Research Article

Physicochemical Characterization of *Zulal* Prepared by Using *Safoof-E-Bars*

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ABSTRACT

Vitiligo constitutes an important dermatological disease especially in India. Safoof-e-Bars (SB), an Unani pharmacopoeial formulation, is an important powder dosage form used widely to treat vitiligo. It is used internally as Zulal and externally as Zimad. Standardization is an important aspect for maintaining and assessing the quality and safety of polyherbal formulation. As physicochemical standardization of each and every dosage form is important and till date standardization of Zulal of Safoof-e-Bars has not been done, so it was evaluated physicochemically on various parameters such as organoleptic properties like appearance, colour, smell and taste, pH value, viscosity, specific gravity and qualitative analysis.

Keywords: Zulal, Safoof-e-Bars, Standardization.

INTRODUCTION

Zulal is a watery preparation obtained by soaking the drug in water which is neither boiled nor shacked. The water is decanted gently after a particular time and administered orally. In the present study, *zulal* was prepared by using *Safoof-e-Bars* (SB) as per the method described in Unani Pharmacopoeia of India (UPI). *Zulal* was prepared by soaking 10g of *Safoof-e-Bars* in 50ml of water over night. The infusion was then filtered in the morning and the filtrate was formed as *zulal*[1]. *Safoof-e-Bars* is a powder dosage form having ingredients Babchi (*Psoralea corylifolia*), Chaksu (*Cassia absus*), Panwar (*Cassia tora*) and Anjeer-khushk (*Ficus carica*). *Psoralea corylifolia* is reported to contain psoralen, which is one of the important therapeutically active compounds in treating vitiligo. SB is used widely to treat vitiligo both internally in the form of *Zulal* (Infusion) as well as externally in the form of *Zimad* (Paste)[2]. Although the standardization of *Safoof-e-Bars* has been done but till date standardization of its *Zulal* has not been done.

MATERIALS AND METHODS

Procurement of Raw Drugs

The ingredients of formulation were procured from the Pharmacy, National Institute of Unani Medicine, Bengaluru. Ingredients were identified and authenticated by Botanist, Senior Assistant Prof. S. Noorunnisa Begum, Centre for Repository of Medicinal Resources (C-RMR), Trans-Disciplinary University (TDU), Attur, Bengaluru. The voucher specimens (*Ficus carica*-4516, *Cassia tora*-4517, *Psoralea corylifolia*-4518 and *Cassia absus*-4519) have been deposited in the museum of Institute of Trans-Disciplinary Health Sciences and Technology, Bengaluru.

Preparation of *Zulal*

Zulal was prepared by soaking 10 g of *Safoof-e-Bars* in 50 ml of water overnight. The infusion was filtered in the morning[1]. Ingredients of *Safoof-e-bars* are given in table 1.

Table 1: Ingredients of *Safoof-e-Bars*

S. No	Common Name	Scientific Name	Quantity
1	Babchi	*Psoralea corylifolia* Linn.	100 gm
2	Chaksu	*Cassia absus* Linn.	100 gm
3	Tukhm-e-Panwar	*Cassia tora* Linn.	100 gm
4	Anjeer-khushk	*Ficus carica* Linn.	100 gm

Physicochemical Characterization of *Zulal*

Zulal was evaluated physicochemically in the laboratory of Dept. of *Ilmul Saidla*, NIUM, Bengaluru, on various parameters such as (1) Organoleptic properties like appearance, colour, odor and taste (2) pH value (3) Viscosity (4) Specific gravity (5) Qualitative analysis.

Determination of Organoleptic Properties

Organoleptic properties of *zulal* such as appearance, colour, odor and taste were noted.

- Appearance**:** Small quantity of *zulal* was taken in a test tube and appearance was observed visually.
- Colour**:** Small quantity of *zulal* was taken into watch glass and placed against white background in white tube light. The colour of *zulal* was noted.
- Odor**:** Odor was observed by smelling *zulal* directly.
- Taste**:** *Zulal was* examined for the taste on the upper surface of the tongue.

Determination of pH

The pH of *zulal* was determined by using pH meter (Digital pH meter-Eutech instruments, 1544421). The pH meter was calibrated using buffer solution at pH 4 and 7.

Determination of Viscosity

Viscosity of *Zulal* was determined by using 'U' tube viscometer. *Zulal* was filled in a 'U' tube viscometer in accordance with the expected viscosity of the liquid, so that the fluid level stands within 0.2 mm of the filling mark of the viscometer, when the capillary is vertical and the specified temperature is attained by the test liquid. The *zulal* was sucked or blown to the specified mark of the viscometer and the time taken for the meniscus to pass the two specified marks is measured. The kinematic viscosity in centistokes was calculated from the following equation[1].

Kinematic viscosity = kt

Where; k = the constant of the viscometer, determined by observation on liquids of known kinematic viscosity

t = time in seconds for meniscus to pass through the two specified marks.

Determination of Specific Gravity

Specific gravity of *zulal* was determined by using 10 ml *Geissler pycnometer.* The pycnometer was thoroughly cleaned and dried. Then it was calibrated by filling it with recently boiled and cooled water at 25°C and the content was weighed. The capacity of pycnometer was calculated by assuming that the weight of 1 ml of water at 25°C when weighed in air of density 0.0012 g per ml is 0.99602 g. The weight of the water was determined by subtracting the weight of the empty pycnometer. Thereafter the pycnometer was filled with *zulal* and the temperature was again adjusted to 25°C. Any excess of the substance was removed and then weighed. The weight of *zulal* wasd determined by subtracting the weight of the empty pycnometer. Finally the specific gravity of the *zulal* was obtained by dividing the weight of the *zulal* contained by the weight of water contained in the pycnometer [1].

Qualitative Analysis

Alkaloids:

Dragendorff's test: A drop of Dragendorff's reagent was added in the *zulal.* If a brown precipitate was formed then it was the indication of presence of alkaloids [3].

Mayer's test: One ml of acidic *zulal* was taken in a test tube and few drops of Mayer's reagent were added. If a white or pale yellow precipitate was formed then it was the indication of presence of alkaloids [4].

Carbohydrates:

Benedict's test: 5 ml of Benedict's solution was added to 0.5 ml of *zulal* and boiled for 5 minutes. A coloured ppt was the indication of presence of carbohydrates [4].

Fehling's test: 1 ml of a mixture of equal parts of Fehling's solution 'A' & Fehling's solution 'B' was added to 2 ml of *zulal* and boiled the contents of the test tube for a few minutes. If a white or pale yellow precipitate was formed then it was the indication of presence of Carbohydrate [4].

Flavonoids:

0.5 ml of alcoholic extract of *zulal* was taken in a test tube, 5-10 drops of diluted hydrochloric acid was added, after that small piece of zinc was added and then the solution was boiled for few minutes. If pink colour was produced then it was the indication of presence of flavonoids [4].

Glycosides:

Small amount of alcoholic extract of *zulal* was dissolved in one ml of water, and sodium hydroxide solution was added in it. A yellow colour indicated the presence of glycosides[4].

Phenols:

A small quantity of alcoholic extract of *zulal* was dissolved in five ml of distilled water, and 5-8 drops of 1% solution of lead acetate was added. If yellow precipitate was formed then it was indication of presence of phenols [4].

Proteins:

Millon's test: A small quantity of *zulal* was dissolved in one ml of distilled water and 5-6 drops of Millon's reagent were added in this solution. A white ppt was formed. If this ppt turns red on heating then it was the indication of protein [4].

Biuret's test: To one ml of hot *zulal*, 5-8 drops of 10% sodium hydroxide solution were added followed by one or two drops of 3% copper sulphate solution. If red or violet colour was obtained then it was the indication of protein [4].

Saponins:

In a test tube containing about 5 ml of an aqueous extract of the *zulal*, a drop of sodium bicarbonate solution was added. Mixture was shaken vigorously and left for 3 minutes. Honey comb like froth was the indication of saponin [4].

Tannins:

A few drops of 1% solution of lead acetate were added in a test tube containing five ml of *zulal.* If yellow precipitate was formed then it was the indication of presence of tannins [4].

RESULTS AND DISCUSSION

The organoleptic properties of *zulal* was found to be transparent clear liquid in appearance, dark yellow in colour, bitter in taste with light aromatic odor (Table 2). Organoleptic properties of any product are an important parameter for drug identification and quality assurance. Visual inspection provides simplest and the quickest means to establish identity, purity and quality. Odor serves as a vital function regarding quality of formulation and acceptability by patient. Change in odor from pleasant to unpleasant may indicate microbial growth.

Table 2: Organoleptic Properties of *Zulal*

Appearance	Transparent clear liquid
Colour	Dark yellow
Odor	Slightly aromatic odor
Taste	Bitter

The mean value of pH of *zulal* was found to be 5.936±0.008 (Table 3). The pH value of an aqueous liquid may be defined as the common logarithm of the reciprocal of the hydrogen ion concentration expressed in g per liter. This definition provides a useful practical means for the quantitative indication of the acidity or alkalinity of a solution [1]. The concentration of hydronium ions influences the concentration of the anions, cations, and undissocited molecules present in solution. In turn, these chemical species often affect the stability, therapeutic activity and pharmaceutical elegance of medicinal agents in aqueous preparation [5].

The mean value of viscosity of *zulal* was found to be 2.222±0.029 (Table 3). Viscosity is a property of liquid that is closely related to the resistance to flow. The specifying of temperature is important because viscosity change with temperature; in general viscosity decreases as temperature is raised [6]. The viscosity of a fluid substance is constant for any given temperature and is a measurable characteristic of the substance. The viscosities of solution and liquid mixtures often vary with their concentration and composition. This property may be used in many cases, as a rapid means of analysis. As the viscosity of a liquid changes very rapidly with the temperature, decreasing about 2 percent for each degree rise in temperature, it is important to know the exact temperature of the liquid at the time of measurement [5].

The mean value of specific gravity of *zulal* was found to be 1.023±0.005 at 25°C (Table 3). Unless otherwise stated in the individual monograph, the specific gravity determination is applicable only to liquid, and unless otherwise stated, is based on the ratio of weight of a liquid in air at 25°C to that of an equal volume of water at the same temperature [6]. It is commonly used in industry as a simple means of obtaining information about the concentration of solution of various materials such as sugar solutions, syrups, juices, honey etc [7].

Table 3: Physicochemical properties of *Zulal*

Parameters	Samples			Mean±SEM
	1	2	3	
pH Value	5.95	5.92	5.94	5.936±0.008
Viscosity (cps)	2.2657	2.1677	2.2331	2.222±0.029
Specific Gravity	1.0243	1.0224	1.0233	1.023±0.005

In qualitative estimation of *zulal*; alkaloids, carbohydrates, glycosides, phenol, protein and tannins were examined for their presence which are responsible for the therapeutic effects and these were found to be positive (Table 4).

Table 4: Qualitative analysis of *Zulal*

Phytochemical Constituents	Phytochemical test	Result
Alkaloids	Dragendroff's test	+ve
	Mayer's test	+ve
Carbohydrates	Benedict's test	+ve
	Fehling's Test	+ve
Flavonoids	Flavonoid test	+ve
Glycosides	Glycosides test	+ve
Phenols	Phenol test	+ve
Proteins	Millon' test	+ve
Saponin	Foam test	+ve
Tannins	Lead acetate test	+ve

CONCLUSION

Since there is no standard physicochemical profile of *Zulal* of SB till date, so this study was carried out to develop quality control parameter for the first time. This study gave valuable information and data that may considered as reference standard for future studies. However further studies like animal studies, clinical trial etc are needed to be done on *Zulal.*

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