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RESEARCH ARTICLE

PHYSICOCHEMICAL STUDY OF *MARJAN (CORALLIUM RUBRUM LINN) SOKHTA*

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ABSTRACT

Shokhta /Moharraq are Unani pharmaceutical process, in this process the animal drug Carbonized. Physicochemical test were applied upon these drug the outcomes are based on following parameters; Carbonized value 89.5%, Maximum temperature 1100 ^{0}C, Water soluble matter 0.37%, Alcohol soluble matter 1.83%, pH 1% and 10% is 9.74, 10.10, Atomic absorption Spectroscopic Analysis (AAS) Results in ppm, Cd=0.018, Hg Nil, As= Nil, Pb=0.004, Ca=0.024, P=0.009, Mg=0.022.Inorganic elements use as a micronutrient in health.

INTRODUCTION

Marjan (Corallium rubrum) are marine invertebrates of the phylum Cnidaria, class Anthzoa which form compact colonies made of genetically identical individual polyps. Several species, mainly belonging to the subclass Hexacorallia, form hard calcium carbonate ($CaCO_3$) skeletons which are the main constituents of the tropical coral reefs. The skeletons often present complex morphologies which give three dimensional complexities to the substratum and serve as a refuge for several species, increasing biodiversity and contributing to shape marine seascapes[1]In Unani literature *'Beekh-e-Marjan' or 'Busud'* (Root of coral) and *Shakh-e-Marjan* (Branch of coral) are used separately for different medicinal properties. Some authors however are of the view that the so called root of coral is not a drug of animal origin and mentioned it under mineral origin drugs. It is also known as *Busud or Marjan* and is comprehensively described in Unani literature. It appears like the honey comb but the pores are large. The *Busad* is soft when remains in water but becomes hard after removing out. There are different types of *Busud* which have been classified according to color namely white, red and black. The white are soft which and slightly harder, black one is bad in quality. Then red and the black are very hard, black is considered bad in quality. The best quality *Bussud* is red, which is clear with no earthy matter. Its ash is used as tooth powder for strengthening of gums and teeth. It also used as 'Surma' for the treatment of eye diseases. If mixed with appropriate oil it is used as ear drop. As an aqueous lotion it is useful in leprosy. Internally it is astringent, styptic, antidiarrheal, diuretic, antiseptic, detoxificant and tonic for the heart and brain. It is useful in melanocholia, epilepsy, insanity, palpitation, enlargement of spleen, gastric disorder renal calculi and piles. Administration with egg yolk gum acacia and catechu is recommended in stomatitis, hemoptysis, cough, phthisis and asthma. Its use has also been mentioned in impotence, spermatorrhoea, gleet, gonorrhea, carbuncles, scrofulous affections, tuberculosis, diabetes, and general debilities[2,3] *Sokhta/Moharraq* is Unani pharmaceutical process. In this process animal, herbal, mineral drugs are processed is known as *Moharraq (Sokhta). Ehraq*is the processes by which drugs are burnt to the charring stage but not reduce to ash. Drugs which undergo this process are suffixed with the term "*Moharraq" or "Sokhta"* For example, *Sartan Moharraq, Busud sokhta, Marjan sokhta* etc. this process is undertaken to evaporate all moisture content and to make the drug completely dry as indicated in respectively formulation[4,5]

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MATERIAL AND METHOD

Procurement of *Marjan:* *Marjan (Corallium rubrum)* was procured from the open market, Khari Bawali, Delhi-110006.

Identification of *Marjan:* Identification of *Marjan (Corallium rubrum)* was done by the experts of Department of *Ilmul Advia,* Ayurvedic & Unani Tibbia College, Karol Bagh, New Delhi after matching it with specimen available in the Raw Drug Museum.

Method of preparation of *Marjan Sokhta:* 30 gm *Marjan* was taken, broken into small pieces and kept in a disc shaped earthen pot. This pot was covered with another pot of same shape and size. The edges of the pots were sealed and then *kaproti* was done to make *boota*. This *boota* was then kept in furnace/ *bhatti* and heated in fire of cow dung cakes (CDC). The change in temperature of furnace was regularly monitored using pyrometer and recorded. After complete extinguishing of fire and cooling of furnace, the *boota* was removed, seal opened and *Marjan sokhta* was collected. The process was repeated three times with different quantities of CDC and change (if any) in the quantity of drug obtained after *sokhta* was observed. The changes in intensity and degree of heat with respect to different quantities of CDC were also observed.

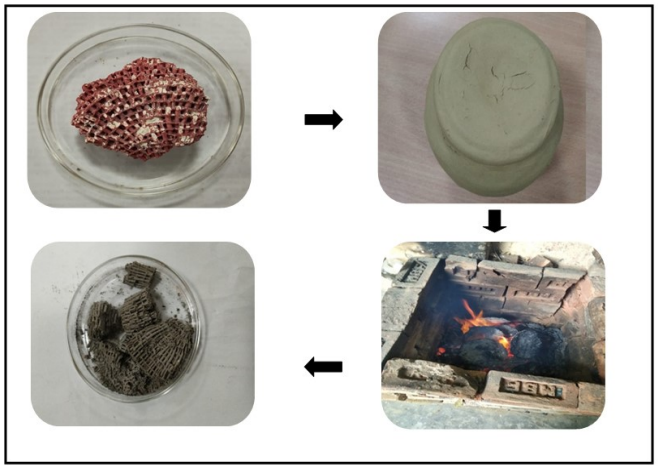

Figure. Preparation of Marjan Sokhta

PHYSICO-CHEMICAL ANALYSIS OF *SOKHTA/ MOHARRAQ* DRUGS

Organoleptic Properties

- **Appearance:** Appearances of all *sokhta* drugs were recorded.
- **Determination of Taste:** This was identified by the volunteers.
- **Determination of Colour:** The colour of all the samples was also noted.
- **Determination of Odour:** A small portion of the sample was examined by slow and repeated inhalation of air over the material.

Determination of Carbonized Value: The carbonized value of the *moharraq* drugs was determined in terms of percentage. The initial weight of the raw drug was measured, and then the weight of *moharraq* drug was measured. The carbonized value was calculated as under:

$$\text{Carbonized value} = \frac{\text{Weight of } moharraq \text{ drug}}{\text{Weight of raw drug}} \times 100$$

Determination of pH[6]

- **pH of 1 % solution:** One gram sample was mixed in 100 ml of distilled water and pH was checked with the standardized glass electrode.
- **pH of 10 % solution:** Ten gram sample was mixed in 100 ml of distilled water and pH was checked with the standardized glass electrode.

Determination of Alcohol Soluble Matter[6]: Macerated 5 gram accurately weighed drugs in 100ml of ethanol in a closed flask for twenty four hours shaking frequently during six hours and allowed to stand for eighteen hours. Filter rapidly through whatman filter paper No. 42. Then the filtrate was evaporated to dryness in a glass petri-dish, dried at 105 $^{\circ}$C and weighed. The percentage of alcohol soluble matter was calculated.

Determination of Water Soluble Matter[6]: Macerated 5 gram accurately weighed drugs in 100ml of 0.25% chloroform water V/V, in a closed flask for twenty four hours shaking frequently during six hours and allowed to stand for eighteen hours. Filter rapidly through Whatman filter paper No. 42. Then the filtrate was evaporated to dryness in a glass petri-dish, dried at 105 ^{o}C and weighed. The percentage of water soluble matter was calculated.

Atomic Absorption Spectroscopy (AAS): This technique was used to determine the concentration of certain metallic ions in a solution by measuring the intensity of absorption of light at a particular wavelength when a solution of the substance being examined is introduced in to a flame.

Method: Prepared three standard solution of the element to be determined and then introduced each standard solution into the flame three times, and recoded the study reading. A standard calibration curve was plotted by taking the mean of each group of three readings. Then the test solution was introduced into the flame and recorded the reading. This sequence was repeated twice and using the mean of three reading the concentration of the element was determined using the standard calibration curve. The concentration of the given element in the ash solution of the drug in ppm units was calculated knowing the concentration of the given element in ash solution of the drugs. The following formula was used to calculate the concentration of the given element in mg/g of ash[7]

ppm reading × dilution × original volumes

1000 × wt. of ash in gram

In this formula, ppm reading is the concentration of the given element in drug solution obtained from the standard calibration curve[8]

Organoleptic characteristics of *Marjan Sokhta:* The organoleptic characteristics of *Marjan sokhta* are given in table.

Table No 1. Organoleptic description of *Marjan Sokhta*

Appearance	Solid
Color	Black
Taste	Coal like
Odor	Burnt smell

Weight variation in *Marjan* after *Sokhta* procedure: The weight of the crude drug was kept constant but weight of CDC was varied and accordingly the variation in weight of *moharraq/ sokhta* (carbonized) drug was observed and carbonized value was calculated as given in table.

Table No: 2. Carbonized value of *Marjan Sokhta*

S. No	Raw drug	Cow dung cakes	Carbonized drugs	Carbonized value
1	30 gm	2.0 kg	28.34 gm	94.6%
2	30 gm	2.5 kg	27.81 gm	92.7%
3	30 gm	3.0 kg	27.26 gm	90.86%

Temperature variation during *Marjan Sokhta* procedure: The variations in temperature with respect to change in quantity of CDC were recorded at regular time intervals as shown in figure.

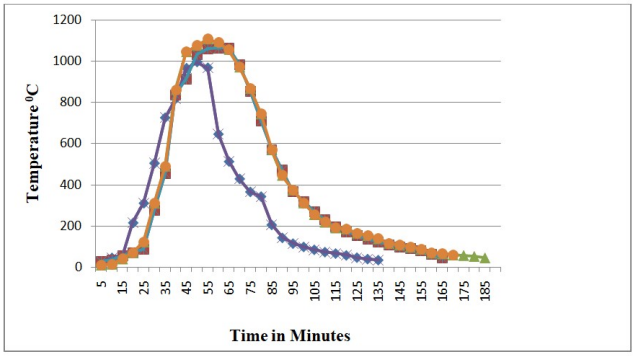

Figure No. 2. Temperature variation during *Marjan Sokhta* procedure

pH value of *Marjan Sokhta*: The pH values of different samples of *Marjan Sokhta* in 1% and 10% solution were analyzed and given in table.

Table No: 3. pH values of *Marjan Sokhta*

Sample No.	pH (1%)	pH (10%)
1	10.03	10.29
2	9.61	10.06
3	9.98	10.15

Water soluble and Alcohol soluble matter in *Marjan Sokhta:* The water soluble and alcohol soluble matter in *Marjansokhta* is given below in table.

Table No: 4. Water soluble and alcohol soluble matter in *Marjan Sokhta*

Sample No.	Water soluble matter (%)	Alcohol soluble matter (%)
1	0.27	2.00
2	0.35	1.87
3	0.37	1.83

Spectroscopic Analysis: The elemental analysis of *Marjansokhta* was done through AAS and the results are given in table.

Table No. 5. AAS analysis of *Marjan Sokhta*

S. No	Element	Results (ppm)
1.	Cadmium	0.018
2.	Mercury	Nil
3.	Arsenic	Nil
4.	Lead	0.004
5.	Calcium	0.024
6.	Phosphorus	0.009
7.	Magnesium	0.022

DISCUSSION

In Unani system of medicine, human body is considered as a small universe (*micro cosm*) in itself, and resembles to the external real world (*macro cosm*) in its features and composition. Therefore, any pathological change that occurs within human body will be treated according to the laws of universe and predominantly with natural source. That is why herb/plant, animal and metal/ mineral origin drugs are thought to be beneficial in protection of health and life and treatment of disease. In *Ilmul Saidla* (Unani pharmaceutics), *Ehraq* is the process by which drugs are burnt to the charring stage but not reduced to ash. Drugs of plant, animal and metal/mineral origin undergo this process are suffixed with the term *'Moharraq' or 'Sokhta'*, for example, *Sartan Moharraq, Marjan Sokhta, Aqrab Sokhta,* etc.

This process is based on the following premises:

- To evaporate all moisture contents, and to make the drug completely dry;
- To extract maximum contents of inorganic nature.

The elemental analysis shows that these drugs have a remarkable inorganic diversity. Many inorganic elements showed their presence in these drugs. Of there include Arsenic (As), Cadmium (Cd), Calcium (Ca), Chromium, Lead (Pb), Magnesium (Mg), Mercury (Hg), Phosphorus (P). *Marjan* was taken in the quantity of 30 gm which was reduced to 27.26 gm after 3rd process of *Ehraq*. The maximum temperature recorded was 1100^0 C. The elemental analysis of drug showed presence of Calcium in 0.024, Phosphorus 0.009, Magnesium 0.022 whereas Lead and Cadmium were found in 0.004 and 0.018 gm, respectively. The later elements were within permissible limit as per WHO guidelines. The role of Calcium, Phosphorus and Magnesium is corroborated in therapeutic role of *Marjan Sokhta* in *Amraze Qalb wa Dum* (Cardiac diseases and blood disorders), *Amraze Maida* (Gastric disorders).

CONCLUSION

Amal-e-Ehraq is a Unani pharmaceutical process. In this process animal, herbal, mineral and metal drugs are processed. The processed drug is known as *Moharraq* or *Sokhta.* By definition, *Ehraq* is processes by which drugs are burnt to the charring stage, but not reduced to ash. Drugs which undergo this process are suffixed with the term "*Moharraq* or *Sokhta" Marjan Sokhta:* Carbonized value 89.5%, Maximum temperature 1100 ^{0}C, Water soluble matter 0.37%, Alcohol soluble matter 1.83%, pH 1% and 10% is 9.74, 10.10, Atomic absorption Spectroscopic Analysis (AAS) Results in ppm, Cd=0.018, Hg Nil, As= Nil, Pb=0.004, Ca=0.024, P=0.009, Mg=0.022

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