

Studies on Chemical Properties and Nutritive value of Dairy Dessert (Sandesh) Incorporated with Ashwagandha (*Withania somnifera*) and Tulsi (*Ocimum sanctum*)

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ABSTRACT

This study was aimed to optimize the chemical properties and nutritive value of Herbal Sandesh by incorporating Ashwagandha and Tulsi extract. Ashwagandha and Tulsi are popular herbs which have been used to improve the chemical quality of dairy products. Sandesh was prepared under standard procedure and the above mentioned herbs were incorporated in the herbal Sandesh @ 1%, 2%, and 3% and combination of Ashwagandha and Tulsi 2%, 3%, 4%, 5% and 6% in the form of extract in treatments. The products were tested to find the total solids, moisture, fat, protein, ash, carbohydrate and Nutritive value. The sample (A₁B₀) incorporated with Ashwagandha extract @ 1% showed promising results in the chemical properties (Total Solid-72.26%, Fat-18.58%, Protein-17.51%, Ash-1.72%, Carbohydrate-34.45%) and good Nutritive value (energy value)-375.1 Kcal was considered as best sample Sandesh among other samples.

Keywords: Chemical properties, Sandesh, Ashwagandha, Tulsi, Nutritive Value.

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 (Sen and Rajorhia, 1985). In India three types of sandesh are available in the market, which are (a) soft grade Sandesh (Narampak) (b) hard grade Sandesh (Karapak) and (c) kachhagolla. Soft grade Sandesh (Narampak) contains 26.51% moisture. Hard grade Sandesh (Karapak) contains 13.67% moisture. Kachhagolla contain 35.0% moisture. Soft grade Sandesh is the most popular and hard grade is the least popular. This popular sweetmeat is liked by most of the people of this sub-continent due to their good flavor and high food value. It can easily be digested and people of all ages like it. Sandesh contains 255.3 g/kg water, 229.30 g/kg fat, 170.30 g/kg protein, 25.3 g/kg lactose, 16.60 g/kg ash and 296.80 g/kg sucrose (Jailkhani and Sukumar, 1980). 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).

Withania somnifera (Ashwagandha) is a plant used in medicine from the time of Ayurveda, the ancient system of Indian medicine. The dried roots of the plant are used in the treatment of nervous and sexual disorders. From chemistry point of view, the drug contains group of biologically active constituents known as withanolides. The biologically active chemical constituents of *Withania somnifera* (WS) include alkaloids (isopelletierine, anaferrine, cuseohygrine, anahygrine, etc.), steroidal lactones (withanolides, withaferins) and saponins (Mishra, et al., 2000). Today there is much interest in natural products with anticancer activity. Withanolides are of under research potential as far treatment of cancer is concerned. The research paper reviews the

scope of studies published in favor of anticancer potential of withaferin-A (Singh et al., 2010).

Tulsi or Holy Basil is an Indian medicinal plant. Because of its beneficial factors, Tulsi is being used across the globe for health ailment, as antioxidants, etc. Its chemical constituents include Eugenol (main pharmacological ingredient), Carvacrol, Cineole, Limatrol, Sterols, Vitamin A, C, Iron (Fe), Zinc (Zn). Ingestion of 1 g of dried Tulsi leaves daily provides approximately 8.5 mg vitamin C, which is superior to synthetic vitamin C in terms of bioavailability within the body.

The leaf extract in addition can protect mice from drug induced catalepsy (Pemminati et al., 2007). Most importantly Tulsi possesses both anticancer and antioxidant properties (Mathew et al., 2010; Islam et al., 2011). These well established nutritional and pharmacological properties of the whole herb in its natural form result from synergistic interactions of many different active phytochemicals (Bharavi et al., 2010).

MATERIALS AND METHODS

The present study has been carried out in the research Lab, Warner School of Food and Dairy Technology, Sam Higginbottom Institute 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) 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

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they 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 a 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, final products optioned and the packed in plastic box at storage room temperature (25± 5 °C).

Table No. 1: Treatment combination (formulation of Sandesh samples)

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

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

Ashwagandha extract		Tulsi extract	
A ₀ = 0.0%		B ₀ = 0.0%	
A ₁ = 1.0%		B ₁ = 1.0%	
A ₂ = 2.0%		B ₂ = 2.0%	
A ₃ = 3.0%		B ₃ = 3.0%	

Chemical Analysis:

Total Solids: Total solids in Herbal Sandesh were determined gravimetrically as per the procedure laid down in dairy chemistry manual, ICAR publication and in IS:1479, Part: II, 1961 (20).

Moisture: The moisture percentage in Herbal Sandesh was determined as per procedure laid down in IS.1165 (1957).

Fat Percentage: The fat percent in Herbal Sandesh was determined as per I.S.2802 (1964).

Protein percent: The protein content of Herbal Sandesh was determined by Kjeldahl method described in AOAC (1980).

Ash percent: Ash content in Herbal Sandesh was determined according to the method described in AOAC (1980).

Carbohydrate percent: The total carbohydrate content of Herbal Sandesh was determined by difference method.

Acidity: Titratable acidity of Herbal Sandesh samples (expressed as lactic acid) was determined as per the procedure laid down in IS: 1479, Part: I.

Energy value of the product: Energy value of the product was estimated on the basis of nutritional composition of the product.

Statistical Analysis:

The data obtained were statistically analyzed for its validity by using factorial design and critical difference (C.D) technique (Imran and coover, 1983).

RESULTS AND DISCUSSIONS

Chemical properties such as total solids, moisture, fat, protein, ash, carbohydrate, and nutritive value (energy value) for the studied herbs based Herbal Sandesh prepared by different concentration of Ashwagandha and Tulsi extract @ 1%, 2%, and 3% respectively are included in Table-1. All properties were affected significantly by the formulation (P<0.05).

Table 2: Table for Chemical Properties of Herbal Sandesh. The addition of herbs decreases the Total solids of Herbal Sandesh and therefore increases in the moisture content of Herbal Sandesh. Fat content of the Herbal Sandesh lowest ranged from 17.72 % (A₃B₃) and highest ranged from 18.6% (A₀B₁). There were significant differences in the fat content of the Herbal Sandesh contained herbs. The addition of herbs caused a decrease in carbohydrate content of Herbal Sandesh. According to the results of this research there were significant differences in the protein and ash content (P<0.05) of different experimental Herbal Sandesh. Herbal Sandesh containing 1% Ashwagandha had significantly higher protein content (17.51%) and ash content of Herbal Sandesh was recorded as the higher 1.72% (A₁B₀), as shown Table-2.

The addition of Herbs increased the acidity of Herbal Sandesh and acidity was increased with the increase in the level of Herbs added. The lowest acidity for the sample was 0.25% (A₀B₀) and the maximum was 0.32% (A₃B₃). The increase in acidity of Herbal Sandesh might be due to the acidity of Ashwagandha and Tulsi extract.

Table No. 2: Average of Data obtained for Chemical Analysis of Herbal Sandesh

S.No.	Treatment combination	Total Solid (%)	Moisture (%)	Fat (%)	Protein (%)	Ash (%)	Carbohydrate (%)	Acidity (%)	Energy Value (Kcal)
		1	2	3	4	5	6	7	9
1	A ₀ B ₀	72.38	27.62	18.76	17.66	1.88	34.08	0.25	375.8
2	A ₀ B ₁	72.02	27.98	18.6	17.5	1.71	34.2	0.26	374.3
3	A ₀ B ₂	70.54	29.46	18.41	17.31	1.69	33.14	0.28	367.5
4	A ₀ B ₃	69.27	30.73	18.21	17.17	1.67	32.22	0.3	361.4
5	A ₁ B ₀	72.26	27.74	18.58	17.51	1.72	34.45	0.26	375.1

6	A ₁ B ₁	70.89	29.11	18.4	17.31	1.69	33.49	0.27	368.8
7	A ₁ B ₂	69.39	30.61	18.2	17.18	1.67	32.34	0.3	361.9
8	A ₁ B ₃	68.06	31.94	18.1	17.01	1.65	31.3	0.31	356.1
9	A ₂ B ₀	70.94	29.06	18.39	17.31	1.69	33.55	0.27	368.9
10	A ₂ B ₁	69.49	30.51	18.22	17.18	1.68	32.41	0.29	362.4
11	A ₂ B ₂	68.14	31.86	18.09	17.15	1.65	31.25	0.3	356.4
12	A ₂ B ₃	67.43	32.57	17.91	16.86	1.63	31.02	0.31	352.7
13	A ₃ B ₀	69.51	30.49	18.2	17.18	1.68	32.45	0.29	362.4
14	A ₃ B ₁	68.4	31.6	18.08	17.16	1.66	31.51	0.3	357.4
15	A ₃ B ₂	67.68	32.32	17.86	16.89	1.64	31.28	0.31	353.5
16	A ₃ B ₃	66.81	33.19	17.72	16.66	1.62	30.82	0.32	349.4

As shown in Table-2, the acidity of the Tulsi was higher than the Ashwagandha, therefore when Tulsi extract were added to the Sandesh the acidity of Herbal Sandesh significantly increased compared to other experimental Herbal Sandesh. Moisture content of Herbal Sandesh was recorded as the highest 33.19% (A₃B₃). Nutritive value (energy value) of Herbal Sandesh was recorded as the highest 375.1 Kcal.

CONCLUSION

The work provided a better understanding of desired chemical properties and nutritive value imparted by the herbs to the Herbal Sandesh. The Herbal Sandesh prepared by standard procedure incorporated with Ashwagandha and Tulsi extract. Chemical properties were analyzed in terms of total solids, moisture, fat, protein, carbohydrate, ash and acidity %. 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 Ashwagandha, Tulsi and combination of herbs. The best sample incorporated with the Ashwagandha @ 1% Herbs showed exceptional results as compared to other samples. The evidence from this study suggests that Herbs additives in Herbal Sandesh increased the acceptability of Sandesh.

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