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## Effect of incorporation of sweet potato and elephant foot yam on physico-chemical properties of milk cake

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### Abstract

Conventional Indian milk items have been acquiring fame among dairy networks in India and all throughout the planet. A few government and private associations have been considering the automated and sterile preparing and circulation of native milk items. Khoa, produced using native milk items, is a significant base for scrumptious sweet. The current examination was made with an endeavor to foster yam and elephant foot sweet potato on nature of milk cake by incomplete expansion of various degrees of yam and elephant foot sweet potato, and from there on assess the impact of expansion of yam and elephant foot sweet potato milk cake on nourishing quality. For control, milk cake was normalized to 16.6% milk fat and 17% sugar to acquire 82.60% absolute strong and treatment (S1E1) was normalized to 15.10% fat, 17% sugar and 5% yam mash and 5% elephant foot sweet potato mash, (S1E2) was normalized to 14.5% fat, 17% sugar and 5% yam mash and 10% elephant foot sweet potato mash, (S1E3) was normalized to 13.90% fat, 17% sugar and 5% yam mash and 15% elephant foot sweet potato mash, (S1E4) was normalized to 13.30% fat, 17% sugar and 5% yam mash and 20% elephant foot sweet potato mash, (S2E1) was normalized to 13.10% fat, 17% sugar and 10% yam mash and 5% elephant foot sweet potato mash, (S2E2) was normalized to 12.80% fat, 17% sugar and 10% yam mash and 10% elephant foot sweet potato mash, (S2E3) was normalized to 12.62% fat, 17% sugar and 10% yam mash and 15% elephant foot sweet potato mash, (S2E4) was normalized to 12.51% fat, 17% sugar and 10% yam mash and 20% elephant foot sweet potato mash, (S3E1) was normalized to 12.40% fat, 17% sugar and 15% yam mash and 5% elephant foot sweet potato mash, (S3E2) was normalized to 12.21% fat, 17% sugar and 15% yam mash and 10% elephant foot sweet potato mash, (S3E3) was normalized to 12.18% fat, 17% sugar and 15% yam mash and 15% elephant foot sweet potato mash, (S3E4) was normalized to 12.14% fat, 17% sugar and 15% yam mash and 20% elephant foot sweet potato mash, (S4E1) was normalized to 12.12% fat, 17% sugar and 20% yam mash and 5% elephant foot sweet potato mash, (S4E2) was normalized to 12% fat, 17% sugar and 20% yam mash and 10% elephant foot sweet potato mash, (S4E3) was normalized to 11.80% fat, 17% sugar and 20% yam mash and 15% elephant foot sweet potato mash, (S4E4) was normalized to 11.66% fat, 17% sugar and 20% yam mash and 20% elephant foot sweet potato mash. In the Milk cake samples of different treatments and control, sensory attributes was evaluated by trained panel list using 9 point hedonic scale. The highest value was observed in treatment (S2E2). In analysis Physico-chemical properties, microbiological properties, all the treatments.

**Keywords:** sweet potato and elephant foot yam, buffalo milk, physico-chemical properties, microbiological properties

### Introduction

Traditional Indian milk products have been gaining popularity among dairy communities in India and around the world. Several government and private organizations have been studying the mechanized and sanitary processing and distribution of indigenous milk products. Khoa, made from indigenous milk products, is an important base for delectable sweet. The typical diet of milk varies greatly depending on the area of the world. In the human diet, milk is considered a full food. Milk contains all of the nutrients that the human body needs for proper nutrition. Milk may be eaten whole or refined into different milk products such as concentrated milk, coagulated, fermented, fat-rich, and frozen milk. Milk sweets have long been an inseparable part of the Indian subcontinent's socio cultural life. In India, khoa is commonly used as a base ingredient in a wide range of traditional Indian sweets. It has a lot of muscle-building protein, bone-forming nutrients, and energy-giving fat and lactose in it. Burfi is considered to be one of the most popular khoa-based sweets in India. The khoa-based sweet's unique adaptability across India. Because of khoa's unique ability to combine with a large

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variety of foods in terms of taste, body, and texture, an amazing array of burfi varieties has appeared. Bottle gourd, red pumpkin, elephant foot yam, and other vegetables are common and regularly consumed in India by people of all social groups. The elephant foot yam decreases cholesterol levels and blood pressure levels in the body. Cancer, weight loss, diarrhea, stomach pain, and gas are all treated with it. It is a potent antioxidant that helps in the slowing of the aging process as well as the prevention of cardiovascular disease and stroke. Local producers nowadays only use fruits in the preparation of burfi; no one uses vegetables. As a result, in this report, vegetables such as elephant foot yam pulp were used to make burfi. Because of the high total solids, the product can have a longer shelf life.

Indian Elephant Foot Yam also proves to have laxative properties thus helps in curing constipation as well as used in the treatment of piles. Besides it also has significant amount of minerals and vitamins but is free of any heavy metals. Most importantly it has proved to have high amount of antimicrobial activity which makes it a curative crop. It shows the presence of an important molecule called Diosgenin which has anticancerous properties. Thus it has a great scope for nutraceuticals. Sweet potato postharvest use is surprisingly limited, limited to fresh, boiled, or roasted human use. The limited number of applications for sweet potato, as well as the limited processing technologies available and adapted to Ugandan conditions, prevent the crop's potential benefits from reaching consumers and farmers. In Uganda, sweet potatoes are grown in abundance. Throughout the year, it offers a large amount of dietary starch. New boiled or steamed sweet potatoes are usually eaten with bean, cowpea, or vegetable sauces. New sweet potato roots are bulky and perishable, so

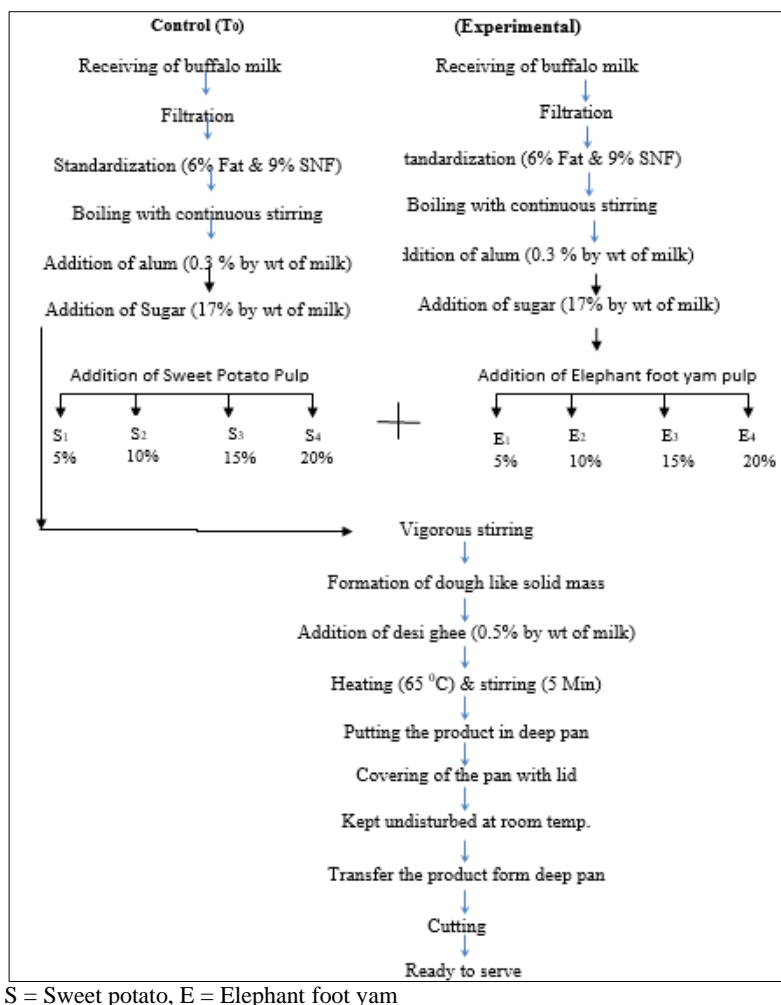
they are not kept in Uganda. In-ground storage, in which unharvested mature sweet potatoes are left in the field until they are required for home consumption or local sale, is the only form of storage that is routinely practiced. Although most people are aware that vitamin C is important for battling cold and flu viruses, few are aware that it is also important for bone and tooth development, digestion, and the formation of blood cells. It aids wound healing, produces collagen, which helps preserve skin's youthful elasticity, and is important for stress management. It also tends to assist in the defense of our bodies against contaminants linked to cancer.

## Materials and Methods

The experiment "Effect of incorporation of Sweet potato and Elephant foot yam on physico-chemical and microbiological properties of Milk cake" was carried out in DT research lab, Warner College of Dairy Technology, SHUATS Prayagraj - 211007, U.P. (India).

### Procurement and collection of ingredient

- **Milk:** Milk was collected from local market of Prayagraj (Allahabad).
- **Sugar:** It was procured from the local market of Prayagraj (Allahabad).
- **Elephant foot yam:** It was collected from local market of Prayagraj (Allahabad).
- **Sweet Potato:** It was collected from local market of Prayagraj (Allahabad).
- **Ghee:** Ghee was collected from local market of Prayagraj (Allahabad).
- **Alum:** Alum was collected from local market of Prayagraj (Allahabad).



**Fig 1:** Flow diagram for manufacturing of sweet potato and elephant foot yam milk cake

**Treatment Combination:** T0 = Milk Cake from buffalo milk (6% fat & 9% SNF).

S1 E1 = Milk Cake with 5% SPP + 5% EFYP, S1 E2 = Milk Cake with 5% SPP + 10 % EFYP

S1 E3 = Milk Cake with 5% SPP + 15 % EFYP, S1 E4 = Milk Cake with 5% SSP + 20 % EFYP.

S2 E1 = Milk Cake with 10% SPP + 5% EFYP, S2 E2 = Milk Cake with 10% SPP + 10% EFYP

S2 E3 = Milk Cake with 10% SPP + 15% EFYP, S2 E4 = Milk Cake with 10% SPP + 20 % EFYP.

S3 E1 = Milk Cake with 15% SPP + 5% EFYP, S3 E2 = Milk Cake with 15% SPP + 10% EFYP.

S3 E3 = Milk Cake with 15% SPP + 15% EFYP, S3 E4 = Milk Cake with 15% SPP + 20% EFYP.

S4 E1 = Milk Cake with 20% SPP + 5% EFYP, S4 E2 = Milk Cake with 20% SPP + 10% EFYP.

S4 E3 = Milk Cake with 20% SPP + 15 % EFYP, S4 E4 = Milk Cake with 20% SPP + 20 % EFYP.

\*SPP = Sweet Potato Pulp, \* EFYP = Elephant Foot Yam Pulp

## Results and Discussion

The current examination was finished for Effect of different levels of Sweet Potato (*Ipomoea batatas*) and Elephant Foot Yam (*Amorphophallus paeoniifolius*) on nature of milk cake. Milk cake is a glow committed traditional thing. This is comprehensively eaten up in India during the whole year. Milk cake contains high proportion of sugar which restricts the calorie conscious people similarly as diabetic individual from consuming this thing. Joining of Elephant Foot Yam and Sweet Potato is consciously suing to fabricate the sufficiency of sweet potato (*Ipomoea batatas*) and elephant foot yam (*Amorphophallus paeoniifolius*) on nature of milk cake as Elephant Foot Yam and Sweet Potato is known to have a foe of diabetic effect.

The current assessment was done to see the shot at intertwining Sweet Potato and Elephant Foot Yam in Milk cake with the objective that it doesn't impact the material limits of the Milk cake.

- Physico-compound attributes of Effect of various degrees of Sweet Potato and Elephant Foot Yam milk cake.

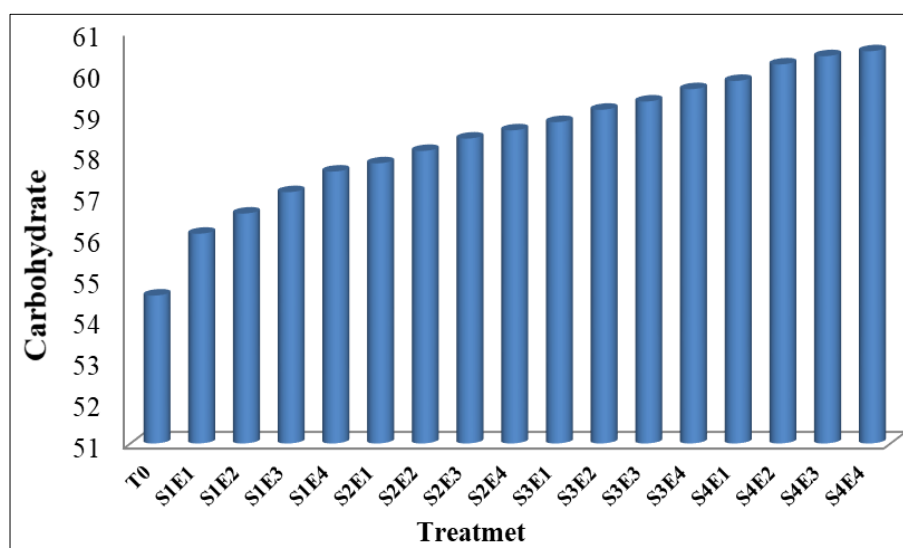
**Table 1:** Average data got on various boundaries of Sweet Potato and Elephant Foot Yam on quality of Milk Cake

Parameters	T0	S1E1	S1E2	S1E3	S1E4	S2E1	S2E2	S2E3	S2E4	S3E1	S3E2	S3E3	S3E4	S4E1	S4E2	S4E3	S4E4
<b>Physico- chemical analysis of Milk Cake</b>																	
Carbohydrate (%)	54.6	56.0	56.5	57.1	57.6	57.8	58.1	58.4	58.6	58.8	59.1	59.3	59.6	59.8	60.20	60.40	60.52
Protein (%)	9.21	8.90	9.25	9.59	9.96	10.02	10.20	10.25	10.51	10.60	10.80	10.90	11.02	11.40	11.62	11.70	11.88
Fat (%)	16.6	15.1	14.5	13.9	13.3	13.10	12.80	12.62	12.51	12.40	12.21	12.18	12.14	12.12	12.00	11.80	11.66
Ash (%)	2.15	2.28	2.41	2.54	2.67	2.71	2.74	2.77	2.79	3.01	3.03	3.05	3.08	3.10	3.18	3.22	3.25
Total solid (%)	82.6	81.69	81.89	82.19	82.52	83.63	83.83	83.85	84.41	84.81	85.24	85.43	85.84	86.42	86.45	87.12	87.27
Moisture (%)	17.3	18.31	18.11	17.81	17.48	16.37	16.17	16.15	15.59	15.19	14.76	14.57	14.16	13.58	13.55	12.88	12.73
Acidity (% in LA)	0.16	0.17	0.18	0.19	0.20	0.21	0.22	0.23	0.24	0.25	0.26	0.27	0.28	0.29	0.30	0.32	0.34
pH	6.58	6.53	6.49	6.44	6.40	6.39	6.38	6.37	6.36	6.35	6.34	6.32	6.30	6.29	6.27	6.26	6.25
Antioxidant content	0.23	11.11	11.50	11.90	12.30	12.50	12.70	12.90	13.11	13.20	13.31	13.46	13.50	13.57	13.63	13.68	13.71

### Carbohydrate (%)

From the table normal information show that the carbs rate in examples of yam and elephant foot sweet potato milk cake tests of S1E1(56.09), S1E2(56.58), S1E3(57.10),

S1E4(57.60), S2E1(57.80), S2E2(58.10), S2E3(58.40), S2E4(58.60), S3E1(58.80), S3E2(59.10), S3E3(59.30), S3E4(59.60), S4E1(59.80), S4E2(60.20), S4E3 (60.40), S4E4 (60.52). Separately

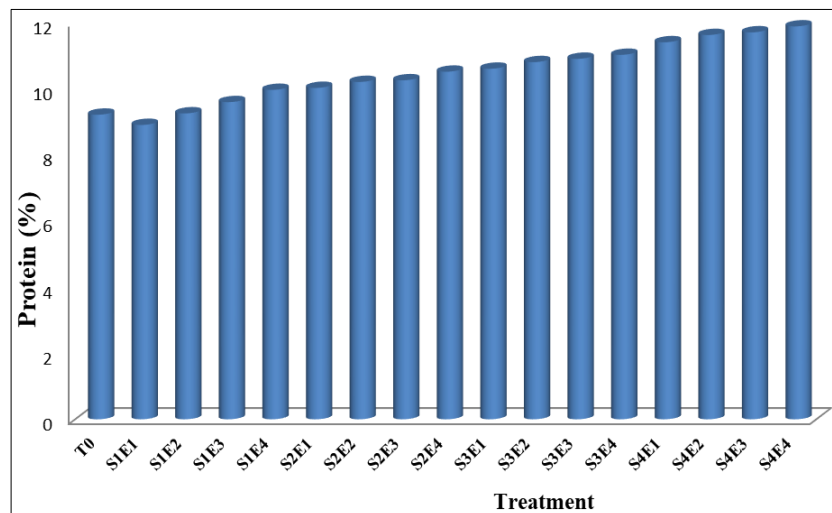


**Fig 2:** Average of Total carbohydrates % in Sweet Potato and Elephant Foot Yam Milk Cake sample

### Protein (%)

From the table average data show that the protein percentage in samples of sweet potato & elephant foot yam milk cake samples of S1E1(8.90), S1E2(9.25), S1E3(9.59), S1E4(9.96),

S2E1(10.02), S2E2(10.20), S2E3(10.25), S2E4(10.51), S3E1(10.60), S3E2(10.80), S3E3(10.90), S3E4(11.02), S4E1(11.40), S4E2(11.62), S4E3 (11.70), S4E4 (11.88). Respectively

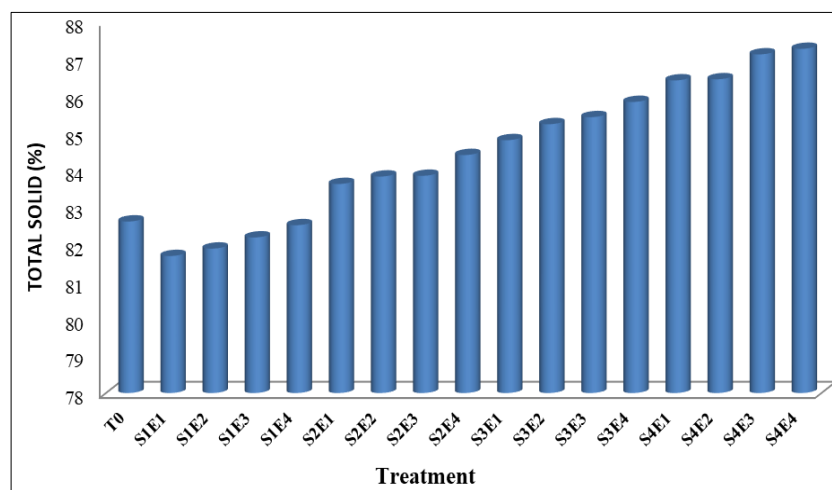


**Fig 3:** Average of protein % in Sweet Potato and Elephant Foot Yam Milk Cake. Sample

**Total solid (%)**

From the table average data show that the total solid percentage in samples of sweet potato & elephant foot yam milk cake samples of S1E1(81.69), S1E2(81.89),

S1E3(82.19), S1E4(82.52), S2E1(83.63), S2E2(83.83), S2E3(83.85), S2E4(84.41), S3E1(84.81), S3E2(85.24), S3E3(85.43), S3E4(85.84), S4E1(86.42), S4E2(86.45), S4E3(87.12), S4E4(87.27). Respectively.

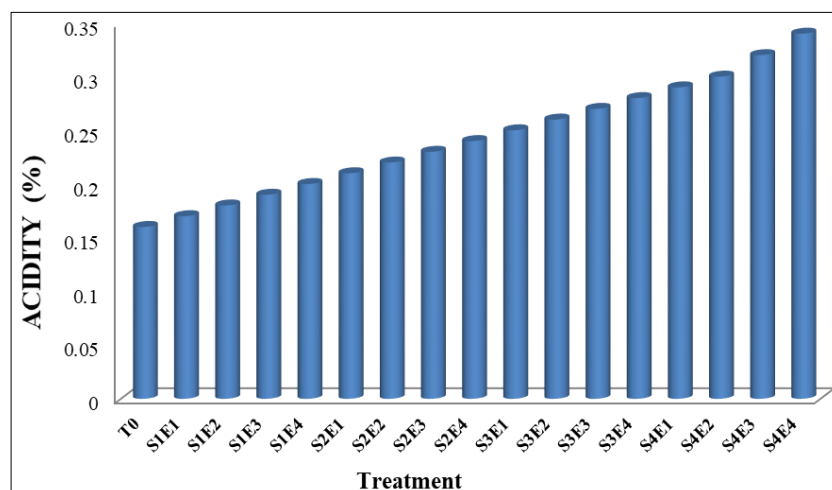


**Fig 4:** Average of Total solid % in Sweet Potato and Elephant Foot Yam Milk Cake sample.

**Acidity (%)**

The average data in the table shows that the acidity percentage in samples of sweet potato & elephant foot yam milk cake samples of S1E1(0.17), S1E2(0.18), S1E3(0.19),

S1E4(0.20), S2E1(0.21), S2E2(0.22), S2E3(0.23), S2E4(0.24), S3E1(0.25), S3E2(0.26), S3E3(0.27), S3E4(0.28), S4E1(0.29), S4E2(0.30), S4E3(0.32), S4E4(0.34). Respectively.



**Fig 5:** Average of acidity% in Sweet Potato and Elephant Foot Yam Milk Cake sample

## Conclusion

It may be concluded that the Sweet Potato and Elephant Foot Yam on quality of Milk Cake can be successfully prepared by supplementing Sweet Potato and Elephant Foot Yam of concentrated milk. Milk Cake made with Sweet Potato and Elephant Foot Yam in treatment S2E2 was best in organoleptic characteristics and received highest score in organoleptic evaluation (colour & appearance, body & texture, Flavour & taste, overall acceptability). Based on its value in traditional medicine and promise from preclinical studies, Sweet Potato and Elephant Foot Yam has plethora of health benefits and Milk Cake being a widely accepted product, it can act as a vehicle to deliver the bioactive components of Sweet Potato and Elephant Foot Yam pulp to the wide range of urban customers who may find it difficult to procure and consume Sweet Potato and Elephant Foot Yam sample.

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