Primary irritation test, Delayed hypersensitivity and Photo irritation or Photo allergy:

Primary irritation: In this test, 30 healthy human volunteers were selected. Definite quantities of test formulation *ghaza* were applied in combination w3ith water on the forearm region and behind ear lobe. Prior to the application, any signs of irritation were observed and noted. No visible reaction or erythema or intense erythema with edema and vesicular erosion occured. The test *ghaza* formulation was evaluated by the same procedure and possible reactions with different degrees like -No Irritation, + Mild irritation, ++ Moderate irritation, +++ High irritation.[9]

Delayed hypersensitivity: Delayed hypersensitivity test was performed with the same procedure as in primary irritation test by increasing the application time and observance time. After washing of test formulation *ghaza* from the skin, the reactions were measured for 2 hours of time and noted down.[9]

Photo irritation / Photo allergy: This test was aimed to know the possible photo allergic reactions of the test formulation *ghaza* on exposure to sun light on application. The formulation was applied as in the Primary irritation test, and the individuals were asked to expose themselves for sun light and possible reactions in the terms of itching, allergy, irritation and signs of redness after washing is measured and noted down [9].

14. Qualitative Analysis: The qualitative analysis of the aqueous extract of ingredients of test formulation *ghaza* was done using various chemical tests. The following tests were performed for this purpose:

Tests for presence of Phenol

Ferric chloride test: A sample of water extract of test formulation *ghaza* was treated with aqueous 5% ferric chloride, black colour appeared. The presence of black colour indicated presence of phenols in the extract.[3]

Zinc-Hydrochloride reducing test: The water extract of test formulation *ghaza* was treated with zinc dust and concentrated hydrochloric acid. The orange colour appeared. The presence of orange colour indicated presence of phenols.[3]

Test for presence of Flavonoids

Alkaline reagent test: In the water extract of test formulation *ghaza*, few drops of Sodium hydroxide solution were added. The yellow colour was appeared. The intense yellow colour disappeared on addition of few drops of dilute hydrochloric acid. This showed presence of flavonoids.[3]

Lead acetate test: The water extract of test formulation *ghaza* was treated with few drops of lead acetate (10%) solution. The yellow colored precipitations were formed. Quantity of precipitation indicated the concentration of flavonoids.[3]

Tests for presence of Tannin

Braymer's test: Two ml of water extract of test formulation *ghaza* was treated with 10% alcoholic ferric chloride solution. The dark greenish colour was appeared. Appearance of dark greenish colour indicated presence of tannins.[3]

Gelatin test: The two ml of water extract of test formulation *ghaza* was treated with 1% gelatin solution containing 10% sodium chloride. Appearance of white precipitation indicated presence of tannins.[3]

Test for glycoside: One ml of water extract of test formulation *ghaza* was taken in a test tube and a few drops of aqueous sodium hydroxide solution were added to it and observed. The intense yellow colour indicated presence of glycosides.[3]

Tests for presence of carbohydrate

Benedict's test: The water extract of test formulation *ghaza* was treated with few drops of Benedict's reagent and boiled. The reddish-brown precipitate indicated the concentration of carbohydrates.[3]

Fehling's test: The equal volume of Fehling's A and Fehling's B reagent were mixed along with few drops of water extract of test formulation *ghaza*. After boiling, appearance of brick red indicated presence of carbohydrates.[3]

Tests for presence of alkaloids

Dragendorff's test: One ml of water extract of test formulation *ghaza* was taken and 2-3 drops of Dragendorff's reagent was added. The formation of yellow precipitate showed presence of alkaloids.[3]

15. Heavy Metal Analysis

Heavy metal analysis of test formulation *ghaza* for presence of lead, arsenic, cadmium, and mercury was done by AAS from Shree Krishna Analytical Services, New Delhi.

RESULTS

Present study was carried out to pharmaceutically develop a ghaza with standard operating procedures (SOPs). Formulation was made in three batches, their mean value was calculated and their organoleptic, physico-chemical and other tests were carried out.

1. **Organoleptic Characteristics**

Table 2: Organoleptic Characteristics of *Ghaza*

S. No.	Organoleptic Character	Observation
1.	Appearance	Powder
2.	Color	Brown
3.	Smell	Agreeable

2. **Feel or Consistency:** The feel of the test formulation *ghaza* was **rough** and **grittiness** noticed by rubbing the formulation between two fingers. It was a freely flow powder formulation.
3. **Particle size analysis:** The particle size of test formulation *ghaza* was found to be **less than 20 micron.**
4. **pH measurement:** The **mean values of pH** of the test formulation *ghaza* in 1% and 10% solutions were found to be **6.76 ± 0.015** and **6.69 ± 0.01**, respectively as shown in the table no 3.
5. **Solubility:** The **mean value of solubility** of the test formulation *ghaza* was found to be **716.66 ± 22.47 mg / 100ml** as shown in the table no 3.
6. **Loss of weight on drying:** The **mean value of loss in weight** on drying of test formulation *ghaza* at 105°C was found to be **9.28 ± 0.63. %** as shown below:

Table 3: pH, Solubility and Loss of weight on drying at 105^0C of *Ghaza*

S. No.	pH (1%)	pH (10%)	Solubility (in mg / 100ml)	Loss of weight on drying at 105^0C (in %)
1.	6.78	6.71	692	9.49

2.	6.75	6.69	736	8.57
3.	6.76	6.70	722	9.79
Mean ± SD	**6.76 ± 0.015**	**6.69 ± 0.01**	**716.66 ±22.47**	**9.28 ± 0.63**

7. **Bulk and Tapped density:** The **mean value of bulk density** and **tapped density** of test formulation *ghaza* were found to **0.569 ± 0.018 gm/ml** and **0.688 ± 0.031 gm/ml** respectively.
8. **Hausner's ratio and compressibility index of *Ghaza:*** The **mean value of Compressibility index** and **Hausner's ratio (HR)** of test formulation *ghaza* were found to be **17.272 ± 3.073** and **1.209 ± 0.044,** respectively as mentioned below in the table:

Table 4: Bulk density, Tapped density, Hausner's ratio and Compressibility index of *Ghaza*

S. No.	Bulk Density (in gm/ml)	Tapped density (in gm/ml)	Hausner's ratio	Compressibility index (in %)
1.	0.572	0.663	1.159	13.725
2.	0.549	0.679	1.233	19.145
3.	0.586	0.723	1.236	18.948
Mean ± SD	**0.569 ± 0.018**	**0.688 ± 0.031**	**1.209 ± 0.044**	**17.272 ± 3.073**

9. **Total ash, acid insoluble and water soluble ash of *Ghaza*:** The **mean percentage values** of the **total ash**, **acid insoluble ash** and **water soluble ash value** of test formulation *ghaza* were found to be **11.20 ± 0.59 %, 6.12 ± 0.14%** and **3.78 ± 0.26 %,** respectively as shown in the following table and figure:

Table 5: Total ash, acid insoluble and water soluble ash of *Ghaza*

S. No.	Total ash (in %)	Water soluble ash (in %)	Acid insoluble ash (in %)
1.	11.45	3.53	6.11
2.	11.64	4.06	5.99
3.	10.52	3.76	6.27
Mean ± SD	**11.20 ± 0.59**	**3.78 ± 0.26**	**6.12 ± 0.14**

10. **Moisture content (Toluene distillation):** The **mean percentage value** of the **moisture content** of *ghaza* was found to be **8.986 ± 0.0312%.**
11. **Volatile oil content:** The **mean percentage value** of the **Volatile oil content** of *ghaza* was found to be **0.99 ± 0.01%.**
12. **Crude Fibres:** The **mean percentage value** of the **crude fibres** of *ghaza* was found to be 0.386 ± 0.0057 %. The results are shown below:

Table 6: Moisture content, Volatile Oil Content and Crude Fibres in *Ghaza*

S. No.	Moisture content (in %)	Volatile Oil Content (in %)	Crude Fibres (in %)
1.	8.970%	0.98	0.38
2.	8.966%	1.0	0.39
3.	9.022%	0.99h	0.39
Mean ± SD	**8.986 ± 0.0312%**	**0.99 ± 0.01%**	**0.386 ± 0.0057**

13. Skin Sensitivity / Patch Test : The formulation showed the following results:

Table 7: Result of Patch Test of *Ghaza*

Name of test	Number of volunteers	Result	Name of test	Number of volunteers	Result
1.Primary irritation Test	28	No irritation (-)	3.Photo irritation Test	27	No irritation (-)
	02	Mild irritation (+)		02	Mild irritation (+)
2.Delayed hypersensitivity Test	28	No irritation (-)		01	Moderate irritation (++)
	02	Mild irritation (+)			

14. Qualitative analysis: The qualitative analysis of test formulation *ghaza* for presence of different phytochemicals was done, which showed the following result:

Table 8: Qualitative analysis of *ghaza* for phytochemicals

S. No.	Phytochemical	Test	Result
1.	Phenols	Ferric chloride test	Positive
		Zinc-Hydrochloride reducing test	Positive
2.	Flavonoids	Alkaline reagent test	Positive
		Lead acetate test	Positive
3.	Tannins	Braymer's test	Positive
		Gelatin test	Positive
4.	Glycosides	Sodium hydroxide test	Positive
5.	Carbohydrate	Benedict's test	Positive
		Fehling's test	Positive
6.	Alkaloids	Dragendorff's test	Positive

15. Heavy Metal Analysis: The result of heavy metal analysis is given below.

Table 9: Heavy Metal Analysis of *Ghaza*

S. No.	Name of Heavy Metal	Result	S. No.	Name of Heavy Metal	Result
1.	Lead	Less than 10 ppm	3.	Mercury	Less than 1 ppm
2.	Arsenic	Less than 3 ppm	4.	Cadmium	Less than 0.3 ppm

DISCUSSION: *Ghaza* is a Unani cosmeceutical dosage form for skincare and enhancement of skin complexion. In the present study, fourteen (14) commonly used Unani drugs were selected for development and evaluation of *ghaza*. In this study, a number of procedures and

a battery of tests were employed, which highlighted that the formulation is safe for use as maximum individuals showed no irritation on its application. The observations and results showed that the **mean values of pH** of the prepared *Ghaza* in 1% and 10% solutions were found to be **6.76 ± 0.015** and **6.69 ± 0.01,** respectively, which was near to neutral The qualitative analysis of *ghaza* for presence of different phytochemicals validated its antioxidant activity. The heavy metal analysis showed that lead, arsenic, mercury and cadmium were found within permissible limits as per WHO guidelines. So, the safety of formulation is ensured.

CONCLUSION: A lot of cosmeceutical formulations available in the market for skincare but they all contain harmful chemicals. The Unani medicine provides a succor to this situation. Almost all Unani pharmacopoeias mention a number of cosmeceutical formulations for skin care, such as *ghaza*. The main hindrance in getting the desired therapeutic efficacy of *ghaza* and its reproducibility is absence of the physico-chemical data and standard operating procedure (SOP) of this conventional dosage form. Hence, this study has been carried out to scientifically validate *ghaza* as an effective and safe Unani cosmeceutical formulation for skin care and enhancer of skin complexion.

Conflict of Interest: None

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