www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; SP-11(10): 117-121

www.thepharmajournal.com
Received: 26-08-2022
Accepted: 29-09-2022

Maske Sachin V
Ph.D. Scholar, Food Science and Technology, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, Uttar Pradesh, India

Dr. John David
Professor and Dean, Warner College of Dairy Technology, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, Uttar Pradesh, India

Souvik Tewari
Assistant Professor, Department of Food and Nutrition, Assistant Professor, Swami Vivekananda University, Barrackpore, West Bengal, India

Corresponding Author:
Maske Sachin V
Ph.D. Scholar, Food Science and Technology, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, Uttar Pradesh, India

Studies on development and cost evaluation of shrikhandwadi prepared from goat milk chakka, Banana pulp, papaya pulp with ashwagandha powder

Maske Sachin V, Dr. John David and Souvik Tewari

Abstract
On the present study, Shrikhandwadi was prepared by using the goat milk chakka, sugar, papaya pulp, banana pulp and ashwagandha powder. Prepared Shrikhandwadi used 125% sugar and 2% ashwagandha powder by weight of chakka for all treatments as well as the goat milk chakka (60-100%), papaya pulp (5-20%) banana pulp (5-20%) used as different proportion in various treatments.
The main objective of this study was to develop Shrikhandwadi and analysis it's physico- chemical properties, as well as estimate the total cost of production of the final developed product per Kg. After the determination of physico-chemical analysis it showed that the protein content, fat content, moisture content, acidity and total energy were decreased as well as carbohydrate content, ash content and total solids were increased.
The total cost estimated for the preparation of final Shrikhandwadi, cost estimation 20% overall expenses were added and final got the cost of Shrikhandwadi per kg was calculated. For the number of treatments raw material in various quantity as per there treatments combinations were used. The total cost estimation of the final Shrikhandwadi of control sample was 203.3 Rs per Kg. The highest cost of final product was treatment no. S_i 214.5 Rs per Kg. as well as the lowest cost of final product Shrikhandwadi was treatment no. S_{xvi} 182.57 Rs per kg. The cost of final product Shrikhandwadi for overall acceptability highest score sample in treatment no. S_{xii} was 186.57 Rs per Kg.

Keywords: Shrikhandwadi, goat milk chakka, papaya pulp, banana pulp and ashwagandha powder, cost estimation

Introduction
Protein, fat, and energy are all well-known benefits of milk consumption. In terms of daily energy consumption, it provides 134 kcal/capita. Goat milk, in addition to cow milk, has recently begun to acquire popularity around the globe. (Tan *et al.,* 2020) [13]. There were 148.88 million goats in India in 2019, an increase of 10.1% from the previous census. (20th Livestock Census, 2020). Goat is among the earliest animals and have been used for a variety of purpose in that milk, meat, hair, and skin. One-fifth of the world's milk is produced by goats. The strong medical values of goat milk have caused its worldwide market worth to soar. Superior to cow milk, and closer to human milk in composition, goat milk (Pal *et al.,* 2017) [10]. Previously considered the "poor man's cow," the goat—and goat milk products—began gaining attention in the United States in the 1960s because of health and nutritive values attributed to goat milk and milk products. Goat milk has long been touted as a nutraceutical because of its simple digestion and lesser allergic qualities compared to cow milk, however many early results were anecdotal (Clark *et al.,* 2017) [4].
When it comes to the nutritional value per 100ml of goat milk it was content energy in Kcal was 69 Kcal, Moisture content was 86.51 gm, protein 3.56 gm, lipid 4.14 gm, Carbohydrates 4.45 gm, ash content was 0.82 gm. Goat milk also content abundant of minerals like calcium was 134 mg, magnesium was 14 mg, phosphorus 111 mg, potassium 204 mg, sodium content was 50 mg per 100 ml of milk (Bhattarai, 2012) [3].
Milk and milk products are essential nutrient as well as functional food source to the humans. It is believed that many people consume dairy products from goats. There is a wide selection of milk products to choose from such as yogurt, ice cream, condensed milk, butter oil, whipped cream, Paneer, Channa, Srikhand, and so on. Are manufactured from the milk of dairy animals including goat (Pal *et al.,* 2017) [10].
Shrikhandwadi is a solid confection obtained by blending of chakka with sugar and desiccating the content to a semi hard mass, which can cut into sizeable.

Addition of increased Sugar content in the blend not only serves as a sweetening agent but also increase the shelf life by retarding the development of oxidized flavour under favourable atmospheric conditions (Gaware *et al.,* 2019) [7].

There are several species of the genus Musa, which belongs to the family Musaceae that are often referred to as bananas (Khoozani *et al.,* 2019) [9]. Banana fruit pulp is a good source of carbohydrate. Its contents protein, ash, crude fibre, fat & sugar. Also, it helps in controlling the wastage of vitamins and minerals from shrikhand. In the process of making shrikhand, the banana pulp added to the milk improved fat and protein recovery and prevented the loss of important milk components in the whey. (Hole *et al.,* 2017) [8].

One of most important plant Papaya (*Carica Papaya Linn*) is from family *Caricaceae* as well as India is first rank of production of papaya (Seshamamba *et al.,* 2018) [1]. While papaya pulp contains a lot of sugar, it also includes a lot of potassium, magnesium, vitamin B, and antioxidant phytocomponents, with each 100 grams of fresh pulp having roughly 10 grams of carbs. Polyphenols, ascorbic acid, and carotenoids make it one of the richest fruits in carotenoids. In terms of carotenoid concentrations, lycopene is the most abundant, followed by-cryptoxanthin and -carotene (Farina *et al.,* 2020) [6]. Since papaya is rich in antioxidants, phytochemicals and supplements, for example, carotenes and L-ascorbic acid; the B nutrients, for example, folate and Pantothenic corrosive; minerals, for example, potassium and magnesium; and dietary fibre, it is considered one of the most important organic products (Devaki *et al.,* 2015) [5].

"Indian Ginseng" or "Indian Winter cherry" are popular names for Ashwagandha (Withania somnifera, a member of the Solanaceae family) (Pratibha *et al.,* 2019) [11]. As an Ayurvedic adaptogen, the ashwagandha root has been used for thousands of years to alleviate the symptoms of anxiety and stress (Verma *et al*., 2021) [14]. Function of ashwagandha is used for boosts the brain as well as nervous system, it's also used as memory improver. It helps to maintain a healthy balance between the sexes and the reproductive system for those who use it. As an effective adaptogen, ashwagandha is used to boost the body's ability to cope with stress. The ashwagandha improves the body's cell-mediated immunity in order to protect it against illness. Strong antioxidant activities help to protect cells from free radical-induced cell damage. "Ashwagandha also has anti-Parkinson, anti-venom, anti-inflammatory, anti-tumor, immunomodulation, hypolip idemic, antibacterial, cardiovascular protective characteristics (Agarwal *et al.,* 2018) [2].

Materials and Methods

The study was carried out at Warner College of Dairy Technology, Sam Higginbottom University of Agriculture, Technology, and Sciences, Prayagraj (Allahabad), Uttar Pradesh, Department of Dairy Technology (India).

Treatment Combination

Treatment combination of Shrikhandwadi was prepared from goat milk chakka, papaya pulp and banana pulp. In that sugar and ashwagandha powder was taken by weight of chakka in all treatments content was 125% sugar and 2% ashwagandha respectively.

Table 1: Treatment combination of Shrikhandwadi

Treatment No.	Treatments Combination
S_0	100% Goat milk Chakka
S_i	90% Goat Milk Chakka + 5% Banana Pulp + 5% Papaya Pulp
S_{ii}	85% Goat Milk Chakka + 5% Banana Pulp + 10% Papaya Pulp
S_{iii}	80% Goat Milk Chakka + 5% Banana Pulp + 15% Papaya Pulp
S_{iv}	75% Goat Milk Chakka + 5% Banana Pulp + 20% Papaya Pulp
S_v	85% Goat Milk Chakka + 10% Banana Pulp + 5% Papaya Pulp
S_{vi}	80% Goat Milk Chakka + 10% Banana Pulp + 10% Papaya Pulp
S_{vii}	75% Goat Milk Chakka + 10% Banana Pulp + 15% Papaya Pulp
S_{viii}	70% Goat Milk Chakka + 10% Banana Pulp + 20% Papaya Pulp
S_{ix}	80% Goat Milk Chakka + 15% Banana Pulp + 5% Papaya Pulp
S_x	75% Goat Milk Chakka + 15% Banana Pulp + 10% Papaya Pulp
S_{xi}	70% Goat Milk Chakka + 15% Banana Pulp + 15% Papaya Pulp
S_{xii}	65% Goat Milk Chakka + 15% Banana Pulp + 20% Papaya Pulp
S_{xiii}	75% Goat Milk Chakka + 20% Banana Pulp + 5% Papaya Pulp
S_{xiv}	70% Goat Milk Chakka + 20% Banana Pulp + 10% Papaya Pulp
S_{xv}	65% Goat Milk Chakka + 20% Banana Pulp +15% Papaya Pulp
S_{xvi}	60% Goat Milk Chakka + 20% Banana Pulp + 20% Papaya Pulp

(*125% sugar and 2% ashwagandha powder used by weight of chakka for all treatments)

Preparation of Shrikhandwadi

Shrikhandwadi was prepared by the using different treatment combination of goat milk chakka, banana pulp, papaya pulp with constant of ashwagandha powder as well as sugar and the curd was manufactured by using the starter culture was (curd culture 2%). was show in the Table 1. The following was the process of preparation of Shrikhandwadi in figure No.1.

Process flowchart of Preparation of Shrikhandwadi

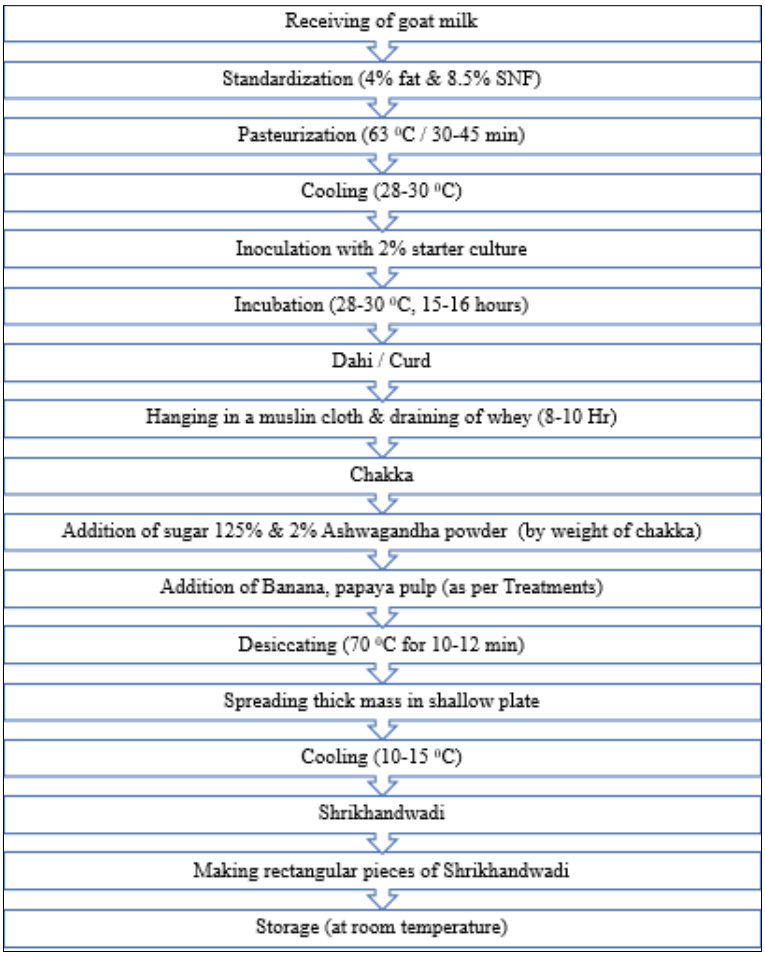

Fig 1: Process flowchart of preparation of Shrikhandwadi

Results and Discussion

The present studies were carried out on the "Process optimization and quality evaluation of Shrikhandwadi prepared from goat milk chakka, banana pulp, papaya pulp with ashwagandha powder" were done in the laboratories of department of Warner College of Dairy Technology, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, U.P., India.

A. Chemical properties of Shrikhandwadi

Table 2: Chemical Analysis of final developed product Shrikhandwadi

Treatments	Carbohydrates	Protein	Fat	Ash	Total Solids	Moisture	Acidity	Total Energy (Kcal)
S_0	77.39	6.00	5.51	0.88	89.78	10.22	2.07	383.15
S_i	74.52	9.23	5.21	0.92	89.88	10.11	2.30	381.91
S_{ii}	75.10	9.11	4.82	0.93	89.96	10.03	2.37	380.24
S_{iii}	75.93	9.02	4.21	0.94	90.10	9.89	2.38	377.70
S_{iv}	76.30	8.98	3.92	0.95	90.15	9.84	2.39	376.42
S_v	75.11	9.10	4.81	0.93	89.95	10.04	2.30	380.15
S_{vi}	76.00	9.03	4.16	0.94	90.13	9.86	2.80	377.56
S_{vii}	76.44	8.96	3.91	0.95	90.26	9.73	3.20	376.79
S_{viii}	76.63	8.91	3.80	0.96	90.30	9.69	3.21	376.36
S_{ix}	76.04	9.01	4.17	0.94	90.16	9.83	2.70	377.74
S_x	76.41	8.95	3.85	0.95	90.17	9.82	2.75	376.12
S_{xi}	76.55	8.89	3.78	0.96	90.18	9.81	2.80	375.79
S_{xii}	77.67	8.82	3.75	0.97	91.22	8.77	3.45	375.74
S_{xiii}	76.45	8.94	3.83	0.95	90.17	9.82	2.30	379.08
S_{xiv}	76.87	8.87	3.72	0.96	90.44	9.61	2.95	379.87
S_{xv}	77.78	8.80	3.64	0.97	91.19	8.80	3.45	376.03
S_{xvi}	78.49	8.78	3.42	0.98	91.67	8.32	3.57	376.32
Minimum	74.52	6.00	3.42	0.88	89.78	8.77	2.07	375.74
Maximum	78.49	9.23	5.51	0.98	91.67	10.22	3.57	383.15
F test	S	S	S	S	S	S	S	S
S. Ed. (±)	0.014	0.027	0.016	0.011	0.016	0.022	0.011	0.008
C. D. (P = 0.05)	0.028	0.053	0.032	0.023	0.031	0.043	0.023	0.016

Carbohydrates Content (%)
carbohydrates content was recorded in control sample S_0 was 77.34, as well as highest level of carbohydrates content in the treatment no S_{xvi} it content 78.46 percent carbohydrates and lowest level of carbohydrates content in the treatment no S_i content 74.50 percent carbohydrates.

Protein Content (%)
The protein content was observed in control sample S_0 was 6.09, and it was lowest level of protein content, as well as highest level of protein content in the treatment no S_i it content 9.23 percent protein.

Fat Content (%)
The fat content was determined in control sample S0 was 5.51, and it was highest level of fat content, as well as lowest level of fat content in the treatment No S_{xvi} it content 3.42 percent fat.

Ash Content (%)
The ash content observed in control sample S0 was 0.88, and it was lowest level of ash content, as well as highest level of ash content in the treatment No S_{viii} it content 0.98 percent ash.

Total Solid Content (%)
The total solids content was recorded in control sample S0 was 89.78 percent, and it was lowest level of total solids content, as well as highest level of total solids content in the treatment No S_{xvi} it content 91.67 percent total solids.

Moisture Content (%)
The moisture content was observed in control sample S0 was 10.22 percent, and it was highest level of moisture content, as well as lowest level of moisture content in the treatment No S_{xii} it content 8.77 percent moisture content.

Acidity Content (%)
Noted that the acidity content was recorded in sample S_{xiv} was 2.07 percent, and it was highest level of acidity content, as well as lowest level of acidity content in the treatment No S_{xiv} it content 3.57 percent acidity content.

Total Energy (Kcal)
The total energy was observed in sample S_0 was 383.15 Kcal, and it was highest level of acid content, as well as lowest level of total energy in the treatment No S_{xii} it content total energy was 375.74 Kcal.
Data of average of chemical analysis of Shrikhandwadi were statistically analyzed to find out the significant difference between the treatments showed in the table No. 2
The table No. 2 also showing the values of F. Cal. are more than F. Tab's value. At 5% significant level on their respective d. f.

Cost Estimation of final prepared Shrikhandwadi
In addition to other aspects, the cost of raw materials plays a key role in determining the cost of production. It serves as a foundation for establishing prices and calculating profits. The price of product depends upon cost of raw materials and production cost. The cost of final prepared Shrikhandwadi was calculated as below:

Table 3: Cost estimation of final developed product Shrikhandwadi

Treatments	Goat Milk Chakka (gm)/ Cost in Rs	Banana Pulp (gm)/ Cost in Rs	Papaya Pulp (gm)/ Cost in Rs	Sugar (gm)/ Cost in Rs	Ashwagandha Powder (gm)/ Cost in Rs	Overall Expenses (20%) Rs	Total Yield (gm/Rs)	Price/ Kg Rs
S_0	100/26	--	--	125/4.50	--	6.10	180/36.60	203.3
S_i	90/23.4	05/0.2	05/0.3	112.5/4.0	1.8/1.5	7.08	170/36.48	214.5
S_{ii}	85/22.10	05/0.2	10/0.6	106.2/3.8	1.7/1.4	5.68	166/33.78	203.49
S_{iii}	80/20.80	05/0.2	15/0.9	100/3.6	1.6/1.3	5.36	161/32.16	199.75
S_{iv}	75/19.50	05/0.2	20/1.20	93.75/3.3	1.5/1.2	5.08	156/30.48	195.38
S_v	85/22.10	10/0.4	05/0.3	106.2/3.8	1.7/1.4	5.60	166/33.60	202.40
S_{vi}	80/20.80	10/0.4	10/0.6	100s/3.6	1.6/1.3	5.34	161/32.04	199.00
S_{vii}	75/19.50	10/0.4	15/0.9	93.75/3.3	1.5/1.2	5.06	156/30.36	194.61
S_{viii}	70/18.20	10/0.4	20/1.2	87.5/3.1	1.4/1.19	4.82	151/28.91	191.45
S_{ix}	80/20.80	15/0.6	05/0.3	100/3.6	1.6/1.3	5.32	161/31.92	198.26
S_x	75/19.50	15/0.6	10/0.6	93.75/3.3	1.5/1.2	5.04	156/30.04	192.56
S_{xi}	70/18.20	15/0.6	15/0.9	87.5/3.1	1.4/1.19	4.80	151/28.79	190.66
S_{xii}	65/16.90	15/0.6	20/1.2	81.25/2.9	1.3/1.1	4.54	146/27.24	186.57
S_{xiii}	75/19.50	20/0.8	05/0.3	93.75/3.3	1.5/1.2	5.02	156/30.12	193.07
S_{xiv}	70/18.20	20/0.8	10/0.6	87.5/3.1	1.4/1.19	4.77	151/28.66	189.80
S_{xv}	65/16.90	20/0.8	15/0.9	81.25/2.9	1.3/1.1	4.52	146/27.12	185.75
S_{xvi}	60/15.60	20/0.8	20/1.2	75/2.7	1.2/1.0	4.26	140/25.56	182.57

The cost estimation was calculated in table no. 3 it was showed that the total cost estimated for the preparation of final Shrikhandwadi. In that cost estimation 20% overall expenses were added and final got the cost of Shrikhandwadi per kg. For the number of treatments used raw material in various quantity as per there treatments combinations. The total cost estimation of the final product Shrikhandwadi of control sample was 203.3 Rs per Kg. The highest cost of final developed product was treatment no. S_i 214.5 Rs per Kg. as well as the lowest cost of final development of product Shrikhandwadi was treatment no. S_{xvi} 182.57 Rs per kg. The cost of final prepared Shrikhandwadi of overall acceptability high score sample it was selected from panel members treatment No. S_{xii} was 186.57.
It was concluded that the in different treatment combination percentage of goat milk chakka was decrease also the cost of final product was decreases, so final product cost was totally depending upon the quantity of chakka used in the treatment.

Conclusion
Shrikhand is perishable indigenous dairy product with low shelf life in that prepare valuable product is Shrikhandwadi

enriched with goat milk chakka, banana pulp, papaya pulp with ashwagandha powder. It gives the medicinal benefits as well as fruits flavour to the Shrikhandwadi in different texture. The cost estimated was concluded that the product was made in very low cost and it gives the better profit in market value. The total cost estimation of the final Shrikhandwadi of control sample was 203.3 Rs per Kg was calculated. The highest cost of final product was treatment no. S_i 214.5 Rs per Kg was calculated. As well as the lowest cost of final developed product Shrikhandwadi was treatment no. S_{xvi} 182.57 Rs per kg was calculated. The cost of final developed Shrikhandwadi for overall acceptability highest score sample in treatment no. S_{xii} was 186.57 Rs per Kg was calculated.

Acknowledgment
It is my privilege to extend my sincere thanks to Chhatrapati Shahu Maharaj Research, Training and Human Development Institute (SARTHI), Pune, Maharashtra, India. For the providing fund for completing my research work through CSMNRF-2021/2021-22/491.

References

1. 20th Livestock Census. Department of Animal Husbandry, Dairying and Fisheries, Government of India; c2020.
2. Agarwal P, Vaishnav R, Goyal A. Global Journal of Medical Research: B Pharma, Drug Discovery, Toxicology & Medicine. 2018; 3(18):14-23.
3. Bhattarai R. Importance of Goat Milk J Food Sci. & Technol. Nepal. 2012;7:107-111.
4. Clark S, Garcia M. A 100-Year Review: Advances in goat milk research, Journal of Dairy Science. 2017;12(100):10026-10044.
5. Devaki C, Samreen F, Prakash J. A Review on Composition, Processed Products and Medicinal Uses of Papaya (*Carica Papaya* L.) International Journal of Food, Nutrition and Dietetics. 2015;3(3):101-117.
6. Farina V, Tinebra I, Perrone A, Sortino G, Palazzolo E, Mannino G, *et al*. Physicochemical, Nutraceutical and Sensory Traits of Six Papaya (*Carica Papaya* L.) Cultivars Grown in Greenhouse Conditions in the Mediterranean Climate Agronomy. 2020;10(501)2-16.
7. Gaware A, Raziuddin M, Zanjad N, Katekhaye A. Studies on Sensory, Textural Profile and Chemical Quality of Buffalo Milk Shrikhandwadi International Journal of Livestock Research. 2019;9(2):175-182.
8. Hole D, Kahate P, Shelke R, Ingle S, Khandare N. Studies on keeping quality of shrikhand prepared from cow milk blended with unripe banana Asian J Dairy & Food Res. 2017;36(1):26-29.
9. Khoozani AA, Birch J, Bekhit AEDA. Production, application and health effects of banana pulp and peel flour in the food industry. Journal of food science and technology. 2019;56(2):548-559.
10. Pal M, Dudhrejiya T, Pinto S. Goat Milk Products and their significance, Beverage & Food World. 2017;44(7):21-25.
11. Pratibha, Dipti, Rath S. Pharmacognostical and phytouchemical evaluation of *Withania somnifera* (L.) Dunal root, World Journal of Pharmaceutical Research. 2019;8(2):1106-1115.
12. Seshamamba B, Malati P, Ruth A, Mallika A, Sharma V. Studies on physicochemical properties & proximate analysis of Carica Papaya seed Journal of Pharmacognosy and Phytochemistry. 2018;7(6):1514-1519.
13. Tan S, Chin N, Tee T, Chooi S. Article Physico-Chemical Changes, Microbiological Properties, and Storage Shelf Life of Cow and Goat Milk from Industrial High-Pressure Processing, Processes. 2020;8(697):1-13.
14. Verma N, Gupta S, Tiwari S, Mishra A. Safety of Ashwagandha Root Extract: A Randomized, Placebo-Controlled, study in Healthy Volunteers Complementary Therapies in Medicine. 2021;57:102642, 1-6.