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**COMPARATIVE PHARMACEUTICAL-ANALYTICAL STUDY OF
KANJI PREPARED BY USING TWO DIFFERENT CONTAINERS
(MUD POT AND PLASTIC CONTAINER)**

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ABSTRACT

Fermented preparations in Ayurvedic medicine fall under the category of Sandhana Kalpana (fermentative preparations). Sandhana Kalpana is divided into Madya Kalpana (Alcoholic preparations) and Shukta Kalpana (Acidic preparations). Kanji is having synonyms like bhakta vaari, aranala, kanji, dhanyamla, chukra and amlasaaraka etc., belongs to Shukta Kalpana group. Various references are available for the preparation of Kanji and those include Sharangadhara Samhita, Bhavaprakasha etc. Among these, the reference available in Dravyaguna Vijnana is followed in the present study, two samples of kanji prepared in two different containers Sample 1 in mud pot and Sample 2 in plastic container. Organoleptic evaluation showed both samples have sour taste, liquid consistency, with strong pleasant acidic odor in sample1 and unpleasant acidic odor in plastic container. Physico-chemical evaluation showed that ph of sample1 was 3.41 and sample 2 was 3.5. TSS of sample 1 was 3 and sample 2 was 2, Refractive index of sample (1) 1.340 and sample (2) was 1.342. Viscosity of sample 1 and sample 2 was 0.009. And alcohol content of both sample remained 1%.

Keywords: Kanji, rice, pH, specific gravity, shukta kalpana, sandhana kalpana

INTRODUCTION:

The word kanji has been derived from the root anja and has the meaning kutsita anjika [1]. It refers to sour gruel i.e., water of boiled rice in the state of spontaneous fermentation [2]. Fermented preparations are classified into Sandhana Kalpana (alcoholic preparations) and Shukta Kalpana (acidic preparations) [3]. Kanji is a type of fermentative preparation categorized under shukta kalpana, it is having synonyms like bhakta vaari, aranala, kanji, dhanyamla, chukra and amlasaaraka etc. [4]. Various references are mentioned for the preparation of Kanji and those include Sharangadhara Samhita [5], Bhavaprakasha [6], Bhojana Kutuhalam [7], Parada Vijnaniyam [8], Dravyaguna vijnana [9]. Among these, the reference available in Dravyaguna Vijnana is having only two ingredients, short duration and is easy to prepare. During olden days mud pots were used for majority of preparations. Kanji consists of weak organic acid and crude vinegar [10]. In Unani System, Kanji is known as Muriyya (Arabic Word) and Aabkaam (Persian Word) [11]. As it is an acidic fermentation, the container used should be inert and this purpose was served by mud pot as it is said that if vessel is untold then mud vessel should be used [12]. In recent days, usage of mud pots has been

reduced as it is difficult to handle them. Also, for bulk manufacturing it is difficult to use mud pots. There are other options like stainless steel, plastic syntax, cement tanks etc, therefore, in this research work Kanji has been prepared according to method mentioned in Dravyaguna Vijnana and an attempt has been made to ferment this Kanji using two containers, one with mud pot and the other with plastic container. Both the samples were observed and compared for differences using basic analytical parameters like pH, viscosity, refractive index, total suspended solids, specific gravity and alcohol content.

MATERIALS AND METHODS

Methodology was divided into two sections which includes Pharmaceutical study and Analytical study.

Pharmaceutical Study:

Collection and authentication of raw materials

The raw materials include rice, collected from Belagavi and authenticated from the Department of Dravya Guna Vijnana, Sri Dharmasthala Manjunatheswara College of Ayurveda & Hospital, Hassan. The authentication was done based on organoleptic and morphological characters.

Methods

The preparation was carried out in 3 steps

1. Preparation of rice
2. Dhoopana of earthen pot and plastic container
3. Preparation of kanji

Preparation of Anna

The authenticated rice grains were cleaned to make it free from foreign particles and were measured. The rice grains were made into two batches where

each batch has 196gm (200ml). To prepare the anna (rice) the method mentioned in classics was used, ratio of rice grain and water taken was 1:5(1P rice grains:5P water) [13]. Here the volumetric ratio was taken to prepare anna. The rice grains and water added in a steel vessel and kept on a stove on to prepare rice and temperature maintained was mild to moderate.

Table 1: Ingredients and their quantity for the preparation of rice

S. No.	Ingredients	Quantity
1	Rice grains	196 gm (200ml)
2	Water for cooking rice	1000ml

Dhoopana of earthen pot and plastic container

The kanji was planned to prepare in two different containers, one was mud pot (Sample1) and other was plastic container (Sample 2). Hence dhoopana was done to both the containers with jatamamsi (*Nardostachys jatamansi*), musta (*cyperus rotundus*), haridra (*curcuma longa*) for 15 minutes.

Preparation of kanji

Two batches of cooked rice were transferred to two different containers which were fumigated with dhupana

ingredients, one in mud pot (Sample 1) and other in plastic container (Sample 2). And 3 parts of water added and sandi bandana (sealing) was done with cloth and multani mitti and kept in a husk for two week [14].

Precautions:

Mud pot and plastic container were cleaned well and dried completely before dhoopana (fumigation). During preparation temperature was maintained on mrudu (mild) to madhyama agni(moderate).

Table 2: Ingredients with quantity for preparation of kanji

Samples	Quantity of cooked rice obtained	Quantity of water added
Sample 1 (mud pot)	1000ml	3000 ml
Sample 2 (plastic container)	1000ml	3000ml

Observation and Results of Pharmaceutical Study

It took around 30 minutes to cook the rice completely. During the preparation of

rice and kanji, the ratio of rice grains, cooked rice and water was taken volumetrically.

Results of pharmaceutical study

Table 3 Results of Anna preparation

S. No.	Parameters	Sample 1	Sample 2
1	Raw rice	200ml	200ml
2	Water added to cook rice	1000ml	1000ml
3	Cooked rice	1000ml	1000ml

Table 4: Results of Kanji Preparation

S. No.	Parameters	Sample 1	Sample 2
1	Water added to cooked rice	3000 ml	3000ml
2	Final product obtained	1800ml	2500ml

It took 15days (two weeks) for the completion of kanji preparation. The sandi bandhana (sealing) of both the containers was opened and tested for completion of kanji process. In both the

containers acidic odour was present and effervescence, hissing sounds were absent which is suggestive of completion of procedure.

Table 5: Results of organoleptic parameters of both samples of Kanji

S. No.	Test	Results	
		Sample1 (mud pot)	Sample 2 (plastic container)
1	Colour	Transparent	Transparent
2	Odour	Strong, pleasant acidic odour	Unpleasant acidic odor
3	Consistency	Liquid	Liquid
4	Taste	Sour	Sour

Table 6: Parameters to test the completion of fermentation both samples 1 and sample 2

S. No.	Tests	Results of sample 1	Results of sample 2
1	Candle light test	Burning candle continues to burn	Burning candle continues to burn
2	Hissing sound	Absent	Absent
3	Effervescence	Absent	Absent
4	Acidic odour and taste	Present	Present

Table 7: Results of Physico-chemical analysis

S. No.	Parameters	Sample 1 (mud pot)		Sample 2 (plastic container)	
		Before fermentation	After fermentation	Before fermentation	After fermentation
1	pH [15]	7.08	3.41	7.13	3.57
2	TSS [16]	0.4	3	0.4	2
3	Refractive index [17]	1.340	1.343	1.340	1.342
4	Specific gravity [18]	1.00	1.01	1.00	1.007
5	Viscosity [19]	0.01	0.009	0.01	0.009
6	Alcohol content [20]	0%	1%	0%	1%

	
<p>Raw rice : 200ml</p>	<p>Cooked rice: 1000ml</p>
	
<p>Dhupana of the mud pot</p>	<p>Dhupana of the plastic container</p>
	
<p>Adding water to cooked rice sample 1</p>	<p>Adding water to cooked rice sample 2</p>
	
<p>Sandhi banditha pot</p>	<p>Sandi bandita plastic container</p>

Figure: 1 preparation of anna and kanji

DISCUSSION:

Different references like Sharangadhara Samhita, Bhavaprakasha, Bhojana Kutuhalam, Parada Vijnaniyam, Dravyaguna vijnana are mentioned for kanji preparation, which includes different ingredients and method of preparation. Among these the reference of Dravyaguna Vijnana is taken in the current study which consists of simple method by using cooked rice and 3 parts of water. As per the classics they have mentioned one week to keep for fermentation. But it took two weeks for fermentation may be because of average temperature in Hassan was around 28 °C during the period of fermentation.

It took 30 minutes to cook both batches of rice, at a temperature of around 101°C -230°C. The weight by volume ratio was not taken as the rice grains swells up because of absorption of water molecule and water would not be sufficient to cook the rice. And hence volume by volume ratio was taken for both purpose of cooking rice (rice grains: water 1:5) and also for kanji (rice: water 1:3) preparation. It took 15 days for the completion of fermentation of both samples. The total product obtained in sample 1 was 1800ml and sample 2 was 2500ml. The volume obtained in mud pot was less compared to plastic container this could be because of loss of liquid

through the pores of the pot. Both samples had transparent color, sour taste, and liquid consistency. Sample 1 had pleasant acidic odor and sample 2 had unpleasant acidic odor.

pH of both samples changed from alkaline to acidic, Ph of sample 1 and sample 2 after fermentation were 3.41 and 3.57 respectively, and this change was due to acidic fermentation. Alcohol content was found to be 1% for both sample 1 and sample 2 after fermentation. The TSS of sample 1 was 3 and sample 2 was 2 respectively, suggesting the increase in total suspended solids of both samples. After fermentation refractive index of sample 1 was 1.343 and sample 2 was 1.342 which was 1.340 for both samples before fermentation, indicating slight increase in the density of both samples after fermentation. After completion of fermentation, Specific gravity of both samples 1 and sample 2 were 1.01 and 1.007 respectively, the value is very near to specific gravity of water. The viscosity of both the samples 1 and 2 decreased after fermentation and found to be 0.009 for both samples respectfully.

CONCLUSION

In organoleptic character, smell of the sample 2 was having unpleasant acidic odor, and sample 1 had pleasant acidic odor.

Pharmaceutico-analytical study of kanji showed that Sample 1 (prepared in pot), showed varied results compared to sample 2 (plastic container), in parameters like TSS, Refractive index, specific gravity. And alcohol percentage is same in both the samples.

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