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Microbiological quality of herbal sandesh prepared by ashwagandha (*Withania somnifera*) and tulsi (*Ocimum sanctum*) at ambient temperature

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Abstract

In the present study Herbal Sandesh, a chhana-based (heat-acid coagulated product) popular sweet delicacy of the eastern part of India, especially in West Bengal, is prepared by incorporating medicinal herbs that showed microbiological properties. Ashwagandha (*Withania somnifera*) and Tulsi (*Ocimum sanctum*) are popular medicinal plant that helps to improve microbial quality of dairy products. The present study was carried out to find out the microbiological analysis such as Standard Plate count, Coliform count, Yeast and mould with herbal extract inclusion in the Sandesh. The addition of herbs @1%, 2%, 3%, 4%, 5% and 6% decreased the SPC and Yeast and Mould, where as in the present investigation coliform count were found to be absent in all the samples (0, 5, 10 and 15 days). This indicates that proper hygienic precautions had been taken during the production and packaging of Herbal Sandesh. The result found that best result in SPC and Yeast and mould count at 0,5,10 day15 of herbal Sandesh by inclusion of Ashwagandha @ 3% and Tulsi @ 3 % herbs extract respectively in selected Sandesh compared to @ 0% used of herb in Sandesh.

Keywords: Herbal sandesh, Indian medicinal herbs, microbial analysis, ashwagandha and tulsi

Introduction

Sandesh, a chhana based milk sweetmeat, is the oldest and most popular sweet in our country because of its high palatability. It is also a delicious, wholesome, nutritious food and very famous item in Bangladesh. It is also popular in West Bengal and some parts of Assam, Myanmar, Orissa and Tripura and other parts of India. The demand for sandesh is steadily growing. It is very vital to health because of its fairly high protein and fat content, minerals, specially calcium and phosphorus and also fat soluble vitamins particularly vitamin A and D content. Protein efficiency ratio, biological value and digestibility coefficients of Sandesh are higher than skim milk (Rajani and Sharda, 1983) [13]. Modern medicine or allopathy is very costly and poor people cannot afford it. Now-a-days Ayurveda has become popular not only in India but also in many developing and developed countries due to the fact that there is no side effect (Panneerselvan *et al.*, 2003) [9]. The advantages of certain ayurvedic herbs are well documented in literature. Low cost nutritive biscuits made of ayurvedic components Shatavari, Ashawagandha and Yastimadhu powder was developed (Mehta, 2013) [8].

Withania somnifera (Ashwagandha) is a plant used in medicine from the time of Ayurveda, the ancient system of Indian medicine. Ashwagandha root texture determined by the starch and fiber content plays a significant role in the market price of the roots benefiting farming community. Brittle roots having high starch and low fiber are highly priced because of their ease in making powder and are quoted to be characteristic root textural features of commercial Ashwagandha. It has been used as an antibacterial, antioxidant, adaptogen, aphrodisiac, liver tonic, anti-inflammatory agent (Mehrotra *et al.*, 2011) [7]. The plant contains tropane alkaloids such as tropine, hygrine, anferine and a number of steroidal lactones known as Withanolides. Recently *W. somnifera* L. was also used to inhibit the development of tolerance and dependence on chronic use of various phototropic drugs (Gupta and Rana, 2007) [4]. However, the last few years have seen a major increase in their use in the developed world. Several screening studies have been carried out in different parts of the world. There are several reports on the antimicrobial activity of different herbal extracts in different regions of the world (Singh and Paney 1998; Kuttan, 1996) [14, 6].

Ocimum sanctum, known as Tulsi in Hindi and holy basil in English, is an erect softy hairy aromatic herb or undershrub found throughout India. Tulsi is commonly cultivated in gardens.

Two type of *Ocimum sanctum* are met within cultivation i.e. Tulsi plant with green leaves known as Sri Tulsi & Tulsi plant with purple leaves known as Krishna Tulsi. *Ocimum sanctum* is held sacred by Hindus and is used as medicinal plants in day to day practice in Indian homes for various ailments. It shows a number of medicinal activities. it used in anticancer, antifertility, antidiabetic and various other disease (Prakash *et al.*, 2011). The addition of tulsi paste at 0.2 per cent, 0.3 per cent and 0.4 per cent level improved the taste and flavour, colour and appearance, body and texture and also overall acceptability of herbal yoghurt. There was less number of yeast and mould and no number of coliform counts because of proper maintenance of sanitary condition. It is also due to the anti-microbial and anti-bacterial properties of herbal paste (Tulsi) added in low fat herbal yoghurt. Kumari *et al.*, (2011) [5]. The herbal products are gradually gaining popularity in the world market due to presence of natural antioxidants and functioning active ingredients. They used *Tulsi* for the preparation of various traditional herbal sweets like sandesh chamcham, etc. (Bandopadhyay, 2006) [1]. Aqueous extract of leaves of *Ocimum kilimandscharicum* contains camphor, 1,8-cineole, limonene, trans caryophyllene, camphene, 4-terpeneol, myrtenol, α -terpineol, endo-borneol, linalool (Eliningaya *et al.*, 2011). Leaves also contain flavonoids, tannins, saponins, sterols, carbohydrates, proteins and triterpenoids (Paschapur *et al.*, 2009) [10]. *Ocimum kilimandscharicum* is active against *aspergillus fumigates*, *aspergillus niger*, *candida albicans*, *Cryptococcus neoformans*, *microsporium cassis*, *sporotrichum schenkii* (Prasad *et al.*, 1986) [12].

Material and Methods

The present study has been carried out in the research Lab, Warner School of Food and Dairy Technology, Sam Higginbottom University of Agriculture, Technology and Sciences, Allahabad, U.P. (India). All the raw materials were collected from the local market of Allahabad. Potable water

was used for preparing the product. It was ensured that the materials used were free from any kind of infection.

Herbs: Ashwagandha root powder and Tulsi leaves dried form were purchased from Allahabad city.

Preparation of herbal water extract: Herbal water extract was prepared by soaking each herb in distilled water (1:10) overnight followed by centrifugation (2000 rpm; 15 min at 40 °C). The supernatant was harvested and refrigerated and used in the preparation of Herbal Sandesh.

Preparation of chhana: The method adopted to prepare chhana in this study was according to the method given by Bhattacharya *et al.*, (1971) [2] with slight modification. The standardized buffalo milk was heated up to 75 °C. The freshly prepared coagulant solution was heated to 75 °C and then added slowly in a thin continuous stream with continuous gentle agitation till a clear whey separated out. Stirring was then stopped and the curd was allowed to remain in whey for about 5 minutes. It was then drained through a hang with muslin cloth (10 min) and stored for future use.

Preparation of herbal Sandesh: Fresh chhana and herbs (table 1) was kneaded thoroughly to make an uniform dough. Fine powdered cane sugar (300 g) was added to the dough' and was kneaded again. The dough was then heated (75 °C) in an iron pan with continuous stirring. Heating was continued until the mixture acquired desired consistency with slightly cooked flavour. During the final stages of heating, the mixture developed slight cooked flavour and the sticking tendency to the pan disappeared. The cooking was completed in 15-20 min. The products were then transferred to a shallow pan, cooled and sliced into desired shapes. Thus, final product obtained and packed in plastic box for storage at room temperature (25± 5 °C).

Table 1: Ingredients Used in the Preparation of Herbal Sandesh for 1 Kg.

S. No.	Treatment	Chhana		Ashwagandha Root Extract		Tulsi Leave Extract		Total (gm)
		%	(gm)	%	(gm)	%	(gm)	
1	A ₀ B ₀	100	1000	0	0	0	0	1000
2	A ₀ B ₁	99	990	0	0	1	10	1000
3	A ₀ B ₂	98	980	0	0	2	20	1000
4	A ₀ B ₃	97	970	0	0	3	30	1000
5	A ₁ B ₀	99	990	1	10	0	0	1000
6	A ₁ B ₁	98	980	1	10	1	10	1000
7	A ₁ B ₂	97	970	1	10	2	20	1000
8	A ₁ B ₃	96	960	1	10	3	30	1000
9	A ₂ B ₀	98	980	2	20	0	0	1000
10	A ₂ B ₁	97	970	2	20	1	10	1000
11	A ₂ B ₂	96	960	2	20	2	20	1000
12	A ₂ B ₃	95	950	2	20	3	30	1000
13	A ₃ B ₀	97	970	3	30	0	0	1000
14	A ₃ B ₁	96	960	3	30	1	10	1000
15	A ₃ B ₂	95	950	3	30	2	20	1000
16	A ₃ B ₃	94	940	3	30	3	30	1000

NOTE: Sugar use For all Treatment: 300 gm (30.0% of total wt.)

Results and Discussion

Microbial Analysis of Herbal Sandesh

The studies were conducted on the assessment of microbial

analysis of the Herbal Sandesh. The findings are tabulated in Table-2

Table 2: Microbial attributes of herbal Sandesh (Mean Value)

Treatments	SPC ($\times 10^4$ CFU/gm)				Yeast and mould (per gm)				Coliform count (per gm)			
	0 days	5 days	10 days	15 days	0 days	5 days	10 days	15 days	0 days	5 days	10 days	15 days
A ₀ B ₀	7.40	51.60	101.80	147.8	0.00	5.40	18.40	29.0	0.00	0.00	0.00	0.00
A ₀ B ₁	4.40	38.40	46.20	59.60	0.00	3.20	7.80	16.80	0.00	0.00	0.00	0.00
A ₀ B ₂	4.00	27.80	42.40	58.80	0.00	1.80	6.80	14.60	0.00	0.00	0.00	0.00
A ₀ B ₃	3.40	24.20	38.60	57.20	0.00	0.60	4.60	9.20	0.00	0.00	0.00	0.00
A ₁ B ₀	4.80	32.20	48.20	61.80	0.00	2.40	7.20	14.20	0.00	0.00	0.00	0.00
A ₁ B ₁	4.40	30.20	44.60	59.20	0.00	1.00	6.20	12.60	0.00	0.00	0.00	0.00
A ₁ B ₂	3.60	24.80	34.60	58.00	0.00	0.40	5.60	11.40	0.00	0.00	0.00	0.00
A ₁ B ₃	3.20	22.60	31.20	56.00	0.00	0.00	3.80	8.00	0.00	0.00	0.00	0.00
A ₂ B ₀	4.40	24.80	45.40	60.60	0.00	1.00	4.80	11.80	0.00	0.00	0.00	0.00
A ₂ B ₁	3.80	23.40	38.20	58.40	0.00	0.20	4.20	9.60	0.00	0.00	0.00	0.00
A ₂ B ₂	3.00	16.60	32.80	57.20	0.00	0.00	3.40	7.00	0.00	0.00	0.00	0.00
A ₂ B ₃	2.60	8.60	35.20	55.20	0.00	0.00	3.20	5.40	0.00	0.00	0.00	0.00
A ₃ B ₀	3.80	17.00	40.60	58.80	0.00	0.40	3.20	7.20	0.00	0.00	0.00	0.00
A ₃ B ₁	3.60	15.80	36.20	58.00	0.00	0.00	2.60	6.0	0.00	0.00	0.00	0.00
A ₃ B ₂	2.80	7.40	33.60	55.40	0.00	0.00	2.20	5.00	0.00	0.00	0.00	0.00
A ₃ B ₃	1.80	5.00	30.40	54.80	0.00	0.00	1.60	4.60	0.00	0.00	0.00	0.00

SPC in Herbal Sandesh at zero day

The highest mean in SPC ($\times 10^4$ CFU/gm) at zero day of Herbal Sandesh was obtained in treatment A₀ B₀ (5.2) while A₃B₃ recorded the minimum (1.8).

SPC in Herbal Sandesh at five days

The highest mean in SPC ($\times 10^4$ CFU/gm) at 5th days of Herbal Sandesh was obtained in treatment A₀ B₀ (51.6) while A₃B₃ recorded the minimum (5.0).

SPC in Herbal Sandesh at ten days

The highest mean in SPC ($\times 10^4$ CFU/gm) at 10th days of Herbal Sandesh was obtained in treatment A₀ B₀ (94.2) while A₃B₃ recorded the minimum (32.8).

SPC in Herbal Sandesh at fifteen days

The highest mean in SPC ($\times 10^4$ CFU/gm) at zero day of Herbal Sandesh was obtained in treatment A₀ B₀ (147.8) while A₃B₃ recorded the minimum (54.8).

Yeast and Mold count in Herbal Sandesh at zero day

Mean in values of yeast and mould count (per gm) of Herbal Sandesh at zero day was nil.

Yeast and Mold count in Herbal Sandesh at five days

The highest mean in Yeast and mold (per gm) count at 5th days of Herbal Sandesh was obtained in treatment A₀ B₀ (5.4) while A₁B₃, A₂B₂, A₂B₃, A₃B₁, A₃B₂ and A₃B₃ recorded the minimum (0.0).

Yeast and Mold count in Herbal Sandesh at ten days

The highest mean in Yeast and mold (per gm) count at 10th days of Herbal Sandesh was obtained in treatment A₀ B₀ (18.4) while A₃B₃ recorded the minimum (1.6).

Yeast and Mold count in Herbal Sandesh at fifteen days

The highest mean in Yeast and mold (per gm) count at 15th days of Herbal Sandesh was obtained in treatment A₀ B₀ (29.0) while A₃B₃ recorded the minimum (4.6).

Coliform count in Herbal Sandesh

In the present investigation coliform count were found to be absent in all the samples (0, 5, 10 and 15 day). This indicates that proper hygienic precautions had been taken during the production and packaging of Herbal Sandesh.

Conclusion

Quality of sandesh from buffalo milk could be improved through incorporation of medicinal Herbs such as Ashwaghandha and Tulsi into milk prior to manufacture. Microbial properties were analyzed in terms of SPC, yeast and mold and coliform. The results of the present study revealed that the inclusion of herbs in the Herbal Sandesh @1%, 2%, 3%, 4%, 5% and 6% level of Ashwaghandha, Tulsi and combination of herbs. The best sample incorporated with the Ashwaghandha @ 6% Herbs produced better results in Microbial properties of buffalo milk sandesh compared to control. The evidence from this study suggests that Herbs additives in Herbal Sandesh increased the acceptability of Sandesh.

References

- Bandopadhyay RS. A study on formulation and process techniques of Indian traditions sweets and Herbal Sweets⁷ Medical Jour. of Australia. 2006; 185:4-21.
- Bhattacharya DC, Mathur PM, Srinivasan MR, Samlik O. Studies on the method of production and self-life of paneer. J of Food Sci. Technol. 1971; 7:117-119.
- Eliningaya J Kweka, Hassan M Nkya, Lucile Lyaruu, Epiphania E Kimaro, Beda J Mwang'onde, Aneth M. Mahande. Efficacy of Ocimum kilimandscharicum plant extracts after four years of storage against Anopheles gambiaess. Journal of Cell and Animal Biology. 2009; 3:171-174
- Gupta GL, Rana AC. *Withania Somnifera* a commonly use in Ayurvedic Medicine plant. Phycog Mag, 2007; 2(1):129.
- Kumari K, Verma A, Neerubala. Preparation of low fat tulsi flavoured yoghurt, Food Sci. Res. J. 2011; 2(2):188-190.
- Kuttan G. Use of *Withania somnifera* dunal as an adjuvant during radiation therapy. Ind. J Exp. Bio. 1996; 34(9):854-856.
- Mehrotra V, Mehrotra S, Kirar V, Shyam R, Misra K, Srivastava AK *et al.* Antioxidant and antimicrobial activities of aqueous extract of *Withania somnifera* against methicillin-resistant Staphylococcus aureus. J Microbiol Biotech Res. 2011; 1(1):40-45.
- Mehta, Meena. Development of low cost nutritive biscuits with Ayurvedic formulation. International Journal of Ayurvedic and Herbal Medicine. 2013;

- 3(3):1183-11903.
9. Panneerselvan K, Jayapragasam M, Mani DK, Bhavanisankar K. Indigenous knowledge of *Withania obtusifolia* in Trichy region. World Ayurveda summit in Bangalore, 2003.
 10. Paschapur Mahesh S, Patil MB, Ravi Kumar, Sachin R Patil. Evaluation of aqueous extract of leaves of *Ocimum kilimandscharicum* on wound healing activity in albino wistar rats International journal of pharmtech research coden (USA). 2009; 1:544-550
 11. Prakash P, Neelu gupta. Therapeutic uses of *Ocimum sanctum* with a note on eugenol and its pharmacological uses. Indian j Physiol pharmacol, prakash *et al.* 2005; 49(2):125-131.
 12. Prasad G, Kumar A, Singh AK, Bhattacharya AK, Singh K, Sharma VD. Antimicrobial activity of essential oils of some *Ocimum* species and clove oil. Fitoterapia, 1986, 429-32
 13. Raja SG, Sharada D. Protein quality of sweet meats prepared with sweet curdled milk. Indian J of Dairy Sci. 1983; 36(3):239-243.
 14. Singh VP, Paney RP. Ethnobotany of Rajasthan, In India. Scientific Publishers, Jodhpur, India, 1998, 212.