Research Article Arch Pharm Sci & Res Vol 2 No 2 343-346 April 2010

MODERN SIMULATION OF TRADITIONAL SUNNAM (CALCINED ASH) PREPARATION AND THEIR CHEMICAL ANALYSIS

R.SaravanaBhavan, R.Mallikeshwari, Dr.B. jaiprakash*

Dept. of Pharmacognosy, K.M College of Pharmacy, Utthangudi, Madurai-107
* Dept. of Pharmacognosy, Kripanidhi College Bangalore – 34

The temperature monitored in the traditional method was used for simulating the heating process by using muffle furnace. The chemical analysis of the raw materials, and the final products obtained both by traditional and modern methods showed that almost all $CaCO_3$ and $MgCO_3$ were oxidised to CaO and MgO. Absorption Spectrum analysis showed the amount of trace elements (Mn, Zn, Cu, Fe, Cd, Ni, and Pb) present in the raw materials, and the final products of both traditional and modern method of preparation.
Key words: Parpam, Sunnam, Bhasmas

INTRODUCTION

Modern simulation of Sunnam preparation from naturally available sea materials like Sangu (Conch Shell - *Xancus Pyrum*) and Muthu Sippy (Oyster Shell - *Pinctada species*) is not well known. This aspect was taken into consideration for the study to formulate a suitable and easy method of preparing sunnam by using muffle furnace for heating process. Literature says that Sunnam of Sangu and Muthu Sippy is used for healing the diseases like bronchitis, cough, veneral diseases, peptic ulcers and calcium deficiency [1].

MATERIALS AND METHODS

Each 250 grams of Sangu (Conch Shell) and Muthu Sippy (Oyster Shell) were collected from coastal area. The collected above materials were washed with water, to remove the foreign debris and then immersed each in 500ml of lime juice for the whole night. The next day they were taken, washed again and dried. Then each material was broken into pieces and ground into coarse powder with the help of stone mortal and pestle (kalvam). To this lime juice was added individually and ground into fine paste like mass. Then it was made into small circular cakes (villai) and dried in sunlight. The dried cakes of Sangu and Muthu Sippy were again ground separately with 200gm of *Cissus quadrangularis* and lotus leaves (*Nellumbo nucifera)* respectively. And the resulting paste was made into circular cakes and dried well. These dried cakes were placed in a shallow earthen plate and covered with another same earthen plate, and the junction of these plates were sealed with clay smeared cotton cloth in seven consecutive layers and dried.

Heating Process: - A pit was dug in an open place (3ft x 3ft) for conducting the heating process. In the case of Sangu, out of 50 dried cow dung cakes 25 cakes were placed in the pit, and above that the dried earthen vessel was placed. Then the remaining 25 cakes were placed above the earthen vessel. Similarly, instead of 50 cakes, 30 cakes were used for Muthu Sippy by adopting the same procedure for Sangu as given in Siddha Materia Medica. All the cow dung cakes were set fired and become ash within half an hour period. After 10 hrs the heat of the burnt ashes in the pit get reduced to atmospheric temperature. The earthen vessel was then collected from the pit and opened. The resultant content was again ground into fine powder.

In order to simulate the heating procedure, the temperature generated inside the earthen vessel while heating in traditional method was found out by using thermocouples. The thermocouple was inserted inside the earthen vessel without any processing product inside and sealed as stated earlier. And the thermocouple was connected to an electrical reading monitor. The temperature change for every five minutes was monitored and noted down until it reaches the atmospheric temperature after reaching a maximum temperature. The maximum temperature reached when using 50 dried cow dung cakes were used was 750°C and

Table –1 Estimation of Calcium Carbonate and Magnesium Carbonate in raw materials before processing.

Raw Materials	$CaCO_3$ Percent	$MgCO_3$ Percent
Sangu (conch shell)	48.8 %	4.4 %
Muthu Sippy (Oyster shell)	47.6 %	4.7 %

Table – 2 Estimation of Calcium Oxide and Magnesium Oxide in final Products.

Types	CaO (Percent)		MgO (Percent)	
	T	**M**	**T**	**M**
Sangu Sunnam	55.7	58.3	23.1	25.7
Muthu Sippy Sunnam	54.0	55.6	7.3	8.6

Table – 3 Elemental analysis of raw materials by Atomic Absorption Spectra.

Raw Materials	Mn	ZN	Cu	Fe	Cd	Ni	Pb
Sangu	0.27	0.70	0.10	5.67	0.06	0.86	0.76
Muthu Sippy	0.24	0.81	0.08	3.72	0.04	0.30	0.40

Concentration of metallic elements in parts per million (ppm)

Elemental analysis of the final product of sunnam by Atomic Absorption Spectra.

Table – 4 Elemental Analysis of final products of Sunnam by Atomic Absorption Spectra. (Concentration in ppm)

Final Products (Sunnam)	Mn	Zn	Cu	Fe	Cd	Ni	Pb
Sangu T	0.47	0.59	0.31	14.58	0.07	0.86	0.55
Sangu M	0.91	0.58	0.29	12.15	0.06	0.77	0.43
MuthuSippy T	0.49	0.84	0.22	9.41	0.04	0.77	0.11
MuthuSippy M	0.49	0.64	0.15	12.04	0.07	0.52	0.65

T – Traditional Method M – Modern Method

690°C when 30 dried cow dung cakes were used.

In the case of modern method the heating process was done using muffle furnace to simulate the same temperature condition obtained in the traditional method. Hence in the modern simulation, the dried earthen vessels with circular cakes were kept into the muffle furnace. The muffle furnace was put off when the temperature reached 750°C and 690°C in respect of Sangu and Muthu Sippy. Then the calcined product was ground to fine powder. This powder again used as starting material and the procedure was repeated as in the case of traditional method.

CHEMICAL ANALYSIS

The chemical analysis was done to find out the major constituents and the trace elements present both in the raw shells and their processed final products. The raw materials of Sangu and Muthu Sippy shells were subjected to chemical estimation of $CaCO_3$ and $MgCO_3$ which are the major chemical constituents. The final products obtained both in traditional and modern method were subjected to the estimation of Calcium oxide and Magnesium oxide by adopting *iodimetric* method and *gravimetric* method [2]. The values are given in table – 1 and 2. The amount of trace elements present in the raw materials, final products obtained from traditional method and modern method were found out by doing the Atomic Absorption Spectrum analysis for Mn, Zn, Cu, Fe, Cd, Ni and Pd. The resultant values are given in Table – 3 and 4.

RESULT AND DISCUSSION

Temperature monitoring study in the heating process of traditional method revealed that when 50 cow dung cakes were used for calcining Sangu, the maximum temperature obtained inside the earthen vessel was 750°C, and when 30 cow dung cakes were used for calcining Muthu Sippy, the maximum temperature obtained inside the earthen vessels was 690°C. It was found that in standard calcination method in metallurgy, the temperature at which $CaCO_3$ gets converted into CaO is 840°C, but from 550°C onwards the oxidation gets started [3]. In the traditional method of preparing both the Sangu and Muthu Sippy sunnam, the maximum temperature monitored was above 550°C which enhances the oxidation of $CaCO_3$ and $MgCO_3$.

CHEMICAL ANALYSIS

The chemical analysis of raw materials (Sangu and Muthu Sippy) was done for the content of $CaCO_3$ and $MgCO_3$. In Sangu 48.8 % of $CaCO_3$ and 4.4%MgCO3 were found to be present. Where as in Muthu Sippy 47.6% of $CaCO_3$ and 4.7% of $MgCO_3$ were found. The chemical analysis of the final product of traditional method of Sangu revealed that the entire $CaCO_3$ and $MgCO_3$ were converted into their oxides, with the value of 55.7% of CaO and 23.1% of MgO. And the final product of Sangu sunnam obtained from modern method showed the presence of 58.3% of CaO and 25.7% of MgO. In the case of Muthu Sippy 54.0% of CaO and 7.3% of MgO were found in traditional method, where as in modern method 55.6% of CaO and 8.6% of MgO were registered. The final product of Sangu and Muthu Sippy sunnam prepared by both traditional and modern methods showed little difference in their content.

The Atomic Absorption Spectrum analysis for the raw materials of Sangu and Muthu Sippy and their final products were done for the elements like Mn, Zn, Cu, Fe, Cd, Ni, and Pb, and their values are given in table – 3.

The analysis of raw materials showed that the content of the above said elements were comparatively less in Muthu Sippy than in Sangu except Zn. Comparison of the trace elements in the final products of both traditional and modern methods revealed that all the elements were reduced

in their content in modern method and in traditional method except an increase of Mn content was noticed in the case of Sangu. However, in Muthu Sippy the Mn content was remaining same in both traditional and modern methods and a slight increase of iron content was observed in modern method.

DISCUSSION

The traditional method of heating process for preparing Sangu (Conch Shell) and Muthu Sippy (Oyster Shell) Sunnam is a lengthy and laborious process by using dried cow dung cakes. To overcome this hurdle, the modern method of using muffle furnace having a similar effect of traditional method of heating process was used. The heating process done by modern method is simple and more or less accurate method. The conversion of $CaCO_3$ and $MgCO_3$ into CaO and MgO in the final products of both traditional and modern products was due to the effect of heating process however, CaO and MgO content 6.

of Sangu and Muthu Sippy were increased slightly in modern method than in traditional method. The overall increase of CaO and MgO content in both methods was due to plant juice that was added during the preparation. Atomic spectrum analysis of trace elements, reveal that the content of all the elements slightly reduced in modern method than in traditional method for both Sangu and MuthuSippy, except Mn and Fe, which need further investigation.

REFERENCES

1. Vaitya Yoga Ratinavali (Formulary of Ayurvedic Medicine) published by the Indian Medical Practitioners Cooperative Pharmacy and Stores Ltd., 1994, 60-64
2. Basset.J.Denny. R.C, Jeffery.G.H. and Mendham J.Vogels textbook of quantitative inorganic analysis, edition 4, year 1985, 467-468, 465-467, 451-452, 462-464.
3. "Gilchrist, J.D. *Extraction Metallurgy* (3rd ed.). Oxford: Pergamon Press., 1989, 145.
4. Indian drugs, vol.31; 3, March 1994, 127-129.
5. Indian drugs vol. 34; 1, Jan.1995, 60.