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Physico-chemical properties of herbal paneer incorporated with turmeric and black pepper powder

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Abstract
India has progressed from a dairy-deficient country to the world's biggest milk producer. As a result, the dairy business has emerged as one of the most important option available to Indian farmers. Paneer is an indigenous dairy product prepared by the heat and acid coagulation. Herbal paneer was prepared by incorporating the black pepper and turmeric powder as per treatment combination as T_0 (Control), T_1 (0.1% black pepper and 0.1% turmeric powder), T_2 (0.2% black pepper and 0.1% turmeric powder) and T_3 (0.3% black pepper and 0.1% turmeric powder. On an average black pepper and turmeric powder treated paneer of treatments T_0, T_1, T_2 and T_3 contained moisture 51.63, 51.38,51.12 and 50.74%, fat 27.45, 27.36, 27.23 and 27.09%, protein 17.18, 17.41, 17.59 and 17.90%, ash 1.73, 1.79, 1.82 and1.89%, total solids 48.37, 48.65, 48.88 and 49.26%, titratable acidity 0.50, 0.48, 0.46 and 0.45% L.A., pH 5.59, 5.87, 5.96 and 6.17, respectively. Paneer sample was evaluated for textural qualities *viz*., hardness, cohesiveness, adhesiveness, springiness, and chewiness for treatments T_0, T_1, T_2 and T_3. Hardness ranged from 3.290, 3.321, 3.043 and 2.746 kg for treatments T_0, T_1, T_2 and T_3, respectively. Cohesiveness observed for treatments T_0, T_1, T_2 and T_3 were 1.021, 1.019, 1.024 and 1.026, respectively. Adhesiveness ranged from 0.005, 0.0072, 0.002 and 0.0016 kg for treatments T_0, T_1, T_2 and T_3, respectively. Springiness observed for treatments T_0, T_1, T_2 and T_3 were 1.037, 1.013, 1.043 and 1.020, respectively and Chewiness 3.502, 3.419, 3.236 and 2.874 for treatments T_0, T_1, T_2 and T_3, respectively

Keywords: Herbal paneer, Black pepper, turmeric powder, texture etc.

Introduction
Paneer is an indigenous dairy product prepared by the heat and acid coagulation. According to FSSAI, paneer is the product obtained from cow or buffalo milk or combination thereof by precipitation with sour milk, lactic acid or citric acid. It shall not contain more than 70% moisture and milk fat contain shall not be less than 50% on the dry matter basis. Paneer is made up of protein and fat, insoluble salts and colloidal materials, as well as part of the moisture of the original milk, which contains lactose, whey protein, soluble salts, vitamins and other milk components (Kanawjia and sing, 1996) [3].

The good quality paneer made from buffalo milk because it physico-chemical properties as compared to cow milk. Buffalo milk has higher concentration of solid fat, calcium, phosphorus, casein and larger fat globule and casein micelles and also lower voluminosity as compared with cow milk (Sindhu 1996) [7]. The amount of casein and minerals i.e., calcium and phosphorus were impact on firm and rubbery body to buffalo milk paneer. Fat globules and casein micelles of large and maximum concentration of fat, casein, calcium, phosphorus and lower volume in buffalo milk compared to cow milk provide spongy properties to paneer (Ghodekar, 1989) [6].

Paneer has a short life span of about 2-3 days at refrigeration storage without much deterioration in the quality but the freshness of the product is lost after 1 day (Dhankhar, 2014) [15]. Paneer, like indigenous product is a highly perishable in nature and suffers from limited shelf life, largely due to its h moisture content (Arora and Gupta, 1980) [2]. It has been mostly used in traditional medicine as a household medicine for various diseases, including biliary disorders, cough, anorexia, diabetic wounds, hepatic disorders and sinusitis.

Turmeric (*Curcuma longa* L.) is a medicinal plant widely used in *Ayurveda*, *Unani* and *Siddha* medicine as home medicine for various diseases. *Curcumin*, the main yellow bioactive component of turmeric which has a wide spectrum of biological actions. Black pepper is known as the 'king of spices' due to its pungent quality. Black pepper (*Piper nigrum* L.) is a member of family Piperaceae.

This plant and its active component Piperine can stimulate the digestive enzymes of pancreas and intestines and also increases biliary bile acid secretion when orally administrated. Piperine prevents and diminish diarrhea produced by various oil and chemicals (Ahmad *et al*., 2012) [1].

Materials and Methods

The research study was carried out on "Studies on the preparation of herbal paneer with incorporation black pepper and turmeric powder" taken at department of Animal Husbandry and Dairy Science, College of Agriculture, VNMKV, Parbhani.

Materials

The whole fresh buffalo milk was obtained from Dairy unit of college of agriculture, VNMKV, Parbhani. Turmeric powder, black pepper powder, citric acid and muslin cloth purchased from local market.

Methods

The paneer with different combinations was prepared by addition of black pepper and turmeric powder in following treatments.

Treatments

For preparation of paneer by using black pepper and turmeric powder, the treatment combinations was finalized on basis of volume of milk are as follows

T_0 = Buffalo milk + without Black pepper and Turmeric powder.

T_1 = Buffalo milk + 0.1% Black pepper + 0.1% Turmeric powder.

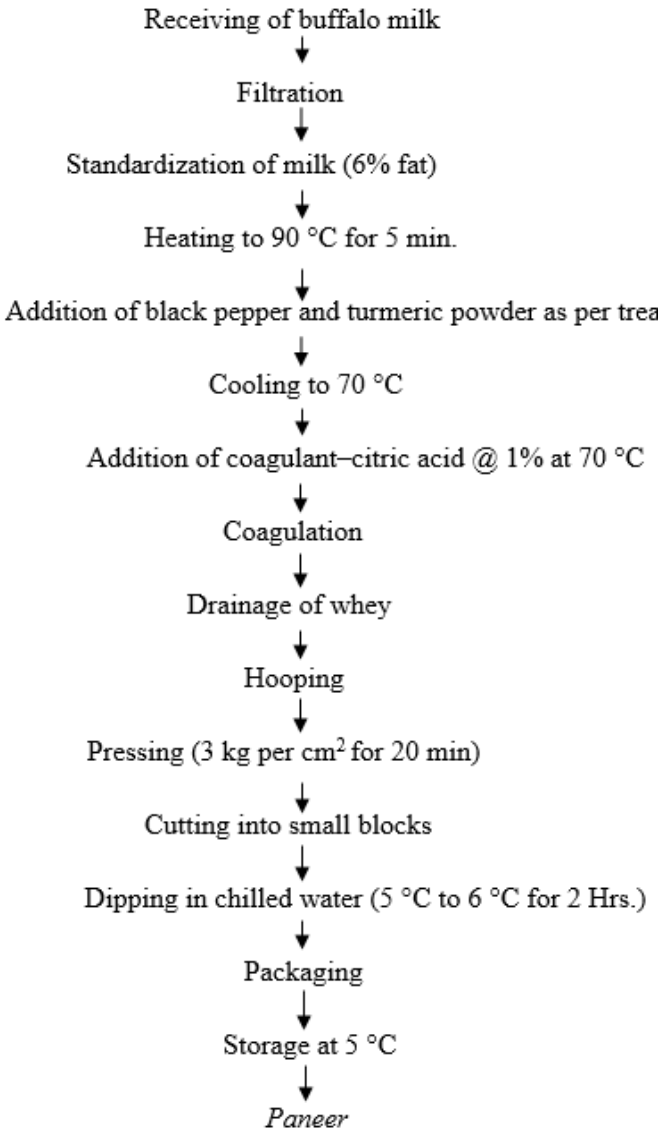
T_2 = Buffalo milk + 0.2% Black pepper + 0.1% Turmeric powder.

T_3 = Buffalo milk + 0.3% Black pepper + 0.1% Turmeric powder.

Procedure for preparation of paneer

Buffalo milk was first filtered through muslin cloth to remove dust and dirt particles. Milk was separated by using centrifugal cream separator for standardization purpose. Buffalo milk having 6% fat was heated at 90 °C for 5 min. Then turmeric and black pepper powder mixed after heating of milk and cooled to 70 °C. It was coagulated with 1% citric acid with slowly continuous stirring until a curd and clear whey separated out. This mixture was allowed to settle down for 10 min.

The whey and coagulant was separated by draining with the help of muslin cloth. The hot coagulant was collected and transferred into a rectangular hoop. The hoop has a rectangular frame with the small holes at bottom. The frame was made from stainless steel plank. Pressing was done by applying the weight of 3.0 kg/cm^2 for 20 minutes for proper textarization of coagulated mass. Cut the coagulated mass into pieces and immersed in chilled water at 5 ºC for 2 to 3 hours, the chilled paneer was then drained out. Finally, the paneer blocks were wrapped in parchment paper and stored in refrigerator.



Results and Discussion

Table 1: Sensory qualities of paneer

Treatments	Sensory parameters			
	Colour and appearance	Flavour	Body and texture	Overall acceptability
T_0	8.45	8.58	8.68	8.55
T_1	8.35	8.78	8.58	8.73
T_2	7.93	7.75	7.53	7.88
T_3	7.00	7.30	6.93	6.98

The colour and appearance score for treatments T_0, T_1, T_2 and T_3 were 8.45, 8.35, 7.93 and 7.00, respectively. The highest score i.e., 8.45 was obtained for treatment T_0. Buch *et al*., (2014) [9]. who studied the sensory attribute of paneer with increasing levels of turmeric and found that addition of turmeric at the rate of 0.6% remain acceptable at 12 days after that sharply decline the colour and appearance score. The flavour score for paneer sample for the treatments T_0, T_1,

T_2 and T_3 were 8.58, 8.78, 7.75 and 7.30, respectively. The highest score was 8.78 obtained for paneer prepared with 0.1% black pepper and 0.1% turmeric powder and lowest i.e. 7.30 was obtained for paneer prepared with 0.3% black pepper and 0.1% of turmeric powder. Mishra *et al*., (2021) [14] reported that addition of black pepper extract at the rate 0, 0.6, 0.7 and 0.8% and initially at the rate of 0 to 0.7%, the flavour scores ware increased and after that sharply decreased. The body and texture score ranges from 6.93 to 8.68 for turmeric and black pepper added paneer. Eresam *et al*., (2015) [12] who found that the body and texture of paneer changes from 8.20 to 7.17 for 0.2 to 1% of black pepper. The maximum score for overall acceptability was found for treatment T_1 i.e., 8.73 (combination 0.1% turmeric powder and 0.1% black pepper powder) meanwhile, minimum score was noted for treatment T_3 i.e.6.98 (combination of 0.1% turmeric powder and 0.3% black pepper powder). Desale, (2012) [13] who studied that effect of cardamom and black pepper on sensory quality of paneer and found that as the level of cardamom and black pepper increased firstly overall acceptability increased and declined gradually as the combination level increased.

Table 2: Physico-chemical analysis

Treatments	Chemical analysis						
	Moisture	Fat	Protein	Ash	Total solids	pH	Acidity
T_0	51.63	27.45	17.18	1.73	48.37	5.59	0.50
T_1	51.38	27.36	17.41	1.79	48.65	5.87	0.48
T_2	51.12	27.23	17.59	1.82	48.88	5.96	0.46
T_3	50.74	27.09	17.90	1.89	49.26	6.17	0.45

Moisture

The moisture content of paneer was found to be 51.63, 51.38, 51.12 and 50.74% for treatments T_0, T_1, T_2 and T_3, respectively. The Moisture content of paneer decreases with addition of different combination of turmeric powder and black pepper increased. It was found that the treatment T_1 was superior over other treatments T_2, and T_3 and where as at par with T_0 (control).

Eresam *et al*., (2015) [12] who prepared paneer using black pepper, cardamom, cinnamon and clove at the rate of (0.6%), (0.6%), (0.4%) and (0.6%), respectively by the expected yield of paneer and found the moisture contained was 50.21, 49.81, 49.71, 49.52 and 49.70, respectively. Himabindu and Arun Kumar (2017) [16] reported that the moisture content of spiced cheese decreased with increase in level of black pepper from 0.5 to 1.5%.

Fat

The average fat content for treatments T_0, T_1, T_2 and T_3 were 27.45, 27.36, 27.23 and 27.09%, respectively. The fat content in control paneer T_0 (27.45) was highest and lowest fat percent was observed in treatment T_3 (27.09). All the treatment significantly differed with each other and T_0 found to be superior over all the treatments.

Singh *et al*., (2018) [17] stated that paneer prepared by using buffalo milk and mint in ratio of 100:0, 98:2, 96:4, 94:6, 92:8, respectively. The fat percent was recorded in 22.69, 22.24, 21.78, 21.33, and 20.87 which were decreasing for treatment T_0, T_1, T_2, T_3 and T_4, respectively. Buch *et al*., (2014) [9] who prepared the paneer by incorporating turmeric powder as a preservative and fat content in paneer decreased from 27.77 to 27.73 with increased level turmeric powder.

Protein

The protein content of the developed paneer increased with increased in the different level of combination of turmeric and black pepper powder. The protein content of developed product ranges from 17.18, 17.41, 17.59 and 17.90% for treatment T_0, T_1, T_2 and T_3, respectively. The highest protein content found in T_3 (17.90) and lowest in T_0 (17.18). All the treatments T_0, T_1, T_2 and T_3 having significantly different with each other.

Buch *et al*., (2014) [9] who reported that evaluation of efficacy of turmeric as a preservative in paneer in which protein content in paneer was increased from 18.41 and 19.15 with increase in level of turmeric i.e., 0.4% and 0.6%, respectively. Khobragade *et al*., (2020a) [4] also stated the physico-chemical composition properties of paneer prepared from blends of raw turmeric extract and milk and protein content in paneer increased from 18.18 to 18.59.

Ash

The ash content of the finished product was increased with the increase in the proportion of the different levels of turmeric and black pepper powder. The average values recorded for ash were1.73, 1.79, 1.82 and 1.89% for treatment T_0, T_1, T_2 and T_3, respectively. All the treatment significantly differed with each other.

Khobragde *et al*., (2020a) [4] who evaluated that the ash content of paneer prepared by blending of raw turmeric extract were increased from 1.52 to 1.63 for treatments T_1 to T_4. Mhatre (2018) [10] also stated that the paneer prepared by blending of ginger juice and found that ash content of paneer increased from 1.68 to 2.41 for treatments T_0 to T_4, respectively. The ash content value given by Prasad *et al*., (2017) [11] for *burfi* prepared with different herbs in which ash content increased from 2.95 to 3.03 for control and 1% turmeric powder added *burfi*.

Total solids

The score for total solids content of paneer prepared from buffalo milk incorporated with black pepper and turmeric powder was ranged in between 48.37 to 49.26%. The highest total solids content was found in T_3 (49.26) percent, meanwhile lowest total solids content was in treatment T_0 i.e. 48.37%. Significant differences were observed in treatments T_2 and T_3 and T_0 and T_1 were at par with each other.

Khobragde *et al*., (2020b) [5] who studied that as the level raw turmeric extract increased, the total solids content of paneer also increased for treatments T_1 to T_4.

Ph

The value of pH content in paneer prepared with different combination of turmeric and black pepper powder increased from treatments T_0, T_1, T_2 and T_3, respectively. The highest value of pH found for T_3 treatment i.e. 6.17% followed by T_2 (5.96), T_1 (5.87) and T_0 (5.59), respectively. Treatment T_3 was significantly differed from all other treatments where as treatment T_1 and T_2 were at par with each other.

Badola *et al*., (2018) [8] who prepared paneer by addition of black pepper and cardamom and the pH observed in paneer sample in the decreasing order from 5.63 (control) and 5.03 (0.25% black pepper and 0.50% cardamom powder). Khobragade *et al*., (2020a) [4] also reported that the increase in level of turmeric extract in paneer, the value pH of paneer

also increased. The value of pH ranges from 5.74 to 5.88 for treatment T_1 and T_4, respectively.

Acidity

The acidity percentage in paneer prepared with different treatment combination of black pepper and turmeric powder were 0.50, 0.48, 0.46 and 0.45% for treatment T_0, T_1, T_2 and T_3, respectively. The acidity percentage was noted in highest in T_0 (0.50) % and lowest value T_3 (0.45) percent. All the treatment significantly differed with each other.

Buch (2014) [9] who studied the evaluation of selected herbs as preservative in paneer, as the level of incorporation of turmeric powder increased, titratable acidity of paneer decreased i.e. 0.55 and 0.50 for 0.4 and 0.6%, respectively.

Conclusion

Herbal paneer can be successfully prepared by using incorporation of black pepper and turmeric powder. Paneer prepared from combination of 0.1% black pepper and 0.1% turmeric powder get highest score for over all acceptability attribute.

It was found that as the level of different combination of turmeric and black pepper increased, there was increased in total solid, ash, pH, protein while decreased in moisture, fat, acidity content of herbal paneer.

Reference

1. Ahmad N, Fazal H, Abbasi BH, Farooq S, Ali M, Khan MA. Biological role of *Piper nigrum* L.(Black pepper): A review. Asian Pacific Journal of Tropical Biomedicine. 2012;2(3):S1945-S1953.
2. Arora VK, Gupta SK. Effect of low-temperature storage on paneer. Indian Journal of Dairy Science. 1980;3(33):374-380.
3. Kanawjia SK, Singh S. Sensory and textural changes in paneer during storage. Buffalo Journal. 1996;12(3):329-334.
4. Khobragade SP, Padghan PV, Shinde AT. Studies on process standardization and sensory properties of buffalo milk paneer blended with raw turmeric extract (*Curcuma longa* L.). The Pharma Innovation Journal. 2020a;9(11): 34-40.
5. Khobragade, SP, Padghan, PV, Deshmukh AP. Effect of raw turmeric extract on shelf life of paneer prepared from blends of raw turmeric extract and buffalo milk. Journal of Pharmacognosy and Phytochemistry. 2020b;10(1):146-148.
6. Ghodekar DR. Factors affecting quality of paneer-A review. Indian Dairyman. 1989;41(3):161-168.
7. Sindhu JS. Suitability of buffalo milk for products manufacturing. Indian Dairyman. 1996;48(4):41-48.
8. Badola, R, Danish M, Kumar S, Fahad M, Kanade PP, Upadhayay S, Rautela,. Effect of Incorporation of black pepper and cardamom on quality characteristics of paneer. International Journal of Applied Science and Engineering. 2018;6(2):121-127.
9. Buch S, Pinto S, Aparnathi KD. Evaluation of efficacy of turmeric as a preservative in paneer. Journal of Food Science and Technology. 2014;51(11):3226-3234.
10. Mhatre MP. Studies on manufacture of paneer by incorporation of ginger (*Zingiber officinale* L.) Juice. (Doctoral dissertation), Dr. Balasaheb Sawant Kokan Krishi Vidyapith, Dapoli. c2018.
11. Prasad W, Khamrui K, Mandal S, Badola R. Anti-oxidative, physico-chemical and sensory attributes of burfi affected by incorporation of different herbs and its comparison with synthetic anti-oxidant (BHA). Journal of food science and technology. 2017;54(12):3802-3809.
12. Eresam EKK, Pinto S, Aparnathi KD. Concise and informative title: evaluation of selected spices in extending shelf life of paneer. Journal of Food Science and Technology. 2015;52(4):2043-2052.
13. Desale RJ. Efficacy of herbal preservatives to enhance shelf life of paneer (Doctoral dissertation). Mahatma Phule Krishi Vidyapeeth, Rahuri; c2012.
14. Mishra D, Rao J, Anand S. Effect of black pepper extract on sensory attributes and shelf life of paneer. The Pharma Innovation Journal. 2021;10(4):732-736.
15. Kundu RS, Dhankhar S, Punia R, Nanda K, Kishore N. Bismuth modified physical, structural and optical properties of mid-IR transparent zinc boro-tellurite glasses. Journal of Alloys and Compounds. 2014 Feb 25;587:66-73.
16. Kumar M, Kumar A. Performance assessment and degradation analysis of solar photovoltaic technologies: A review. Renewable and Sustainable Energy Reviews. 2017 Oct 1;78:554-87.
17. Singh SK. Sustainable people, process and organization management in emerging markets. Benchmarking: An International Journal; c2018.