

Studies on Acceptability and Cost Structure of Kalakand Prepared From Cow Milk Khoa and Wood Apple Pulp

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ABSTRACT: The present investigation with a view to utilizes Wood Apple in preparation of Kalakand with different combinations of cow milk khoa and wood apple pulp like 100:00, 95:05, 90:10, 85:15 and 80:20 in treatments T₁, T₂, T₃, T₄ and T₅. The samples of kalakand were subjected to sensory evaluation by panel of judges. The kalakand prepared from combination of 85 per cent cow milk khoa and 15 per cent wood apple pulp was found acceptable with highest score in treatment T₄ (8.7). The cost of production of acceptable kalakand (T₄) i.e. 15% wood apple pulp blended with 85% cow milk khoa was Rs. 255.31/Kg.

Keywords: Wood apple pulp, cow milk khoa, overall acceptability, cost of production.

INTRODUCTION

The dairy sector is making continuous advancement over the last years and now a wide variety of milk and milk products are readily available to consumers made up of milk. These products are a high-quality, rich taste and flavor (Rasane *et al.*, 2015). India producing milk 187.7 million ton per annum (NCAER, 2019). Out of the total milk production in India, 46 % of milk is consumed as a whole and 54% is used for conversion into different dairy products. Kalakand is a partially desiccated milk product with caramelized flavour and granular texture prepared from acidified milk (David, 2009). Among the indigenous milk products, kalakand occupies an important place. Kalakand is a partially desiccated milk product with caramelized flavour and granular texture prepared from acidified milk (Suresh and Jha 1994). Fortification of different milk products with fruit juice or pulp has been showed to improve their acceptability to a considerable extent (Dhanawade *et al.* 2006). Wood apple has promising therapeutic value because of the presence of various phytoconstituents such as tannins, alkaloids, steroids, flavonoids, terpenoids, fatty acids and vitamins. Addition of wood apple pulp to kalakand with main objectives to find out overall acceptability and calculate cost of production.

MATERIALS AND METHODS

The present investigation was conducted in the Department of Animal Husbandry and Dairy Science, Post Graduate Institute, Dr Panjabrao Deshmukh

Krishi Vidyapeeth, Akola during 2020-21. The treatment details as T₁= Kalakand prepared from 100% cow milk khoa (control), T₂ = 95% cow milk khoa : 5% wood apple pulp, T₃ = 90% cow milk khoa : 10% wood apple pulp, T₄ = 85% cow milk khoa : 15% wood apple pulp, T₅ = 80% cow milk khoa : 20% wood apple pulp. The process line was followed prescribed by Sawant *et al.* (2006) with certain modifications for kalakand preparation. cow milk was measured and poured in Karahi. It was placed over a brisk and non-smoky fire for direct heating. Milk was continuously stirred with khunti in a circular motion. After 10 to 15 minutes of boiling 0.02 per cent citric acid solution was poured slowly, this resulted in partial coagulation of the milk. This process was followed for control treatment, while for other treatment instead of citric acid, wood apple pulp was added as per treatment which result in desired coagulation to get the regular texture of kalakand. Heating and stirring were continued till the contents in the Karahi reached semi solid consistency of danedar texture. At this stage sugar at the rate of 30 per cent was added and stirred well. The finished product was removed and set in a greasy aluminium tray and was allowed to cool at room temperature. Uniform quality was maintained for all replications and calculated amount of wood apple pulp added accordingly to treatments. The quality of kalakand was sensorily evaluated by panel of judges for flavour, colour and appearance, body and texture and overall acceptability by 9-point hedonic scale prescribed by Gupta (1976) and data generated with stational process and results was obtained. The cost of production of per kg

kalakand under various treatments was calculated by considering the prevailing retail market price for various materials i.e. milk, wood apple, sugar, fuel, labour charges and electricity charges.

RESULT AND DISCUSSION

Data obtained in respect to various parameters of sensory evaluation was analyzed, tabulated and presented in Table 1.

Acceptability of kalakand :

Table 1: Acceptability of kalakand blended with Wood apple.

Treatments	Parameter (Max. Score 09)			
	Flavour	Colour and appearance	Body and Texture	Overall acceptability
T ₁	8.2	8.2	8.2	8.2
T ₂	7.8	7.7	7.8	7.8
T ₃	8	7.9	8	8
T ₄	8.7	8.6	8.5	8.5
T ₅	8.4	8.3	8.3	8.3
F. Test	Sig.	Sig.	Sig.	Sig.
S.E.(m)±	0.033	0.056	0.058	0.066
C.D. at 5%	0.099	0.166	0.173	0.197

Flavour of kalakand : Kalakand blended with 15 per cent wood apple pulp, treatment T₄ recorded highest score (8.7) in respect of flavour for the treatment T₂ lowest score (7.8 out). The result indicates that the kalakand prepared with 15 per cent wood apple pulp was superior over 0, 5, 10, 20, per cent level of wood apple. The mean score for flavour of kalakand in treatments T₁, T₂, T₃, T₄ and T₅ were 8.2, 7.8, 8.0, 8.7 and 8.4 respectively. Bhutkar *et al.* (2015) observed that, the flavour score for utilization of ash gourd pulp for kalakand preparation, ash gourd pulp level was increased for blending in cow milk decreased the flavour score, with increase level while beyond 10% of ash guard pulp in kalakand. Manohar *et al.* (2018) reported, the flavour score for kalakand prepared from buffalo milk blended with papaya pulp maximum and minimum score for flavour was recorded in treatment T₂ (5% papaya pulp+10% sugar) was 8.8 and T₄ (10% papaya pulp + 10% sugar).

Colour and appearance of kalakand : The study was undertaken to evaluate the effect of different level of wood apple pulp on Colour and appearance of kalakand and found that, the colour and appearance score of kalakand was significantly affected due to addition of different level of wood apple pulp. The score for colour and appearance of kalakand were T₁ (8.2.), T₂ (7.70), T₃ (7.90), T₄ (8.60) and T₅ (8.30). The significant highest score (8.6 out of 9) was obtained by kalakand prepared from blending with 15 per cent wood apple pulp as compared to other treatments. Present results were supported by the results of past researchers as, Nagar *et al.* (2017) noted that the sensory score for Standardization of papaya enriched kalakand and he was reported that increased papaya pulp level beyond the limit for blending the maximum and minimum score for colour respectively. Manohar *et al.* (2018) reported that the colour and appearance score for kalakand prepared from buffalo milk blended with papaya pulp, the score of colour and appearance was decreased by increase in the level of papaya pulp in papaya pulp kalakand.

Body and texture of kalakand : Significantly highest score (8.5 out of 9) was obtained by kalakand prepared with 15 per cent (T₄) wood apple pulp while

lowest score (7.80) obtained by 5% blended (T₂) kalakand. However, T₁, T₃, T₅ score are 8.2, 8.0 and 8.3 respectively. Results are similar with the results of Surve (2017) reported that addition of date up to 10 per cent increased the score for texture in milk shake and Nager *et al.* (2017) observed that standardization of papaya enriched kalakand and reported that increased papaya pulp level beyond the limit for blending the maximum and minimum score for body & texture was recorded in treatment T₆ (7.97) and T₉ (6.07) respectively.

Overall acceptability of kalakand. The highest score in 15 per cent of wood apple pulp (T₄) and lowest score in 5 per cent of wood apple pulp (T₂) results indicated that the mean score for overall acceptability for T₁, T₂, T₃, T₄ and T₅ treatments were 8.2, 7.8, 8.0, 8.7 and 8.4 respectively. It is concluded that increased in the level of wood apple pulp resulted in better overall acceptability score of kalakand up to a certain limit and there after it decreased proportionately. The present findings are in agreement with Nagar *et al.* (2017) reported that, the overall acceptability score papaya pulp enriched kalakand was varied significantly. The overall acceptability score was highest in treatment T₆ (8.03) and the lowest value recorded in treatment T₉ (6.47). Kumar and Singh (2017) reported that, the overall acceptability score was highest in treatment T₃ (8.48) containing wood apple kalakand prepared by addition of 15 parts of wood apple pulp and 85 parts of khoa by weight basis with addition of 30 per cent sugar.

Cost of production of kalakand : Cost of production of different treatment combinations was Rs. 279.29, Rs. 270.95, Rs. 262.93, Rs. 255.31 and Rs. 248.04 for treatments T₁, T₂, T₃, T₄ and T₅ respectively. It was observed that the preparation of kalakand from cow milk blended with wood apple pulp, the cost was per kg kalakand decreased with increasing level of wood apple pulp. Good quality kalakand was prepared from 85 percent cow milk khoa and 15 per cent wood apple pulp having cost per kg Rs. 255.31.per kg. These results has similar trends as recorded by Thikare *et al.* (2020) who observed that cost of production of 1 kg kalakand ranged from Rs. 289.77 to 248.10.

Table 2: Cost of production for 1 kg Kalakand blended with wood apple pulp (Rs./-)

Sr. No.	Particular	Treatments				
		T ₁	T ₂	T ₃	T ₄	T ₅
1.	Cow milk used (Lit.)	1	1	1	1	1
2.	Amount of milk (40 Rs/Lit)	40	40	40	40	40
3.	Wood apple pulp (gm)	0	7.8	16.7	26.5	37.5
4.	Wood apple pulp @ Rs 150 / kg	0	1.17	2.51	3.98	5.63
5.	Sugar (gm)	64	68	72	76	80
6.	Sugar @ Rs 40/kg	2.56	2.72	2.88	3.04	3.2
7.	Other production cost (labour, fuel, electricity)	20	20	20	20	20
8.	Total cost of production of kalakand (Rs)	62.56	63.89	65.39	67.02	68.83
9.	Quantity of kalakand obtained (gm)	224	235.8	248.7	262.5	277.5
10.	Cost of production of 1 kg kalakand (Rs)	279.29	270.95	262.93	255.31	248.04

CONCLUSION

Acceptability of kalakand in respect of flavour, colour and appearance, body and texture and overall acceptability showed that, 15 per cent of wood apple pulp blended with cow milk kalakand was acceptable. The cost of kalakand was decreased with the increased in level of wood apple kakkakand. The cost of most acceptable kalakand prepared with 15 per cent wood apple pulp was Rs. 256.66 per kg.

FUTURE SCOPE

This study will help to produce good quality nutritional value added dairy product for the health conscious customers.

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Conflict of Interest. None.

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