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Standardization of Abhraka Shodhana - A pharmaceutical study

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ABSTRACT

The use of metals and minerals for therapeutic purpose are very common in Ayurvedic system of medicine. Shodhana is the initial step with objective to remove impurities and detoxify the material and so make them suitable for further processing. Nirvapa is very important step of shodhana process for the metal having high melting point in which the material is heated to red hot stage and then quenched into a liquid medium such as cow milk, decoction of triphala, etc. In the present study, shodhana of abhraka (*biotite*) was done using standard procedure. Raw abhraka was divided into 3 batches and the pharmaceutical study of shodhana process was done. It was found that abhraka attained red hot stage at around 823^{0}C after 55 minutes of heating. Approximately 6 hour is required for seven time nirvapa of abhraka. Solid content and alkalinity of the cow - milk was increased after shodhana process.

Key words: Abhraka, Shodhana, Nirvapa, cow milk.

INTRODUCTION

Evident of using metals & mineral for therapeutic purposes are very old (1000 B.C.) but their frequent use in the therapeutics started with development of the Rasa Shastra during medieval period (8th to 10th century). Further, Rasa Shastra was emerged as the branch of the ayurveda which deals with the preparation of drugs from metals, minerals, vegetables and marine origin using different pharmaceutical processes e.g. shodhana, jarana, marana, satvapatana etc. These processes are used to remove toxicity of the raw material and finally convert them into suitable form for therapeutic use.

Abhraka is an important and potent mineral in Rasa Shastra. Krishna vajra abhraka[2] is generally used for preparation of abhraka bhasma and known for hepato protective effect[3]. Shodhana of abhraka is necessary because ashodhit abhraka may produce harmful effects such as kushta (skin disorder), pandu (anaemia), shotha (infiammation), hritshula (chest pain), parshvashula (back pain), agnimandya (indigestion) and kapha – vata prakopa[4].

Various processes for abhraka shodhana are described in the literature among them nirvapa is considered the most efficient[5]. Different materials have been selected as media[6, 7, 8] in nirvapa because different media provide unique medicinal value in the final product.

Rasa Ratna Samucchaya the bench mark Ayurvedic text of 13th A.D. had mentioned cow milk as best medium for the shodhana of abhraka[9]. To authenticate it in the present study, the shodhana of abhraka was done by using nirvapa process for seven times and cow milk as media.

MATERIALS AND METHOD

Krishna vajra abhraka (Biotite) was taken from Ayurvedic pharmacy of Institute of Medical Sciences, Banaras Hindu University. Cow milk was taken from department of animal husbandry of Banaras Hindu University. Three batches of abhraka were prepared. To ensure the quality of raw material, it was subjected to fire test[10]. The samples successfully passed the fire test were taken for shodhana process. 1 kg of raw abhraka was weighed and taken on iron pan. In a steel vessel, required amount of cow milk was taken with the help of measuring cylinder. Iron pan was kept on charcoal burner (P1.1). The peak temperature of charcoal burner was maintained with the help of electric blower. Abhraka flakes were turned up and down at regular interval with metal tongs to provide equal exposure of heat to the both sides of the surface (P1.2). When abhraka flakes reached at the stage of red hot (P1.3), these were quickly quenched into the cow milk with the help of metal tongs and after few minutes cow milk was separated by filtering through iron sieve and measured. Soft pieces of abhraka were collected on iron pan. Temperature of charcoal, vessel & abhraka was monitored by electric pyrometer. The process was repeated for seven times with fresh cow milk.

RESULTS AND DISCUSSION

Abhraka was heated up to completely red hot state because at this stage elements present in the biotite is converted into oxide form on the surface of abhraka flakes by reacting with atmospheric oxygen. It attained red hot stage at around 823^{0}C (Table 2) after 55 minutes in Batch I.same pattern follow in batch II & III. After heating it was instantly quenched into the liquid media. Instant quenching is important because repeated immediate cooling after heating causes disruption in compression – tension equilibrium leads to cracks on the flake surface thus breaking of the material i.e. reduction in particle size. After each nirvapa,

Table 1: **Variation in weight of abhraka and properties of cow milk during Shodhana**

Sample	Weight (gm)		Solid content ofcow-milk		pH of cow-milk	
No.	Before shodhan	After shodhan	Before shodhan	After shodhana	Before shodhan	After shodhana
Batch 1	1000	920	6.2	6.5	12.1%	12.7%
Batch 2	1000	924	6.1	6.5	12.3%	12.8%
Batch 3	1000	917	6.2	6.6	12%	12.7%

Table 2: Time taken in nirvapa, pattern of temperature and consumption of cow milk for batch-I during shodhana

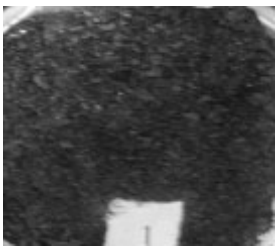
Nirvapa	Time taken	Temperature of	Cow- Milk		
	(minutes)	Abhraka in ^{0}c	Total taken	Remaining	Utilized (ml)
1	30	845	3000	1200	1800
2	40	820	3000	750	2250
3	50	810	3000	700	2300
4	50	825	3000	650	2350
5	60	820	3000	550	2450
6	65	830	3000	250	2750
7	70	820			

the crammed structure of abhraka was destroyed to form small pieces due to increased brittleness. Abhraka got fire during second heating probably due to burning of residual cow milk fat. At early stage of shodhana cracks were seen at the surface of abhraka flakes and finally these became coarse powder (P1.4). In the last stage of the shodhana, fine abhraka particles start floating in air and traveled long distance as compared to initial steps due to significant reduction in the size. Its color was also changed to blackish brown. These observations were an indication of successful completion of the

P 1.1

P 1.2

P 1.3



P 1.4

process. After completion of shodhana, approximately 8% loss in weight of abhraka was observed (Table 1). Approximately 20 liter of cow milk and 6 hour time duration was needed for completing shodhana process (Table 2). Loss in the weight may be due to burning of impurities of raw abhraka.

During the quenching process the temperature of cow milk was suddenly enhanced and reached at boiling stage due to transfer of heat from abhraka and the color of cow milk turned to grey tinge. Utilization of the cow milk was increased as number of nirvapa progressed (Table 2). It was noticed that during heating abhraka produces fumes which had smell of ghee due to the burning of fatty material of cow milk. Solid content (%) and pH of cow milk (Table 1) was increased after shodhana due to the reaction with abhraka which was alkaline in nature. All above mentioned points revealed that during shodhana process, chemical reaction was occurred between abhraka and medium (cow milk) that converted the abhraka into a form which was free from impurities and toxicity.

CONCLUSION

Shodhana of abhraka was done successfully with the cow milk as media. Abhraka attained red hot stage at around 823^{0}C after 55 minutes of heating. Approximately 6 hour is required for seven times nirvapa of abhraka. Solid content and alkalinity of the cow milk was increased after shodhana process. Physical features of the shodhit abhraka were found same as it was observed with other medium in previous studies. Analytical study of shodhit abhraka should be carried out to find out the best media for the shodhana of Abhraka.

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