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## Process optimization and quality evaluation of ready-to-use gulabjamun mix prepared from spray dried skim milk

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### Abstract

In the present study, for improving the quality of the gulabjamun, spray dried skim milk powder has been used as base material in place of khoa in the gulabjamun mix. Different ratios of SMP and vanaspati, along with suji and baking powder were tried. Out of these, use of 50 parts of SMP gave best result in terms of colour & appearance, flavor & taste, body and texture and overall acceptability of gulabjamun. Further, incorporation of baking powder at 2 % level gave the best quality of gulabjamun with soft and uniform granular texture. The average composition of ready-to-use gulabjamun mix was: moisture 8.60 per cent, fat 13.75 per cent, protein 20.50 per cent, ash 4.00 per cent and acidity 0.12 per cent.

**Keywords:** khoa, gulabjamun, khoa powder, gulabjamun mix, baking powder, textural characteristics, sensory attributes

### Introduction

Traditional milk sweets are items of choice of millions in India. Among the milk-based sweets, Gulabjamun occupies a prominent place as a delicacy. The shelf-life of Gulabjamun conventionally prepared from Khoa hardly exceeds one week at ambient temperature. Considerable variations are observed in the textural and compositional properties of the sweet sold in the market, as a consequence of varying quality of raw material and techniques used in the preparations. Hence, in view of the growing demands for Gulabjamun, the methods for manufacture, packaging and storage should be standardized. There is also a great need for developing the sensory standards for the various traditional milk delicacies. The present investigation is planned with a view to standardize the process for formulation of Gulabjamun mix by using Spray and Drum dried Skim milk powder that could easily be used both at household and industrial levels. Dried milk products offer the benefits of enhanced quality, substantial economy in storage space and reduced transportation cost. The proposed formulation may promote the utilization of surplus milk powder for Gulabjamun making and help to eliminate most of the problems associated with the traditional methods of preparation of milk sweets. This investigation is planned with a view to standardize the process for formulation of Gulabjamun mix using spray and drum dried skim milk powder, which will lead to the production of better quality Gulabjamun with higher shelf-life. The addition of vegetable protein and lipids in the form of wheat flour (Semolina and Maida) will improve the nutritional value of native milk proteins. Gulabjamun mix may provide low cost and high quality sweet.

### Material and Methods

The experimental work was carried out in the research laboratory of Department of Dairy Technology, Warner College of Dairy Technology, Sam Higginbottom University of Agriculture, Technology and Sciences, Allahabad.

### Procurement and collection of ingredient

**Spray dried skim milk powder:** Skimmed milk powder manufactured by Anik Industries Ltd., under the brand name 'Anik Spray' was obtained from the local market of Allahabad.

**Wheat flour (Maida):** This was procured from the local market of Allahabad.

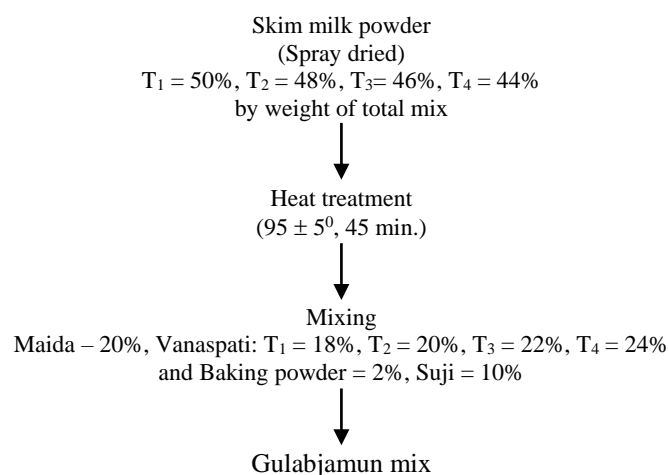
**Semolina (Suji):** This was procured from the local market of Allahabad.

**Vanaspati:** Rath brand Vanaspati manufactured by Agro-Tech. foods Limited, Akrapur district, Unnao (U.P.) - 209801 was obtained from the local market of Allahabad.

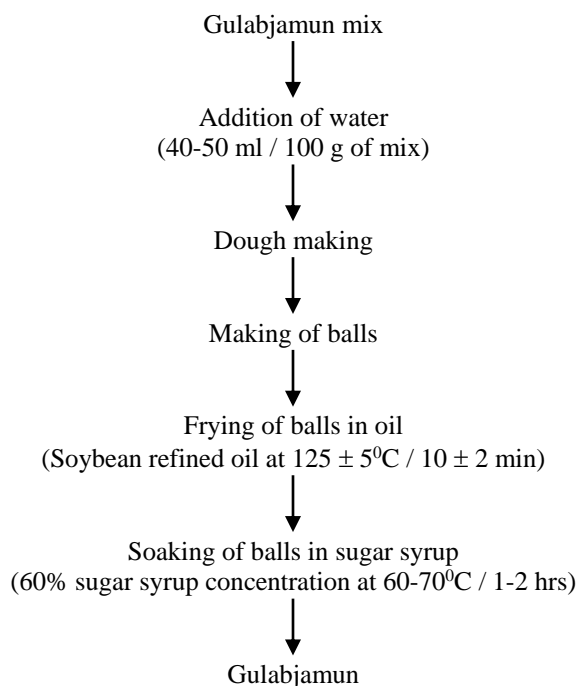
**Baking powder:** Rex brand baking powder manufactured by Achala Food and Packaging, Navi Mumbai was obtained from the local market of Allahabad.

**Sugar:** Sugar was procured from the local market of Allahabad.

#### Flow chart for Preparation of ready-to-use Gulabjamun mix



#### Production of Gulabjamun from ready-to-use Gulabjamun mix



#### Result and Discussion

The present study was planned to elicit the information about “Formulation of Ready-to-use Gulabjamun mix by using spray dried skim milk”. The data collected on different aspects were tabulated and analyzed statistically using the methods of analysis of variance and critical difference. The significant and non-significant differences observed have been analyzed critically within and between the treatment combinations.

**Table 1:** Average of data obtained on organoleptic analysis of different treatments of Gulabjamun prepared from ready to use gulabjamun mix by using spray dried skim milk.

Parameters	Treatments				C.D at 5%
	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	
Colour and appearance	8.30	7.80	7.80	8.00	0.67
Body and texture	7.28	6.50	6.38	6.45	0.555
Flavour and taste	7.88	8.04	7.62	7.58	0.288
Overall acceptability	7.44	6.92	6.74	6.62	0.288

#### Organoleptic parameters

It can be observed from table 1. That the average Colour and appearance score for gulabjamun prepared from ready to use gulabjamun mix in T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub> were. 8.30, 7.8, 7.8 and 8.00 respectively. It can be observed from the data that the color and appearance score for gulabjamun prepared from gulabjamun mix in sample T<sub>1</sub> was higher than other samples. It can be observed from table 1. That the average body and texture score for gulabjamun prepared from ready to use gulabjamun mix in T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub> were. 7.28, 6.50, 6.38 and 6.45 respectively. It can be observed from the data that the body and texture score for gulabjamun prepared from gulabjamun mix in sample T<sub>1</sub> was higher than other samples. It can be observed from table 1. That the average flavour and taste score for gulabjamun prepared from ready to use gulabjamun mix in T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub> were 7.88, 8.04, 7.62 and 7.58 respectively. It can be observed from the data that the body and texture score for gulabjamun prepared from gulabjamun mix in sample T<sub>2</sub> was higher than other samples. It can be observed from table 1. That the average overall acceptability score for gulabjamun prepared from ready to use

gulabjamun mix in T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub> were 7.44, 6.92, 6.74 and 6.62 respectively. It can be observed from the data that the overall acceptability score for gulabjamun prepared from gulabjamun mix in sample T<sub>1</sub> was higher than other samples.

**Table 2:** Average of data obtained on chemical analysis of different treatments for ready to use gulabjamun mix by using spray dried skim milk.

Parameters	Treatments				C.D at 5%
	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	
Moisture	8.60	8.40	7.50	7.28	0.501
Fat %	13.75	14.60	15.25	16.00	1.272
Protein	20.50	18.50	17.50	16.80	1.803
Ash	4.00	3.80	3.60	3.40	0.365
Acidity	0.12	0.16	0.16	0.13	0.032

#### Chemical parameters

It can be observed from table no. 2 that the average moisture percent in gulabjamun mix prepared from spray dried skim milk in T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub> were 8.60, 8.40, 7.50 and 7.28 respectively. It can be observed from the data that the

moisture percent of gulabjamun mix in sample T1 was higher than other samples.

It can be observed from table no. 2 that the average fat percent in gulabjamun mix prepared from spray dried skim milk in T1, T2, T3 and T4, 13.75, 14.60, 15.25 and 16.00 respectively. It can be observed from the data that the fat percent of gulabjamun mix in sample T4 was higher than other samples.

It can be observed from table no. 2 that the average protein percent in gulabjamun mix prepared from spray dried skim milk in T1, T2, T3 and T4 were 20.50, 18.50, 17.50 and 16.80 respectively. It can be observed from the data that the protein percent of gulabjamun mix in sample T1 was higher than other samples.

It can be observed from table no. 2 that the average ash percent in gulabjamun mix prepared from spray dried skim milk in T1, T2, T3 and T4 were 4.00, 3.80, 3.60 and 3.40 respectively. It can be observed from the data that the ash percent of gulabjamun mix in sample T1 was higher than other samples.

It can be observed from table no. 2 that the average percent acidity in gulabjamun mix prepared from spray dried skim milk in T1, T2, T3 and T4 were 0.12, 0.16, 0.16 and 0.13 respectively. It can be observed from the data that the percent acidity of gulabjamun mix in sample T1 was lower than other samples.

#### Cost of Production of ready to use gulabjamun mix

The cost of the ingredient is very important factor besides other factors in determining the cost of production. It is considered as a basis for price fixation and determining the profit. The price of a product is dependent on the cost of production. The cost of ready to use gulabjamun mix from spray dried skim milk was calculated, which is shown in the table:

#### Rates

Spray dried SMP 1kg. @ Rs.200/-

Maida @ Rs. 20/kg-

Suji @ Rs. 30 /kg

Vanaspati @ Rs. 90/kg-

Baking powder @ Rs. 120/kg

Overhead exp. @ 20% /-

Sl. no		T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>
1.	Cost of the product (Rs/kg)	138	138	136	135

#### Conclusion

From the investigation, it is evident that spray dried skim milk can be effectively used in the formulation of Gulabjamun mix by properly blending it in appropriate proportions with other ingredients like maida, suji, vanaspati and baking power. The data obtained from Organoleptic evaluation showed that the gulabjamun prepared from ready-to-use gulabjamun mix sample in the treatment T1 was found to be more acceptable in terms of colour & appearance, flavor & taste, body and texture and overall acceptability. Thus, this study has shown a way, for effective utilization of readily available skim milk powder. On the basis of chemical analysis the ready-to-use gulabjamun mix sample in treatment T1 showed maximum value for moisture, protein, total carbohydrate, and ash but lower value for fat.

The cost of Gulabjamun mix prepared from spray dried skim milk was estimated to be Rs.138/kg in treatment T1.

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