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Effect of selected herbal preservatives and their combinations on sensory evaluation of herbal paneer

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Abstract

The present investigation entitled “Effect of herbal preservatives and their combinations on sensory evaluation of herbal paneer on quality of paneer prepared from cow milk” was carried out in the laboratories of Department of Animal Husbandry and Dairy Science, Dr. PDKV, Akola.

The herbal preservatives viz; ginger, cardamom and turmeric powder were used in paneer. The herbal preservatives were incorporated in the product at the rate of 0.0 (control), 1% ginger powder, 0.6% cardamom powder and 0.4% turmeric powder addition of herbal preservatives in paneer showed the maximum score for the overall acceptability of paneer.

Keywords: Herbal paneer, cardamom, ginger, turmeric, sensory evaluation

Introduction

India contributes about 18-20% of world's total milk production. Out of which buffalo milk contributes 55 percent and cow milk 40.5 percent of total milk production. Hence there is a good potential and availability of milk for the preparation of milk products in India. About 47 percent of milk produce in India is converted into paneer, dhai, khoa etc.

India is world's largest producer of milk, producing 198.4 million tons per annum, per capita availability 407 g per day (Anonymous, 2021) [5]. India's export of dairy products was 39,397.62 metric tonne (MT) worth of Rs. 910.44 cores / 136.06 United States dollars (USD) millions during the year 2016-17 (Anonymous, 2017) [2]. India has progressed from being deficient in milk production at 20 million MT in 1970 to becoming the world's largest milk producer at 160 million MT, accounting for 18.5% of global milk production. India's milk production increased from 165.40 million metric tonnes (MMT) in 2016-17 to 176.35 MMT in 2017-18, a growth rate of 6.62 percent (NDDDB, 2019). To 187.7 MMT in 2018-19 (Anonymous, 2018) [4].

According to the PFA (2010) [7], paneer means product obtained from cow or buffalo milk or combination thereof, by precipitation with sour milk, lactic acid or citric acid. It shall contain not more than 70 percent moisture and the fat content should not less than 50 percent express on dry matter. Bureau of Indian Standards (BIS 1983) imposed maximum of 60 percent moisture and minimum of 50 percent fat on dry matter for paneer. Good quality paneer is characterized by a marble white colour, sweetish, mildly acidic taste, nutty flavour, spongy body and closely knit, smooth texture. The ability of paneer to be deep fried is one feature that has led to its wider acceptance and a favourite for making snacks pakoras or fried paneer chunks (Aneja, 2007) [1].

Spices offer a promising alternative for food safety. Inhibitory activity of spices and derivatives on growth of bacteria, yeasts, fungi and microbial toxins synthesis. Spices have been well known for their medicinal, preservative and antioxidant properties (Souza *et al.* 2005) [10].

Materials and Methods

The following ingredient was used for the research work

Cow milk

Fresh, clean whole Cow milk was procured from Livestock Instructional Farm of

Department of Animal Husbandry and Dairy Science, Dr. PDKV, Akola.

Citric acid

Citric acid was procured from local market of Akola city, used as per requirement.

Ginger, Cardamom and Turmeric

Good quality Ginger, Cardamom and Turmeric was purchased from local market of Akola city.

Methodology

Treatment details

T₁= Control (without spices)

T₂= Acceptable level of ginger powder

T₃= Acceptable level of cardamom powder

T₄= Acceptable level of Turmeric powder

T₅= Acceptable level of Ginger + cardamom

T₆= Acceptable level of Turmeric + Cardamom

T₇= Acceptable level of Turmeric + Ginger

T₈= Acceptable level of Ginger+ cardamom + Turmeric

No. of treatment = 08 No. of Replication = 03

Statistical Design - Data generated from the final experiment was analysed by Analysis of Variance Technique.

Technique for Preparation of Paneer

Paneer was prepared from cow milk with slight modifications using the method given by Singh and Kanawjia (1992) [9] with slight modification for addition of different herbs.

Formation of herbal paneer was done by using cow milk with incorporation of different herbal preservatives. The milk was standardized 4.5% fat. The milk used for

preparation of paneer was subjected to heating 85 °C for 5 minutes. The milk was subsequent cooled to 70 °C. Addition of coagulant-citric acid @1% at 70 °C. The solution was added with continuous agitation until the coagulation was complete. The curd or milk coagulum was allowed to settle for 10 minutes. Whey was drained through muslin cloth by gentle squeezing with hand and spices were added as per the treatment. Proper mixing of preservatives in to coagulum. Lining of muslin cloth in to block and filling of paneer into block. Pressing (pilling and repelling). Removal of herbal paneer from block. Cutting of herbal paneer into required size and chilling is done (4 °C). Removal of herbal paneer cubes from chilling water and allow to drain water and packaging of paneer is done and stored at refrigerated condition (5-7 °C).

Results and Discussion

Effect of herbal preservatives and their combinations on sensory evaluation of herbal paneer

Flavour

It is observed from the above findings that the blending of cow milk with different spices and their combinations in various proportions was produce good quality of paneer to increase up to 0.4% and 0.6% of spices mixing with cow milk. This might be due to acceptable level of spices in treatment T₆ of paneer which produces pleasant flavour.

These results was also in agreement with Roshani Gole (2019) [8] who reported that the mixing of buffalo milk with cumin and black pepper powder in various proportions and combinations produces good quality of paneer and shows highest flavour score (43.25 out of 45) obtained from 0.4% cumin and 0.4% black pepper powder in paneer (T₇).

The result was also in agreement with Omer (2014) [6] observed that flavour score of soft cheese increases with addition of cumin oil.

Table 1: Effect of selected herbal preservatives and their combinations on sensory score of Paneer (Max. score 100)

Treatment	Combinations	Flavour	Body and texture	colour and appearance	Overall acceptability
T ₁	Control	37.50 ^e	29.41 ^{cd}	17.16 ^b	84.08 ^d
T ₂	1% Ginger	37.75 ^c	29.16 ^d	16.91 ^b	85.58 ^{cd}
T ₃	0.6% Cardamom	38.83 ^{bc}	29.75 ^{bcd}	16.91 ^b	87.33 ^b
T ₄	0.4% Turmeric	39.91 ^b	30.25 ^b	17.66 ^b	87.75 ^b
T ₅	1% Ginger + 0.6% Cardamom	38.83 ^{bc}	30.16 ^{bc}	17.41 ^b	86.91 ^{bc}
T ₆	0.4% Turmeric + 0.6% Cardamom	41.91 ^a	33.08 ^a	18.33 ^a	92.66 ^a
T ₇	0.4% Turmeric + 1% Ginger	39.16 ^{bc}	29.68 ^{bcd}	17.25 ^b	82.25 ^e
T ₈	1% Ginger + 0.6% Cardamom + 0.4% Turmeric	38.75 ^{bc}	28.91 ^d	17.08 ^b	80.91 ^e
F-test		Sig	Sig	Sig	Sig
SE (M) ±		0.561	0.259	0.280	0.550
CD at 5%		1.695	0.783	0.845	1.664

Body and texture

It was observed that, body and texture of paneer varies significantly due to addition of spices and their combinations. Significantly highest score (33.08 out of 35) was obtained for paneer prepared with combination of spices at 0.4% turmeric powder and 0.6% cardamom powder. Hence, result indicates that the treatment T₆ was superior over rest of the treatments which had soft body and smooth texture of paneer.

It showed that mixing of cow milk with different spices in combinations (T₆) was found liked very much. The results obtained were in agreement with Anju Boora Khatkar *et al.* (2017) [3] who suggested the score for body and texture for paneer increased with addition of cinnamon spice.

Colour and appearance

The colour and appearance score of paneer was significantly varies due to addition of different level of spices and their combinations. The highest score (18.33 out of 20) was received by the paneer prepared from blending cow milk with combination of 0.4% turmeric powder and 0.6% cardamom powder as compare to other treatments.

Hence, result indicated that the paneer prepared with cow milk by addition of 0.4% turmeric powder and 0.6% cardamom powder is superior over 18.33 (T₆), 17.66 (T₄), 17.41 (T₅), 17.25 (T₇) 17.16 (T₁), 17.08 (T₈), 16.91 (T₂) and 16.91 (T₃) respectively. The highest score of colour and appearance was obtained in T₆ while lowest in T₄ and T₃.

The obtained results were in close agreement with Roshani Gole (2019) [8] observed the significant effect by addition of

different levels of spices with buffalo milk on colour and appearance score of paneer. It shows variation in colour and appearance score according to concentration of spices and their combinations.

Overall acceptability

The overall acceptability of paneer was significantly varies due to addition of spices and their combinations. Significantly highest score (92.66 out of 100) was recorded in paneer prepared by blending 0.4% turmeric powder and 0.6% cardamom powder in combination with cow milk as compare to other treatments.

It was observed that the paneer prepared with different levels of spices had obtained highest score in treatment T₆ (92.66) for the mild pleasant flavour, smooth body and compact texture, good colour and appearance was observed by panel of judges. The treatment T₆ was significantly superior over the T₃, T₄, T₅, T₂, T₁, T₇ and T₈. The treatment T₃ is at par with T₄ treatment. The overall acceptability depends upon the score of flavour, body and texture, colour and appearance all these attributes enhanced in treatment T₆. The above results were in agreement with results showed by Anju Boora Khatkar *et al.* (2017)^[3] obtained that the score for overall acceptability of paneer increased with the addition of cinnamon spice.

Conclusion

The sensory quality of paneer in respect to flavour, colour and appearance, body and texture and overall acceptability for 0.4% turmeric powder and 0.6% cardamom powder in preparation of paneer scored more acceptability than the rest of the inclusion level of spices without any off flavour.

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