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Studies on preparation of herbal *Peda* with turmeric and black pepper powder

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Abstract

To study the effect of turmeric and black pepper incorporation on shelf life of *peda*, control sample (T_0) of *peda* was prepared with 30% sugar and 70% *khoa*. Herbal *peda* (T_2) was prepared with 30% sugar, 1% black pepper & 1% turmeric. During storage at ($7 \pm 1^\circ\text{C}$), free fatty acid value increased from 0.051 per cent oleic acid (0th day) to 0.094 per cent oleic acid (32th day) in T_0 and 0.049 per cent oleic acid (0th day) to 0.096 per cent oleic acid (48th day) in T_2 . Peroxide value content increased from 1.168 milli moles/kg of fat (0th day) to 1.925 milli moles/ kg of fat (32th day) in T_0 and 1.152 milli moles/ kg of fat (0th day) to 1.936 milli moles/ kg of fat (48th day) in T_2 . It has been found that the the shelf life of control *peda* was 32 days and herbal *peda* was 48 days at 7°C . From the study it has been concluded that turmeric and black pepper powder are working as a natural preservative and increasing shelf life of the product.

Keywords: herbal, black pepper, turmeric

Introduction

The consumption of Traditional Indian Dairy Products (TIDP) is likely to grow at an annual growth rate of more than 20 per cent. *Peda* is highly nutritious product as it contains almost all milk solids plus sugar and other additives (Gavhane *et al.*, 2014) [4]. It is heat desiccated indigenous milk sweet prepared by heating a mixture of *Khoa* and sugar until the desired granular and firm texture and flavour develops. The quantity of *peda* produced in India exceeds any other indigenous milk based sweet and it has also special importance in various celebrations (wedding, inaugural functions etc.) throughout the year (Ghule *et al.*, 2013) [5].

Increasing awareness among consumers to ensure good health coupled with changing lifestyle has led to the concept of functional foods. The development of functional food is thus unique to contribute opportunities for the improvement of the quality of food and consumer health and well-being. Nowadays, more and more people are adopting herbal way of life for their health benefits (Neall, 2004) [6]. Herbs and spices are an important part of the human diet. They have been used for thousands of years to enhance the flavor, color and aroma of food. In addition to boosting flavor, herbs and spices are also known for their preservative and medicinal value which forms one of the oldest sciences. Turmeric is mainly used as a spice in Indian foods and has medicinal value also. The major chronic disease including atherosclerosis, cancer, cardiovascular diseases, cataracts, and rheumatoid arthritis are relieved with anti-oxidants like Vitamin C, Vitamin E and Turmeric.

Black pepper is also an important traditional medicine and used to treat asthma, chronic indigestion, colon toxins, obesity, sinus, congestion, fever intermittent fever, cold extremities, colic, gastric ailments and diarrhea. It has been shown to have antimicrobial activity.

Materials and Method

Fresh Buffalo milk (6.0% fat and 9.0%) and High density polyethylene (HDPE) packaging material was purchased from local market of Raipur.

Preparation of *Khoa* and *Peda*

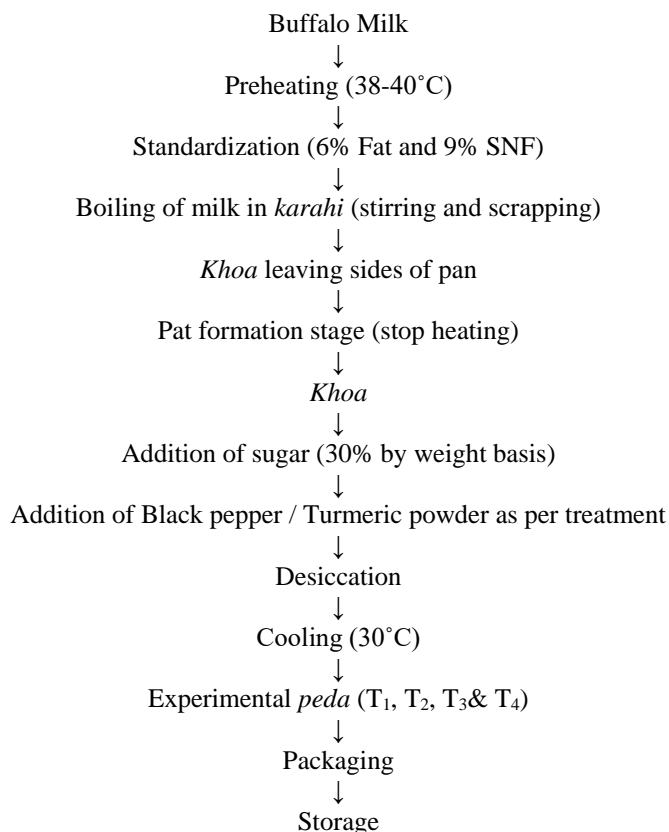
Khoa and *peda* were prepared as per the methodology given by Gavhane *et al.*, (2014) [4] with slight modification. For the preparation of turmeric and black pepper powder incorporated *peda*, optimized the levels of turmeric and black pepper powder incorporation *peda*. The levels of turmeric and black pepper are screened out based on sensory evaluation of the *peda*.

Treatment Details and proportions

Treatment combinations were used for preparation of turmeric and black pepper powder incorporated *peda* are as given below:

Treatments/Ingredients	Percentage (For 100 g)				
	T ₀	T ₁	T ₂	T ₃	T ₄
<i>Khoa</i> (g)	70	68.5	68	67.5	67
Turmeric (g)	0	0.5	1	1.5	2
Sugar (g)	30	30	30	30	30
Black Pepper (g)	0	1	1	1	1
Total	100	100	100	100	100

Preparation of turmeric and black pepper incorporated *peda*



Result and Discussion

The effect of Turmeric and Black Pepper powder incorporation on chemical quality with respect to free fatty acid and peroxide value of *peda* were studied during storage at refrigeration temperature ($7\pm 1^{\circ}\text{C}$) and the results are displayed in respective Tables and Figures.

Effect on free fatty acid shelf life of *peda*

Effect of turmeric and black pepper powder incorporation on free fatty acid value of *peda* during storage is displayed in Table 4.1 and Fig 4.2. On comparing means, it was observed that control T₂ had the lowest free fatty acid value of 0.073 per cent oleic acid and differed significantly from experimental samples while, T₀ had the highest free fatty acid of 0.083 per cent oleic acid.

The control (T₀) net increase in FFA content of the *peda* sample stored at $7\pm 1^{\circ}\text{C}$ were 0.051 (0th day) to 0.094 (32th day) and herbal *peda* (T₂) net increase in FFA content of the *peda* sample stored at $7\pm 1^{\circ}\text{C}$ were 0.049 (0 day) to 0.096 (48 day). It has been found that the shelf life of control *peda* was 32 days and herbal *peda* was 48 days at $30\pm 1^{\circ}\text{C}$. While comparing the results among the treatments, it was observed that T₂ sample was slowly deteriorative followed by T₀. This may be because of the more antioxidative property of *peda* which was added with turmeric and black pepper powder. Buch *et al.* (2014) [1] reported that efficacy of turmeric as a preservative in *paneer* by using turmeric 0.6 % by weight of *paneer* $7\pm 1^{\circ}\text{C}$. They found that increased the free fatty acids, control and 0.6% added *paneer* was recorded in control 0.03 ± 0.01 (0 day), 0.04 ± 0.01 (6 day), 0.07 ± 0.01 (12 day), and decreed in turmeric added *paneer* control 0.02 ± 0.00 (0 day), 0.03 ± 0.01 (6 day) and 0.06 ± 0.01 (12 day). Eresam *et al.* (2015) [3] tested black pepper, cardamom, cinnamon and clove for their relative efficacy in improving shelf life of *paneer*. All the spices were incorporated in *paneer* control, cardamom, cinnamon, clove and black pepper at 0.0, 0.6, 0.4, 0.6, 0.6 and 0.6 % by wt. of expected yield of *paneer*. The order of the relative effectiveness in enhancing shelf life of *paneer* was cardamom > cinnamon > clove > black pepper. Among these spices studied, all spice to improve shelf life of *paneer* up to 28 days of storage at $7\pm 1^{\circ}\text{C}$ but control shelf life of *paneer* up to 14 days of storage at $7\pm 1^{\circ}\text{C}$.

Table 1: Effect of turmeric and black pepper powder incorporation on free fatty acid value of the *peda* samples during storage at $7\pm 1^{\circ}\text{C}$

Treatment	0 th day	4 th day	8 th day	12 th day	16 th day	20 th day	24 th day
T ₀	0.051	0.056	0.062	0.067	0.072	0.078	0.083
T ₂	0.049	0.055	0.058	0.062	0.066	0.069	0.073
Mean of period (S)	0.050	0.056	0.060	0.065	0.069	0.074	0.078

Treatment	28 th day	32 ^h day	36 th day	40 th day	44 th day	48 th day	Mean of Treatment (T)
T ₀	0.091	0.094	0.099*	0.103*	0.110*	0.115*	0.083
T ₂	0.077	0.080	0.084	0.088	0.093	0.096	0.073
Mean of period (S)	0.084	0.087	0.092	0.095	0.101	0.106	

(*Spoilage)

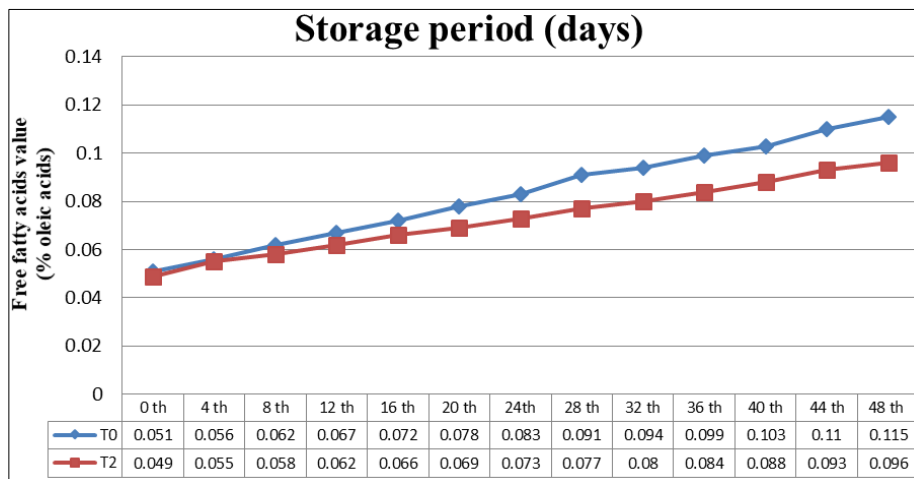


Fig 1: Effect of turmeric and black pepper powder incorporation on free fatty acid value of the *peda* samples during storage at 7±1°C.

Effect on free peroxide value shelf life of *peda*

Effect of turmeric and black pepper powder incorporation on peroxide value of *peda* during storage is displayed in Table 1 and Fig 1. On comparing means, it was observed that control T₂ had the lowest peroxide value of 1.557 per cent oleic acid and differed significantly from experimental samples while, T₀ had the highest free fatty acid of 1.712 per cent oleic acid. Vasava, M Neha *et al.* (2018) [7] reported that Effect of storage on quality of gluten-free gulabjamun, the results indicated that during storage of gluten-free gulabjamun at refrigerated temperature, there was an increase in peroxide value. The peroxide value (milli-eq. O₂/kg) increased from 0.15±0.01 in freshly prepared gluten-free gulabjamun (i.e. 0th day), 0.17± 0.01 (7th day), 0.20± 0.01(14th day), 0.23± 0.01(21th day), 0.24± 0.01(28th day), 0.29±0.01 (35th day) of

storage. The progressive increase in peroxide value during storage could be attributed to degradation of fat, and oxidation of fat leads into formation of peroxides. Chaudhary (2016) [2] studied the effect of storage on peroxide value of gulabjamun prepared using moraiyo as a binder and reported that the peroxide value increased from 0.35±0.16 (0th d) to 0.69±0.025 (28th d) (milli-eq. O₂/kg) at refrigeration temperature (7±2 °C). A similar trend of increase in acidity was observed in the present study. Thus, the results obtained in the present investigations corroborates with those reported in literature.

All the *peda* samples containing T₂ had lower value of peroxide value than the control sample. The maximum ability in preventing the peroxide formation due to its higher antioxidant activity.

Table 2: Effect of turmeric and black pepper powder incorporation on the peroxide value of of the *peda* samples during storage at refrigeration temperature (7±1°C)

Treatment	0 th day	4 th day	8 th day	12 th day	16 th day	20 th day	24 th day
T ₀	1.168	1.264	1.325	1.424	1.525	1.616	1.712
T ₂	1.152	1.216	1.280	1.349	1.429	1.493	1.557
Mean of period (S)	1.160	1.240	1.302	1.387	1.477	1.555	1.635

Treatment	28 th day	32 th day	36 th day	40 th day	44 th day	48 th day	Mean of Treatment (T)
T ₀	1.824	1.925	2.035*	2.117*	2.213*	2.358*	1.731
T ₂	1.621	1.685	1.749	1.813	1.872	1.936	1.550
Mean of period (S)	1.723	1.805	1.892	1.965	2.043	2.147	

(* Spoilage)

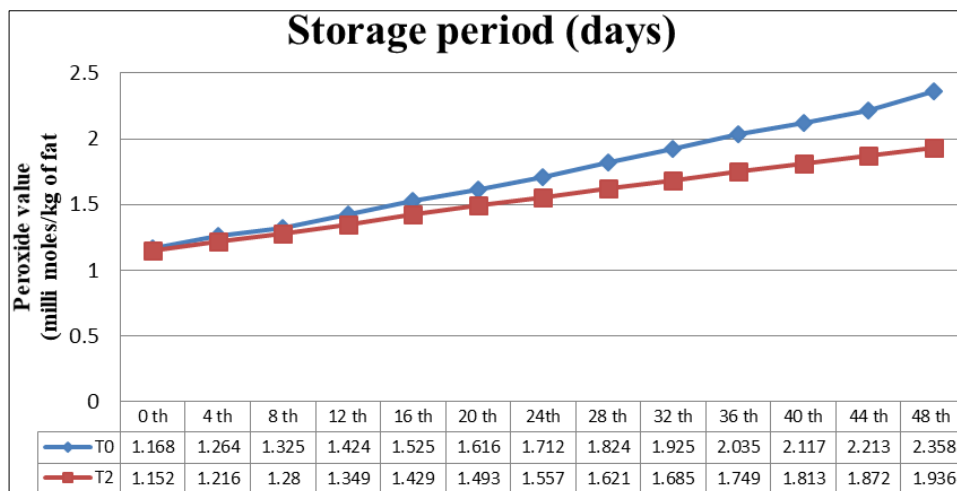


Fig 2: Effect of turmeric and black pepper powder incorporation on the peroxide value of of the *peda* samples during storage at refrigeration temperature (7±1°C)

Summary and Conclusion

During storage at $(7\pm 1^{\circ}\text{C})$, free fatty acid value increased from 0.051 per cent oleic acid (0th day) to 0.094 per cent oleic acid (32th day) in T₀ and 0.049 per cent oleic acid (0th day) to 0.096 per cent oleic acid (48th day) in T₂. Peroxide value content increased from 1.168 milli moles/kg of fat (0th day) to 1.925 milli moles/ kg of fat (32th day) in T₀ and 1.152 milli moles/ kg of fat (0th day) to 1.936 milli moles/ kg of fat (48th day) in T₂. From the study it has been concluded that turmeric and black pepper powder are working as a natural preservative and increasing shelf life of the product.

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