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Effect of different levels of mango seed kernel powder on the sensory quality of low fat khoa

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Abstract

Plant-based alternative is the fast-growing segment in newer food product development category of functional and specialty beverage across the globe. Mangoes (*Mangifera indica*) are tropical fruit-bearing plants of Africa and Asia and has antimicrobial property against various food borne pathogens and also has high antioxidants which improves health and can be used in day-to-day recipes. Keeping the above point's in view present investigation was carried to evaluate the effect of different levels of mango seed kernel powder on the sensory quality of low fat khoa. And the study revealed that out of three different levels of mango seed kernel powder (0.5, 2 or 4 percent) used at different levels and 0.5 percent mango seed kernel powder showed better sensory quality with respect to colour and appearance, body and texture, flavour and overall acceptability. Further increase in the levels showed lower sensory scores and quality of the product.

Keywords: Mango seed kernel powder, quality, low fat khoa, *Mangifera indica*

Introduction

Because of its delicious flavor and taste as well as its high nutritional content, the mango (*Mangifera indica* L.) is one of the most significant tropical fruits in the world (Ibarra *et al.*, 2015) [6]. According to Tharanathan *et al.* (2006) [11], it is abundant in water, carbohydrates, fiber, minerals, vitamins, and antioxidants. Considered as "the king of fruits" due to its chemical makeup, it ranks fifth in total output and is the most traded tropical fruit globally (FAOSTAT, 2015) [5].

Nowadays, synthetic antioxidants from the oil industry, such as butylated hydroxytoluene and butylated hydroxyanisole, are found in nearly all processed foods (Carocho and Ferreira, 2013) [3]. Consuming synthetic antioxidants has been linked to harmful health consequences (Lorenzo *et al.*, 2013) [8]. These effects can be prevented by substituting natural antioxidants which are found in mango seeds. Mangiferin, isomangiferin, homomangiferin, quercetin, kaempferol, and anthocyanins are among the phenolic compounds and phenolic acids that have been found in mango seeds. Additionally, potassium, copper, zinc, manganese, iron, and selenium are among the mineral antioxidants that have been found in mango seeds (Ribeiro and Schieber, 2010) [10].

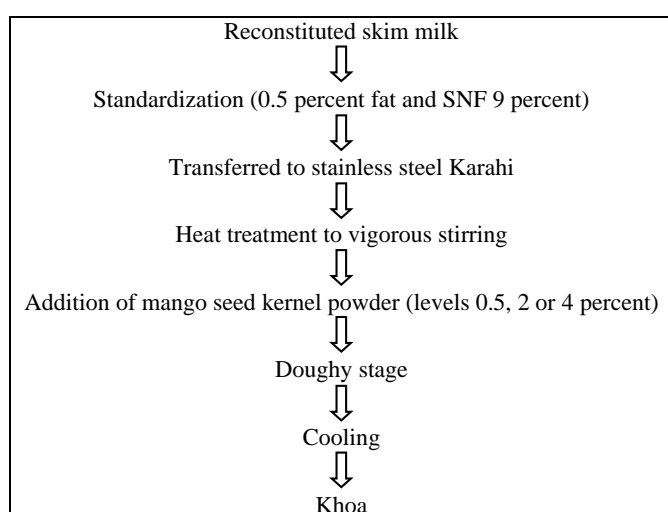
In conjunction with oxygen consumption, the human body generates Reactive Oxygen Species (ROS) through a variety of enzymatic processes (Dina *et al.*, 2009) [4]. ROS can be helpful in modest doses, but excessive levels have been linked to cancer, aging, cardiovascular, and neurological disorders (Bagchi *et al.*, 2000) [2]. Because of this, the body needs external antioxidants to regulate ROS on a continual basis (Ma *et al.*, 2011) [9]. According to Bagchi *et al.* (2000) [2], natural antioxidants have a wide range of biological activities, including pharmacological and therapeutic efficacy against oxidative stress and free radicals. Mango (*Mangifera indica* L.) and other fruits are thought to be a rich source of antioxidants for people (Ma *et al.*, 2011) [9].

Due to their high antioxidant content, mango seed kernels have been shown to exhibit antibacterial action against both Gram positive and Gram-negative bacteria as well as anticancer potential against breast and colon cancer (Khammuang and Sarnthima, 2011) [7]. Its high tannin concentration has been linked to purported antidiarrheal effects. Ascorbic acid, flavonoids, carotenoids, and a high level of antioxidant activity are all present in the mango seed kernel, which also has a high total phenolic content ranging from 21.9 to 447 mg/g on dry weight (Bagchi *et al.*, 2000) [2].

The current study was conducted to assess the impact of varying concentrations of mango seed kernel powder on the sensory attributes of low-fat khoa, taking into account the previously mentioned context.

Materials and Methods

Fresh whole milk was procured from Students Experimental Dairy Plant (SEDP) of Dairy Science College, Hebbal, Bengaluru. Skim milk powder was purchased from milk parlour of mother dairy Bengaluru. Mango seed powder is of Indian Mango Seed Powder brand purchased from the online market. Stainless steel vessels of varying capacities and stainless-steel stirrers were used at various stages of the investigation. The vessels are washed by using detergents and kept for air dry. All the chemicals used in this investigation were of Analytical grade.



Flowchart for manufacturing low fat functional khoa

Results

Effect of addition of different levels of mango seed kernel powder on sensory characteristics of low fat khoa

Table 1.0 displays the sensory assessment results of control and experimental Khoa with varying amounts of mango seed kernel powder, as determined by a five-person panel of judges. The ratings refer to color and appearance, body and texture, flavor, and overall acceptability of the product.

Colour and appearance

It is evident from the results of Table 1, that the mean scores for colour and appearance of control sample was 8.10 as against 8.08, 7.10, 6.50 for khoa incorporated with 0.5, 2.0, 4.0 percent levels of mango seed kernel powder respectively. The color and appearance scores decreased with increase in mango seed kernel powder levels. The highest score with respect to colour and appearance was recorded for khoa containing 0.5 percent level of 8.08. Statistical analysis

revealed that a different level of mango seed kernel powder had significant difference among treated samples but 2.0 percent level of mango seed kernel powder and control showed non-significant difference.

Body and texture

The mean scores for body and texture of control sample were 8.20 as against 8.20, 7.10, 6.50 for khoa incorporated with 0.5, 2.0, 4.0 percent levels of mango seed kernel powder respectively. There was decrease in the body and texture scores with increase in mango seed kernel powder levels. The highest score with respect to body and texture of 8.20 was recorded for khoa containing 0.5 percent level of mango seed kernel powder. Statistical analysis revealed that a different level of mango seed kernel powder had significant difference among treated samples but 2.0 and 4.0 percent level of treated sample showed non-significant difference and also 0.5 percent and treated sample also showed no significant difference.

Flavour

The mean scores for flavour of control sample was 8.50 as against 8.25, 7.0, 6.70 for khoa incorporated with 0.5, 2.0, 4.0 percent levels of mango seed kernel powder respectively. There was decrease in sensory scores with increase in treatment levels. The highest score with respect to flavour of 8.25 was recorded for khoa containing 0.5 percent level of mango seed kernel powder whereas, lowest score of 6.70 was awarded to product with 4 percent mango seed kernel powder. The control and 0.5 percent level of kernel powder added to khoa were found to be non significant when compared to 2.0 and 4.0 percent levels of kernel powder which showed significant difference. statistical analysis revealed that a different levels of mango seed kernel seed powder has significant effect of flavour of khoa.

Overall acceptability

The sensory scores awarded for overall acceptability of khoa was 8.30 for control as against 8.10, 7.40, and 6.50 for samples of 0.5, 2.0 and 4.0 percent mango seed kernel powder level respectively.

Among the various level of mango seed kernel powder used in khoa at 0.5, 2.0 and 4.0 percent. The 0.5 percent level secured highest sensory scores for all sensory attributes viz., colour and appearance, body and texture and overall acceptability compare to 2 and 4 percents.

There was non-significant difference in sensory scores when 0.5 percent of mango seed kernel powder is used whereas, significant difference is seen when 02 percent and 04 percent level of mango seed kernel powder is used. Similar results seen by Arogba, 2002 [1] during manufacture of biscuits with replacing wheat flour with mango seed kernel flour (50:50) with 7.2 points of overall acceptability. Increase in mango seed kernel flour levels decreased the sensory scores.

Table 1: Effect of addition of different levels of mango seed kernel powder on sensory characteristics of low fat khoa

Level of mango seed powder (%)	Colour and Appearance	Body and Texture	Flavour	Overall Acceptability
Control	8.10 ^a	8.20 ^a	8.50 ^a	8.30 ^a
0.5	8.08 ^a	8.20 ^a	8.25 ^a	8.10 ^a
2.0	7.10 ^b	7.10 ^b	7.0 ^b	7.40 ^b
4.0	6.50 ^c	6.50 ^c	6.70 ^c	6.50 ^c
CD ($p \leq 0.05$)	0.53	0.75	0.73	0.60

The values are average of three trails

Superscripts indicates significant differences in values.

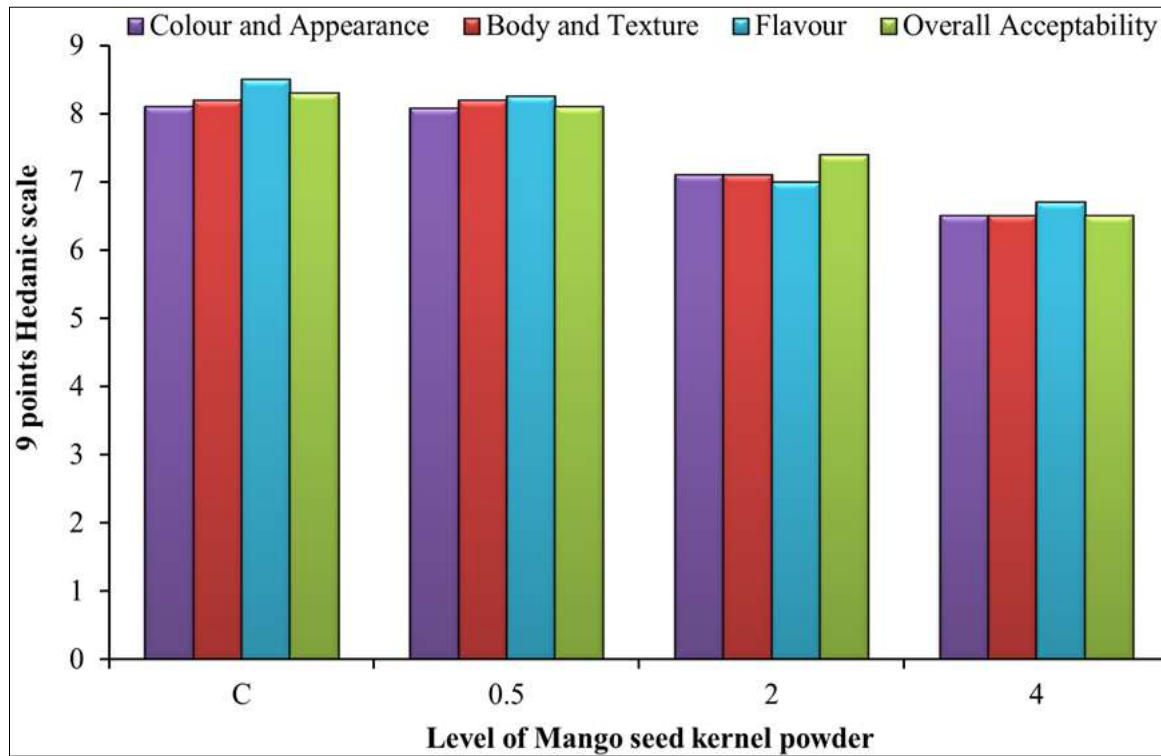


Fig 1: Effect of addition of different levels of mango seed kernel powder on sensory characteristics of low fat khoa

The khoa incorporated with 0.5 percent mango seed kernel powder showed highest average score 8.10 among treated samples while 4 percent mango seed kernel powder treated sample scored lowest 6.50. The sample prepared from 0.05 and control showed no significant difference. Statistical analysis revealed that different level of mango seed kernel powder has remarkable effect on overall acceptability of low fat khoa. There was non-significant difference in sensory scores when 0.5 percent of mango seed kernel powder is used whereas, significant difference is seen when 02 percent and 04 percent level of mango seed kernel powder is used. Similar results seen by Arogba, 1998^[12] during manufacture of biscuits with replacing wheat flour

Conclusion

Out of three different levels of mango seed kernel powder (0.5, 2 or 4 percent) used at different levels and 0.5 percent mango seed kernel powder showed better sensory quality with respect to colour and appearance, body and texture, flavour and overall acceptability. The overall acceptability awarded for 0.5 percent incorporation of mango seed kernel powder was 8.10 against control 8.30 respectively. Further increase in the levels showed lower sensory scores and quality of the product. Hence 0.5 percent was selected for further studies.

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