



Research Article

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ANALYTICAL STUDY OF KANJI: AN ACIDIC FERMENTATIVE PREPARATION OF SANDHAN KALPANA AND ITS EFFECT ON AGNI

Chandra Shekhar ^{1*}, C. B. Jha ²

¹Junior Resident, Department of Rasa Shastra, Faculty of Ayurveda, IMS, Banaras Hindu University, Varanasi, India

²Professor, Former Head of Rasa Shastra, Former Dean of Faculty of Ayurveda, IMS, BHU, Varanasi, India

Received on: 04/07/15 Revised on: 14/08/15 Accepted on: 22/08/15

*Corresponding author

Dr. Chandra Shekhar, Junior Resident, Department of Rasa Shastra, Faculty of Ayurveda, IMS, Banaras Hindu University, Varanasi, India
E-mail: chandu4ubhu@gmail.com

DOI: 10.7897/2277-4343.066132

ABSTRACT

Here, an acidic fermentative preparation named as Kanji (comes under *Shukta Sandhana varga*) is prepared for the internal administration. Three different batches of Kanji have been made from the different Ayurvedic texts in the amount of 1545 ml, 1790 ml and 3950 ml. Total duration taken was 12 days, 15 days and 20 days respectively. On the other hand, as said in the Ayurvedic classics the internal administration of Kanji directly affects the working of Agni (digestive power) and Agni is the root cause for the origin of all types of diseases. These diseases are directly or indirectly related with the inappropriate running of the Agni. Today, it is necessary to standardize the Ayurvedic formulations before its internal use. Hence the prepared samples of Kanji were evaluated on the basis of maximum possible number of biomarkers, analytical parameters (Organo-leptic characteristics, pH, specific gravity, total solid content, total ash, total acidity and total soluble solids) and methods for analysis with the help of different types of analytical tools.

Key words: Kanji, Agni, Deepan- Pachana, Analytical parameters

INTRODUCTION

Most of the diseases are generally resulted from the *Mandagni* i.e. hypo functioning of Agni or slow digestive capacity.¹ The growth rate of *Agnimandhya* based diseases are increasing day by day. The basic reasons behind this are the sedentary life style, inappropriate dietary intake, physical inactivity, stress etc. Therefore Ayurvedic therapeutics always focuses on restoring normal status of Agni. There is a number of single herbs as *Chitraka* (*Plumbago zeylanica*), *Mishi* (*Foeniculum vulgare*) etc. and compound Ayurvedic formulations such as *Hingvastaka Churna*, *Chitrakadi vati* etc. are useful in the conditions which are resulted from the inappropriate functioning of the Agni. Kanji is a unique Ayurvedic preparation which comes under *Shukta Kalpana* preparations. Along with these, it is also observed that Kanji has immense power to improve the digestive capacity by regulating the functioning of Agni. In Ayurvedic classics Kanji has been described as “*Kanjeeviyami*” i.e. ‘to whom make alive’. This extract shows the effect of Kanji on the digestion (*Jatharagni*). *Acharya Charaka* has described that a person dies when the function of Agni is stopped and the person stay happy and healthy when the Agni continue working in a proper way. In the Ayurvedic classics Kanji has been described as a digestive stimulant (*Dipaniya*) and it alleviates burning sensation and fever by external application and reduces *Vata-Kapha* diseases and constipation by internal application^{2,3}. It is seen that the ingredients of Kanji varies from one to another Ayurvedic texts. Such as Kanji described in the *Sharangdhara Samhita*, *Paribhasha Prabandha* and *Rasaratna samucchaya* are different regarding their drug constituents (Table 1).

MATERIAL AND METHODS

In the present study three batches of Kanji were prepared as per the references of Ayurvedic Pharmacopeia of India (*API*, *Paribhasha Prabandha*), *Sharangadhara Samhita* and *Rasaratna Samucchaya*. The preparation of each batch was repeated for three times following a fixed operating procedure and for the validation of the process. The samples were labeled as Kanji I (KI), Kanji II (KII), and Kanji III (KIII). Sample KI was prepared by the fermentation of cooked *Sasthika Sali* rice with water while the fermentation of sample KII was prepared with the fermentation of the mixture of cooked *Sasthika Sali* rice and *Kulmansa* (*Chhota Udada*) along with water. For the preparation of sample KIII total 12 ingredients were taken for the fermentation. Among them *Kulatha* decoction, cooked *Sasthika Sali* rice, *Udada Vataka*, fried *Hingu* and coarse powder of the rest of the ingredients were taken in the fermentative mixture^{4,5}.

Analytical Study

All the three samples of Kanji were analyzed as the basis of various analytical parameters. Organo-leptic characteristics features were analyzed by the perception of *Gyanendriyas* like *Roop* (colour), *Rasa* (taste), *Gandha* (odour) and *Sparsa* (consistency). Physico-chemical parameters were pH, Specific Gravity, Total Solid Content (%) and Total Ash (%). Chemical analysis were made by means of Total Acidity, Total Soluble Solids (TSS) and Sugar (reducing sugar)⁶. The analytical study of each one sample (of every batch) was carried out for authentication of Kanji as per protocol published by CCRAS, Government of India.

Table 1: Three Batches of Kanji with their drug ingredients, parts used and amounts taken for the preparation

S.N.	Batches of Kanji	References	Drug ingredients	Parts used	Amounts
1.	Batch I (KI)	API	1. Sasthika Sali (<i>Oryza sativa</i>)	Fruits	250 g
			2. Water		750 ml
2.	Batch II (KII)	Sharangdhara Samhita	1. Sasthika Sali (<i>Oryza sativa</i>)	Fruits	250 g
			2. Mansha/Udada (<i>Phaseolus mungo kwatha</i>)	Pulse	83 ml
			3. Water		750 ml
3.	Batch III (KIII)	Rasaratna Samucchaya	1. Sasthika Sali (<i>Oryza sativa</i>)	Fruits	250 g
			2. Rajika/ Rai (<i>Brassica juncea</i>)	Seeds	125 g
			3. Kulatha (<i>Dolichos biflorus kwatha</i>)	Pulse	250 ml
			4. Saindhava salt		250 g
			5. Haridra (<i>Curcuma longa</i>)	Rhizome	62.5 g
			6. Bamboo (<i>Bambusa arundinaceae</i>)	Leaves	62.5 g
			7. Jeeraka (<i>Cuminum cyminum</i>)	Fruits	25 g
			8. Mansha/Udada (<i>Phaseolus mungo</i>)	Pulse	62.5 g
			9. Sarsapa (<i>Brassica campestris</i>)	Tail	55 ml
			10. Sunthi (<i>Zingiber officinale</i>)	Rhizome	25 g
			11. Hingu (<i>Ferula narthex</i>)	Niryas	12.5 g
			12. Water		2.5 lit

RESULT

For the preparation of KI, 250 g *Sasthika Sali* rice was cooked (with five times of water) and fermented with 3 times of water and total obtained Kanji I was 1545 ml. For the preparation of Kanji II, 250 g rice was cooked as above and fermented with 3 times of water along with 83 ml of *Kulatha kwatha*. Total yield of K II was 1790 ml. For Kanji III, same amount of rice was cooked as for KI & KII and fermented with the other ingredients as given in table 01. Total obtained Kanji III was 3950 ml.

Table 2: Analytical results of the three batches of Kanji

SN	Analytical parameters	KI	KII	KIII	
1	Organo- leptic	Roop (Colour)	Cloudy, transparent	Light orange	<i>Haridrabh</i> , straw
		Rasa (Taste)	Sour- acidic	Vinegar- acidic	Sour- nutritious
		Gandha (Odour)	Vinegar	Vinegar	<i>Sarsapa- Haridrabh</i>
		Sparsa (Consistency)	Thin & light like water	Thin & light like water	Thin & oily.
2	Physico- Chemical	pH	4.01	3.89	2.93
		Specific Gravity	1.019	1.012	1.014
		Total Solid content (%)	9.84	8.63	9.25
		Total Ash (%)	4.28	4.45	2.60
3	Chemical Analysis	Total Acidity	0.604	0.87	1.26
		Total soluble solids (TSS)	0.148	2.36	0.86
		Reducing sugar	45	70	75

DISCUSSION

All the three samples of Kanji were tested on the basis of their *Rupa*, *Rasa Gandha* and *Sparsa*. They were salty, leak-able and delicious. The colour, taste, odour and consistency of the final preparations were according to their chief constituents present in the formulation⁷. The variations in the pH of the three samples of Kanji were due to the differences in their drug constituents, total duration (*Sandhan Kala*) and manufacturing processes. The final pH of the samples were 4.01, 3.89 and 2.93 respectively. The third sample of Kanji (KIII) has lesser pH value as well as acidity as compared to the other two samples. The initial neutral character of the solution was finally converted into highly acidic near to the pH of the gastric juice which validates the *Dipaniya* property of the preparations⁸. Specific gravity of a liquid is the weight of a given volume of the liquid at a specific temperature compared with the weight of an equal volume of water at the same temperature. Table 2 shows the variation in specific gravity of different samples of Kanji I, II and III^d as 1.019, 1.012 and 1.014 respectively. The slight less specific gravity of

Kanji II may be due to more conversion of solid sugar content of *Sashtika Sali* to liquid acid and water⁸. Total Solid content (%) of these samples were 9.84, 8.63 and 9.25, which signifies the presence of total solid materials and their concentrations. This dataset also validates the specific gravity of the samples. Ash value of these samples was calculated by keeping the liquid samples in the crucibles at the temperature of 450°C until the whitish material is remained in the crucibles. At this temperature organic materials of the samples get burnt without influencing the inorganic contents of the drug. Respective Ash value of the samples was 4.28, 4.45 and 2.60. Kanji III has minimum percentage due to the presence of maximum numbers of organic drug constituents. Total acidity or acid value of the three samples was 0.60, 0.87 and 1.26 respectively. Since the third sample has higher acid value as compared to the other two samples of Kanji. It is because it was added *Amurchchita Sarsapa tail* during its preparation which indicates the occurrence of extra rancidity in the preparation⁹. An optimum concentration of sugar is required for the fermentation process and also to check the fungal and bacterial growth¹⁰. Reducing sugars

have the property to reduce many of the reagents. A reducing sugar is one that in a basic solution forms an aldehyde or ketone. The aldehyde group of glucose converts 3,5 Dinitro salicylic acid (DNS) to 3- amino- 5- nitro salicylic acid, which is the reduced form of DNS.

CONCLUSION

Present study concludes that, this established physico-chemical characteristics of Kanji would be used as a valuable tool in the routine standardization of this *Sandhana* preparation. This study also helps to provide quality control standards which may help in authenticity of the drug and to collect the important information regarding the preparation and analytical knowledge about Kanji.

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Cite this article as:

Chandra Shekhar, C. B. Jha. Analytical study of kanji: an acidic fermentative preparation of sandhan kalpana and its effect on agni. Int. J. Res. Ayurveda Pharm. 2015;6(6):711-713 <http://dx.doi.org/10.7897/2277-4343.066132>

Source of support: Nil, Conflict of interest: None Declared

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