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PHYSICOCHEMICAL STUDY OF SARTAN (SCYLLA SERRATA) SOKHTA

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ABSTRACT

Shokhta /Moharraaq 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; *Sartan Sokhta*: Carbonized value 71.43% , Maximum temperature 1000 °C, Water soluble matter 3.2%, Alcohol soluble matter 1.37%, pH 1% and 10% 9.55, 9.22, Atomic absorption Spectroscopic Analysis (AAS) Results in ppm, Cd=Nil, Hg=Nil, As=Nil, Pb=0.042, Ca=0.016, Mg=0.031, Co=0.043, Zn=0.005. Inorganic elements use as a micronutrient in health.

Keywords; *Sartan (Scylla serrata)*, *Moharraaq*, Physicochemical study, AAS

Introduction

Sartan is a well-known single drug mention in the Unani classical literature. Scientifically it is known as *scylla serrata* belong to family Portunidae. *Sartan* (mud crabs) from genus *Scylla* have been known to be traditionally important worldwide, thus causing them to be cultured in many Asian countries such as Malaysia, Indonesia, Philippines, Taiwan, Sri Lanka, Vietnam, India, and China.¹

Sartan (Crab) is water animals that resembles spider. It can be found in sea, rivers, ponds and accordingly their characteristics may vary broadly. According to the Unani literature *Sartan* can be classified into two types (i) *Sartan nuhary* (ii) *Sartan buhary*. *Sartan nuhary* as found in small water besides such as ponds and lakes, these are small in size, and grayish colour. *Sartan buhary* are comparatively bigger in size and found in rivers and ocean. These are dark grey or black in color.² *Sartan* are commonly sold in many areas due to their delightful and good taste in soup making. Interestingly, mud crabs have been reported to exhibit the potential as an antioxidant and antimicrobial agents³ despite their tasty meat and nutritional richness.⁴ Elderly in Malaysia tend to consume mud crab soup as traditional remedy and folk medicine for the purpose of reducing the symptoms of dengue fever. Comprehensively, mud crabs are marine invertebrates that protect themselves against pathogen by solely relying on their innate immune system. Particularly, the defence system includes both humoral and cellular responses⁵ In addition, antimicrobial peptides present in the haemolymph of mud crab serve as humoral immunity, while antioxidants system benefits as the cellular response

towards infectious diseases or pathogens.⁶ The immune system of crustacean also plays a role when the organisms are exposed to abiotic stress or pollutions. Apart from that, it is reported that the immune system of mud crabs is also modulated based on the changes of environmental temperature and salinity⁷ *Sartan* (Crab) used in Unani Medicine for treatment of chronic cough and pulmonary tuberculosis, Its ash is useful in biliousness, debility, hemoptysis, amenorrhea, renal calculi, and dysuria and breast cancer. It is mixed with the milk of jennet and applied on scorpion and wasp sting. When it's mixed in honey it forms a useful application for dog bite wound, vitiligo, piles, and inflammation. Ash of *Sartan* is mixed in water to prepare a gargle, which is use for sore throat and diphtheria. *Sartan* are useful in eye disease, it is also used to prepare tooth powder.^{8, 9}

Sokhta is the process by which drugs are burnt to the charring stage but not reduced to ash. Drugs which undergo this process are suffixed with the term *sokhta*. In these process fully grown *sartan* (crab) after removing there appendages and viscera are washed thoroughly with saline water. They are then kept in an earthen pot and sealed with clay (*Gil-e-Hikmat*) and dried. Then they are subjected to required heat over a low fire until charred.^{10, 11}

Material and Method

Procurement of *Sartan*

Sartan (*Scylla serrata*) was procured from open sea food market, Ghazipur, Delhi-110096.

Identification of *Sartan*

Identification of *Sartan* (*Scylla serrata*) 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 Sartan Sokhta

Sartan were taken and limbs were cut with knife. Then all the appendages and viscera were removed and their shells were thoroughly washed with saline water and dried. 60 gm of *Sartan* shells were taken and kept in a disc shaped earthen pot. This pot was covered with another pot, sealed and then *kaproti* was done to make *boota*. The *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 *Sartan 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

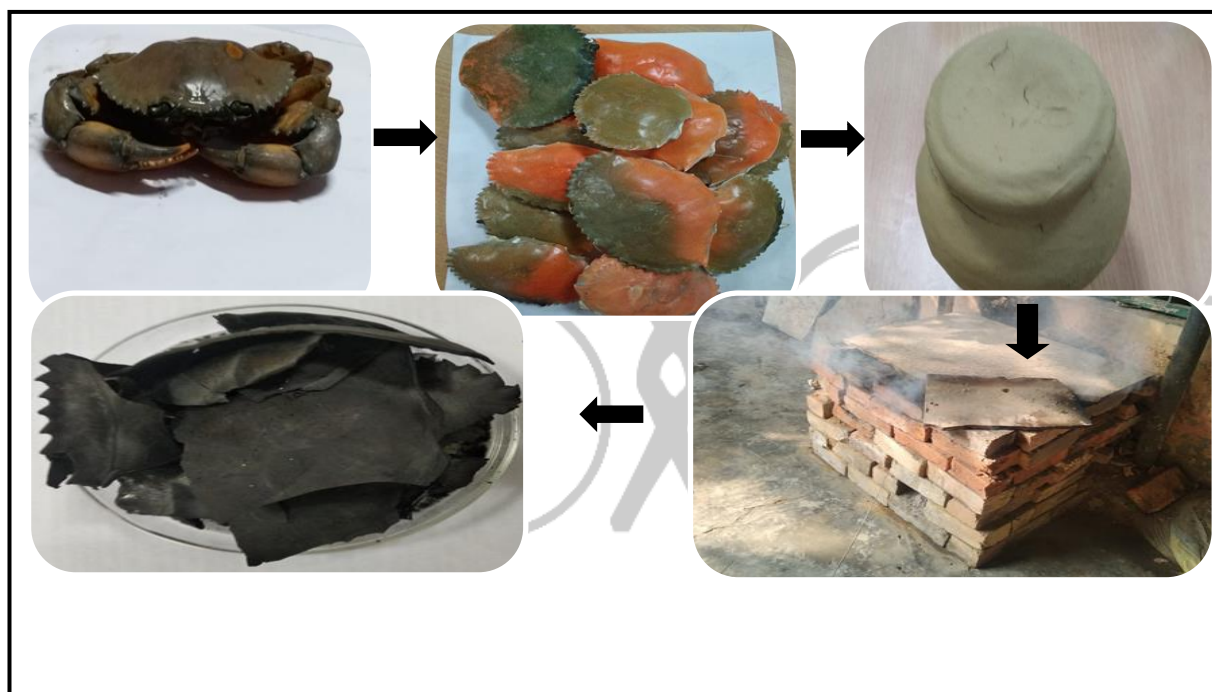


Figure No.1. Preparation of *Sartan Sokhta*

PHYSICO-CHEMICAL ANALYSIS OF SOKHTA/ MOHARRAQ DRUGS

1. Organoleptic Properties

- i. **Appearance:** Appearances of all *sokhta* drugs were recorded.
- ii. **Determination of Taste:** This was identified by the volunteers.
- iii. **Determination of Colour:** The colour of all the samples was also noted.
- iv. **Determination of Odour:** A small portion of the sample was examined by slow and

repeated inhalation of air over the material.

2. 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:

Carbonized value =

Weight of Moharraq drug / Weight of raw drug × 100

3. Determination of pH

(i) pH of 1 % solution: One gram sample was mixed in 100 ml of distilled water and pH was checked with the standardized glass electrode.

(ii) pH of 10 % solution: Ten gram sample was mixed in 100 ml of distilled water and pH was checked with the standardized glass electrode.¹²

4. Determination of Alcohol Soluble Matter

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 °C and weighed. The percentage of alcohol soluble matter was calculated.¹²

5. Determination of Water Soluble Matter

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 °C and weighed. The percentage of water soluble matter was calculated.¹²

6. 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 into 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 recorded 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.¹³

$$\frac{\text{ppm reading} \times \text{dilution} \times \text{original volumes}}{1000 \times \text{wt. of ash in gram}}$$

In this formula, ppm reading is the concentration of the given element in drug solution obtained from the standard calibration curve.¹⁴

1. Organoleptic characteristics of Sartan Sokhta:

The organoleptic characteristics of Sartan sokhta are given in table.

Table No. 1. Organoleptic description of *Sartan Moharraq*

Appearance	Solid
Colour	Black
Taste	Coal like
Odour	Burnt smell

2. Weight variation in *Sartan* 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 *Sartan Sokhta*

S. No	Raw drug	Cow dung cakes	Carbonized drugs	Carbonized value
1	60 gm	1.0 kg	46.90 gm	78.16%
2	60 gm	1.25 kg	45.34 gm	75.56%
3	60 gm	1.5 kg	42.86 gm	71.43%

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

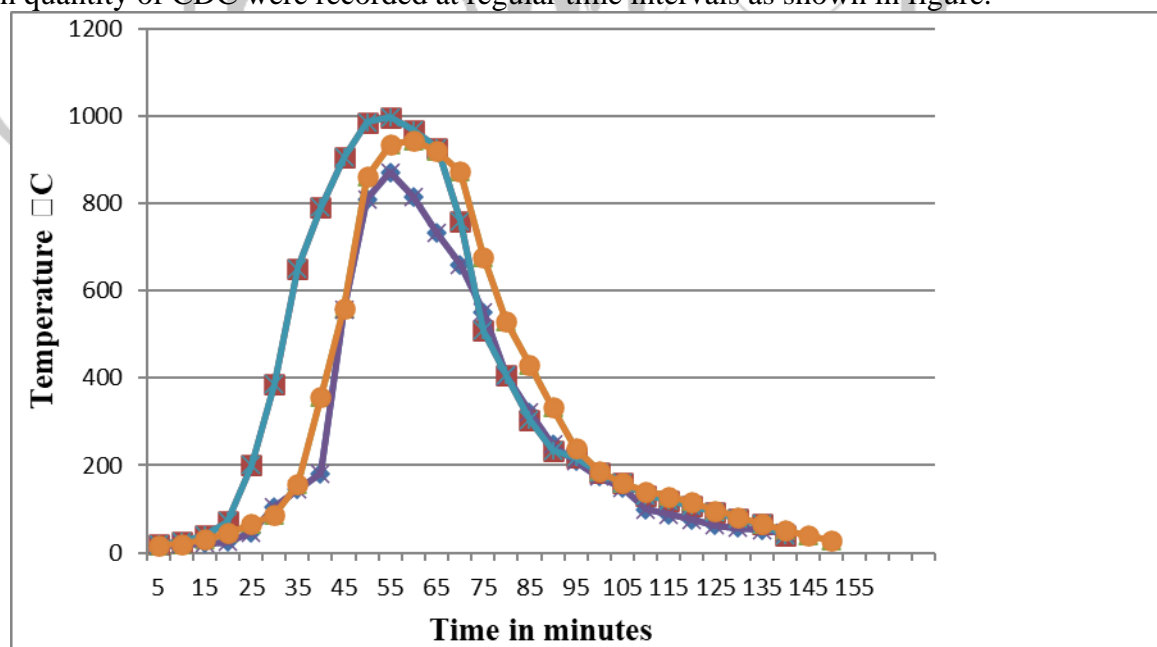


Figure No. 2. Temperature variation during *Sartan Sokhta* procedure

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

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

Sample No.	pH (1%)	pH (10%)
1	10.17	10.50
2	9.60	9.33
3	9.55	9.22

5. Water soluble and Alcohol soluble matter in *Sartan Sokhta*: The water soluble and alcohol soluble matter in *Sartan sokhta* is given below in table.

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

Sample No.	Water soluble matter (%)	Alcohol soluble matter (%)
1	3.0%	1.5%
2	3.5%	1.25%
3	3.2%	1.37%

6. Spectroscopic Analysis:

The elemental analysis of *Sartan sokhta* was done through AAS and the results are given in table.

Table No: 5. AAS analysis of *Sartan Sokhta*

S. No	Element	Results (ppm)
1.	Cadmium	Nil
2.	Mercury	Nil
3.	Arsenic	Nil
4.	Lead	0.042
5.	Calcium	0.016
6.	Magnesium	0.031
7.	Cobalt	0.043
8.	Zinc	0.005

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 pharmaceuticals), *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:

- (i) To evaporate all moisture contents, and to make the drug completely dry;
- (ii) 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 Calcium (Ca), Magnesium (Mg), Lead (Pb), Cobalt (Co), Zinc (Zn) *Sartan* was taken in the quantity of 60 gm which was reduced to 42.86 gm after 3rd process of *Ehraq*. The maximum temperature recorded was 1000^o C. The elemental analysis of drug showed presence of Calcium in 0.016, Cobalt 0.043, Magnesium 0.031 and Zinc 0.005 whereas Lead was found in 0.042. The later element was within permissible limit as per WHO guidelines. The role of Calcium, Cobalt, Magnesium and Zinc is corroborated in therapeutic role of *Sartan Sokhta* in *Amraze Sadr wa Riya* (Respiratory diseases), *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*”

Sartan Sokhta: Carbonized value 71.43% , Maximum temperature 1000 °C, Water soluble matter 3.2%, Alcohol soluble matter 1.37%, pH 1% and 10% 9.559.22,

Atomic absorption Spectroscopic Analysis (AAS) Results in ppm, Cd=Nil, Hg=Nil, As=Nil, Pb=0.042, Ca=0.016, Mg=0.031, Co=0.043, Zn=0.005

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