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Effect of incorporation of flaxseed oil and Brahmi leaves on antioxidant activity (% DPPH radical scavenging activity) of cow ghee

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Abstract

Ghee is one of the major dairy products that has place an important role in the diet of the people of the Indian sub-continent due to ghee has a good flavour and aroma. The Ghee is evolved from word of Sanskrit Ghruta. Ghee is known by its several names in many languages; however, its common Indian name is represented as clarified butter fat. In the present investigation, flaxseed oil was added at three different concentration @ 5%, 10% and 15% and Brahmi leaves were also added @ 5%, 10%, 15% and 20% in cow ghee samples. The cow ghee samples were analysed for Antioxidant activity (% DPPH Radical scavenging activity). The highest mean value for chemical properties of Antioxidant activity (% DPPH Radical scavenging activity) was observed to be 29.00 for sample T11 and treatments T10, T12, T9, T7, T8, T6, T5, T3, T4, T2, T1, and T0 has the mean value of 28.75, 28.50, 28.25, 27.00, 26.75, 26.50, 26.25, 25.75, 25.50, 25.25, 25.00, and 22.50 respectively. It has been observed that when cow ghee samples were incorporated with 5% Brahmi leaves and the level of flaxseed oil increased from 5% to 15%, then the Antioxidant activity (% DPPH Radical scavenging activity) was found to increase significantly ($p < 0.05$) from 25.00 to 28.25. When cow ghee samples were incorporated with 10% Brahmi leaves and the level of flaxseed oil increased from 5% to 15%, then the Antioxidant activity (% DPPH Radical scavenging activity) was found to increase significantly ($p < 0.05$) from 25.25 to 28.75.

Keywords: Cow ghee, antioxidant activity, brahmi, flaxseed oil, radical scavenging activity

Introduction

Milk fat is a valuable and costlier product consumed throughout the world. Milk fat is uniquely distinct from other fats, it is containing short chain fatty acids (Lal *et al.*, 1984; Jensen *et al.*, 1981; Kumar *et al.*, 2011) [11, 8, 10]. Whereas, vegetable oils/fats are rich in linoleic acid (Juyoung *et al.*, 2010; Ivanov *et al.*, 2011) [9, 7] and animal depot fat are also rich in oleic acid (Gunstone *et al.*, 1995) [4]. Milk fat imparts good sensory and nutritional characteristics and economy to the milk and milk products. Therefore, milk fat is highly prone to adulteration with cheaper oils or fats like vegetable oils, animal depot fats, hydrogenated fats and inedible mineral oils etc. In India, milk fat is consumed in the form of ghee (clarified butter fat) and butter. Ghee is an important Indian diet which possess many functional and therapeutic properties (Heyn, 1993) [5]. Ghee is a good source of fat-soluble vitamins such as A, D, E and K and also provides all the essential fatty acids (Chand *et al.*, 1986) [2]. Ghee is uses for religious or festive of Hindu rite. Ghee contains high fat, so during storage condition, ghee undergoes the oxidative degradation (Shende *et al.*, 2014; Gandhi *et al.*, 2013; Pawar *et al.*, 2012) [14, 3, 13] and the level of degradation in ghee depends mainly on the storage temperature, oxygen availability and condition of ghee either solid state or liquid state. Oxidative deterioration of ghee degrades by colour, flavour, aroma and nutritive value.

Linseed is considered best source of oils. It has many benefits to therapeutic properties in preventing diseases related to mammary and prostate gland, exerts anticarcinogenic effect, possess laxative effect, reduces osteoporotic effect, anti-inflammatory properties, and reduces the problems associated with menopause. It also possesses antioxidative properties (Oomah 2001; Alhassane and Xu, 2010; Ivanova *et al.* 2011; Singh *et al.* 2011) [12, 1, 6, 16]. The herbal medicines are widely used in the world.

Brahmi is considered as a Ayurvedic medicinal herb, which is re-emerging as a recourse to treatment of memory boost up and curing other disorders. Brahmi has medicinal influence both in Indian and Chinese by traditional literature. Brahmi was one of the unique and cheapest herbs prescribed for improving the cognitive ability of human beings.

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The significance of Brahmi (*Bacopa monniera* Linn.) in improving memory (Singh and Dhawan, 1997) [15].

Materials and Methods

Procurement of raw materials

Cow milk was collected from local farms of Prayagraj. Ghee was prepared from cream of cow and milk in Dairy Chemistry laboratory, Warner College of Dairy Technology, SHUATS, Prayagraj.

Flaxseed oil was collected from Kamani oil Industries Pvt. Ltd., Khopoli, Maharashtra, India.

Brahmi was procured from Patanjali Pvt. Ltd., Haridwar, India

Preparation of herbal cow ghee samples

Cow cream was separated from cow milk at 38 °C - 40 °C. Then pasteurization of cream was done at 77 °C for 5 minutes, then cooling was done at of cream at 5-10 °C, further the cream was heated and clarification at 113-115 °C / flash. Then the brahmi leaves were added @ 5%, 10% and 15%. The ghee was filtered and stored at room temperature (37±1 °C).

Statistical analysis

The observation recorded in present investigation were analysed for ANOVA and Critical Difference using WASP software developed by ICAR Research complex at GOA.

Result and Discussion

In the present investigation, flaxseed oil were added three different concentration @ 5%, 10% and 15% and Brahmi leaves were added @ 5%, 10%, 15% and 20% in cow ghee samples. The highest mean value of cow ghee for Antioxidant activity (% DPPH Radical scavenging activity) was observed to be 29.00 for sample T11 and treatments T10, T12, T9, T7, T8, T6, T5, T3, T4, T2, T1, and T0 has the mean value of 28.75, 28.50, 28.25, 27.00, 26.75, 26.50, 26.25, 25.75, 25.50, 25.25, 25.00, and 22.50 respectively. It has been observed that

when cow ghee samples were incorporated with 5% Brahmi leaves and the level of flaxseed oil increased from 5% to 15%, then the Antioxidant activity (% DPPH Radical scavenging activity) was found to increase significantly ($p<0.05$) from 25.00 to 28.25. When cow ghee samples were incorporated with 10% Brahmi leaves and the level of flaxseed oil increased from 5% to 15%, then the Antioxidant activity (% DPPH Radical scavenging activity) was found to increase significantly ($p<0.05$) from 25.25 to 28.75.

Table 1: Table showing ANOVA for Antioxidant activity (% DPPH Radical scavenging activity) in control and Cow ghee samples incorporated with Flaxseed Oil and Brahmi Leaves

Source	D.F.	SS	MSS	Cal. F	TAB F(5%)	TAB F(1%)
Treatment	12	155.73	12.98	12.61	S	S
Replication	3	6.21	2.07	2.01	NS	NS
Error	36	37.04	1.03			
TOTAL	51	198.98				
CD at 5% level	1.10					
CD at 1% level	1.75					

When cow ghee samples were incorporated with 15% Brahmi leaves and the level of flaxseed oil increased from 5% to 15%, then the Antioxidant activity (% DPPH Radical scavenging activity) was found to increase significantly ($p<0.05$) from 25.75 to 29.00. When cow ghee samples were incorporated with 20% Brahmi leaves and the level of flaxseed oil increased from 5% to 15%, then the Antioxidant activity (% DPPH Radical scavenging activity) was found to increase significantly ($p<0.05$) from 25.50 to 28.50. When the brahmi leaves were constant, there was significant difference ($p<0.05$) among Antioxidant activity (% DPPH Radical scavenging activity) of treatments suggesting that Brahmi leaves exert significant influence on Antioxidant activity (% DPPH Radical scavenging activity) of ghee samples.

The observations for the Antioxidant activity (% DPPH Radical scavenging activity) of the cow ghee samples are presented graphically in fig. No. 1.

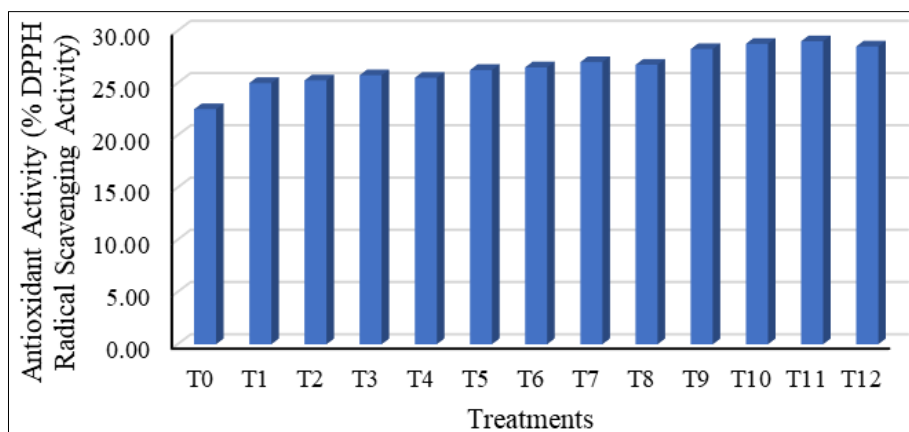


Fig 1: Graph showing Antioxidant activity (% DPPH Radical scavenging activity) of control and Cow ghee samples supplemented with flaxseed oil and Brahmi leaves

Conclusion

In the present study, it may be concluded that herbal cow ghee could be successfully prepared with addition of flaxseed oil and Brahmi leaves. Addition of flaxseed oil and Brahmi leaves in herbal cow ghee is improved the overall acceptability of the product. The consumption of herbal ghee preparation is responsible for lowering the inflammatory in the human body are widely used. The cow ghee samples were

analysed for chemical analysis of Antioxidant activity (% DPPH Radical scavenging activity). The highest mean value for chemical properties of Antioxidant activity (% DPPH Radical scavenging activity) was observed to be 29.00 for sample T11 and treatments T0 has the lowest mean value of 22.50. It has been also observed that when cow ghee samples were incorporated with 5% concentration of brahmi leaves and the level of flaxseed oil increased from 5% to 15%, then

the Antioxidant activity (% DPPH Radical scavenging activity) was found to be increase significantly in the range of 25.00 to 28.25. When cow ghee samples were incorporated with 10% Brahmi leaves and the level of flaxseed oil increased from 5% to 15%, then the Antioxidant activity (% DPPH Radical scavenging activity) was found to increase significantly ($p < 0.05$) from 25.25 to 28.75. The most acceptable quality of herbal cow ghee samples supplemented with flaxseed oil and brahmi leaves was observed 10% flaxseed and 10% brahmi leaves the highest scores of sensory characteristics.

Conflict of interests

Authors are declared no conflict of results.

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