

DEVELOPMENT AND QUALITY EVALUATION OF BANANA CAKE INCORPORATED WITH ALMOND FLOUR, WHOLE-WHEAT FLOUR

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Abstract– The present experiment entitled “Development and quality evaluation of Banana cake incorporated with Almond flour, and Whole-wheat flour” was carried out in food technology lab, department of Dairy technology, Sam Higginbottom University of Agricultural technology and science, during summer session 2022-2023. The experiment was laid out in Random block design (RBD) with 4 treatment and 5 replications. The different treatment combinations were prepared, i.e; T (80% All-purpose flour + 20% Banana), T(30% Almond flour + 40% Whole-wheat flour + 30% Banana), T(30% Almond flour + 30% Whole-wheat flour + 40% Banana), T(30% Almond flour + 20% Whole-wheat flour + 50% Banana). The research study was conducted to identify most suitable blend of almond flour and whole wheat flour as a replacement of all-purpose flour. So, three formulations were developed T- (30:40:30); T - (30:30:40) and T - (30:20:50). And T (*control banana cake*) (The ratio of all-purpose flour and banana pulp is 80:20). The treatments were evaluated for various organoleptic characteristic, physico-chemical parameters, nutritional value analysis and microbial evaluation. After sensory evaluation Banana cake having T (30:30:40) was found to have highest overall acceptability score of 8.72. On the basis of physico-chemical analysis the development of Banana cake sample moisture contains (26.80%), total solids (73.20%), Carbohydrate (57.48%), protein (5.64%), fat (8.84%), ash (1.64%), and dietary fiber (10.18%) is highest. On the basis of minerals analysis shown vitamin-B6 (0.65%) and potassium (456.30%).

INTRODUCTION

The demand of bakery products is increasing day by day. India is a developing country with large segment of population depending on wheat as staple food and 25% of wheat is used in the preparation of baked foods. Bakery is a millennia old process, and bakery products range in complexity from the simple ingredients of a plain pastry to the numerous components of a cake. The term baking applies not only to the production of bread, but also to all food products in which flour is basic material and to which heat is applied directly by radiation from the top or bottom of an oven or heating appliance (Freitas and Naves, 2020). Cake is a delightful and universally loved dessert that has

been enjoyed for centuries. Cakes come in an array of sizes, shaped and flavours with their soft, spongy texture & delectable frosting. Cakes are a symbol of celebration, joy and indulgence, make them a cherished treat across cultures worldwide (Bhadana, 2018).

BANANA CAKE is a cake prepared using banana as a primary ingredient and typical ingredients. It can be prepared in various manners, including as a layer cake, as muffins and as cupcakes. Steamed banana cake is found in Chinese, Malaysian, Indonesian and Vietnamese cuisine. In the Philippines, the term banana cake refers to banana bread introduced during the American colonial period of the Philippines. It can be prepared as a vegetarian dish and as a low-fat dish. Banana cakes

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are a type of traditional sweet dessert prepared using wheat flour, eggs, sugar, baking powder, baking soda. In the Malay culture, several varieties use banana as ingredients and they are known as *kuih*. The preparation of the traditional Malay sweets heavily uses banana cake as it is easier, more convenient, and less time-consuming. Modern food technologies promoted the production of ready to use a premix such as banana powder premix. In a 2021 survey, found that less than 46% of female respondents consumed the daily-recommended amount of dietary fibre and only 44% of female respondent's consumed the daily-recommended amount of iron during the 3-day recording period (Thompson *et al.*, 2021).

MATERIALS AND METHODS

The experiment entitled "*Development and Quality Evaluation of Banana Cake Incorporated With Almond Flour, Whole-wheat Flour*" was carried out in the Warner college of Dairy Technology, Sam Higginbottom university of Agriculture Technology

& Sciences (SHUATS), Prayagraj (U.P) during the year 2022-2023.

RESULTS

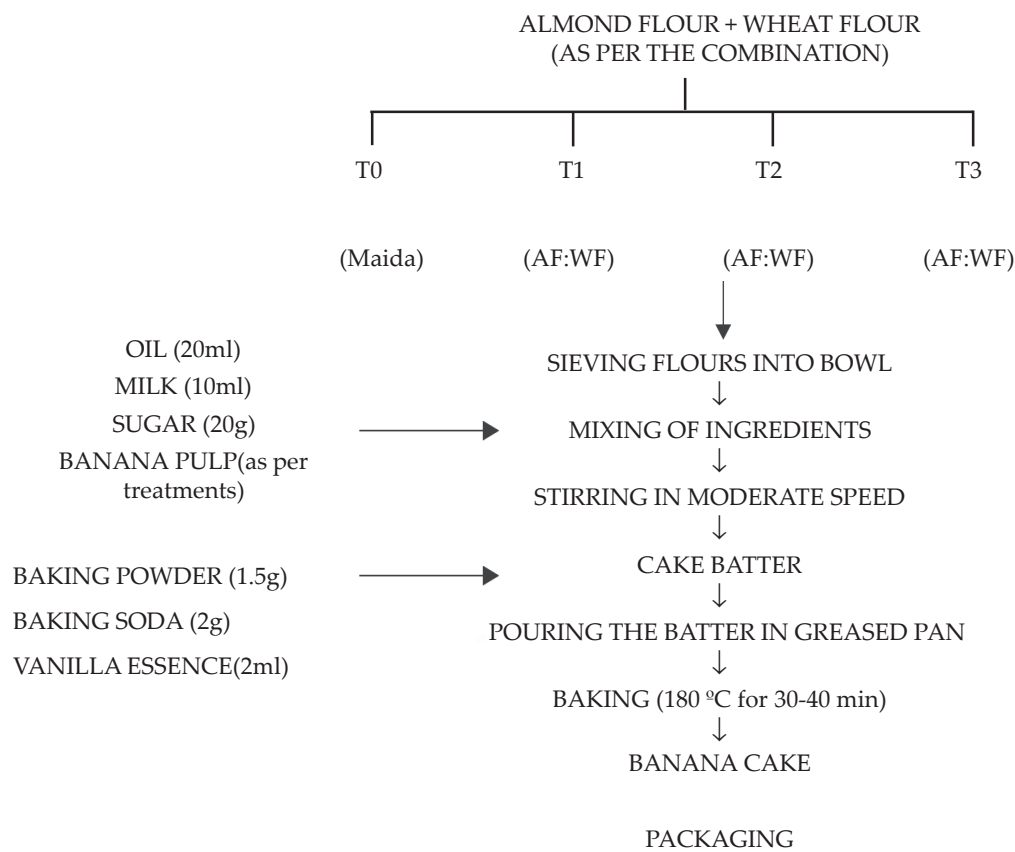
The result revealed that physico-chemical characteristics of Banana cake prepared by Almond flour, Whole-wheat flour and banana had the following performance.

Moisture

The maximum moisture (27.44) was observed in T Almond flour (30%) + Whole-wheat flour (20%)+ Banana (50%). Whereas the minimum moisture (23.01) was observed in T All-purpose flour (80%)+ Banana (20%).

Total solids

The maximum Total solids (76.99) was observed in T All-purpose flour (80%)+ Banana (20%). Whereas the minimum Total solids (72.56) was observed in TAlmond flour (30%) + Whole-wheat flour (20%)+ Banana (50%).



Note: AF-Almond flour, WF-Wheat flour

Fig. 1. Flow chart for preparation of Banana cake

Carbohydrates

The maximum Carbohydrate (63.47) was observed in T All-purpose flour (80%)+ Banana (20%). Whereas the minimum Carbohydrates (56.12) was observed in T Almond flour (30%) + Whole-wheat flour (20%)+ Banana (50%).

Protein

The maximum Protein (5.86) was observed in T Almond flour (30%) + Whole-wheat flour (20%)+ Banana (50%). Whereas the minimum Protein (5.23) was observed in T All-purpose flour (80%)+ Banana (20%).

Fat

The maximum Fat (8.89) was observed in T Almond flour (30%) + Whole-wheat flour (20%)+ Banana (50%). Whereas the minimum Fat (6.8) was observed in T All-purpose flour (80%)+ Banana (20%).

Table 1. Standard recipe for formulation of Almond, Whole-wheat flour and banana in Banana cake.

Treatments	Ingredients			
	Almond Flour	Whole Wheat Flour	Banana	All-purpose flour
T	0	0	20	80
T	30	40	30	0
T	30	30	40	0
T	30	20	50	0

Table 2. Table showing average data of different parameters of Banana cake

Physico-chemical parameter	Treatments			
	T	T	T	T
Moisture	23.30	25.52	26.80	27.43
Total solids	76.70	74.48	73.20	72.57
Carbohydrate	63.16	58.69	57.48	56.14
Protein	5.24	5.42	5.64	5.83
Fat	6.84	8.44	8.84	8.87
Ash	1.46	1.52	1.64	1.73
Dietary fiber	9.88	10.16	10.18	10.24
		Nutritional analysis		
Vitamin-B6	0.16	0.34	0.65	0.97
Potassium	154.84	454.28	456.30	457.68
		Microbial analysis		
Standard plate count (cfu/gm × 10 ³)	4.18	5.46	5.84	6.10
Yeast and Mould (cfu/gm × 10 ³)	0.86	1.53	1.74	1.93
		Sensory Attributes		
Colour and Appearance	6.82	8.26	8.80	8.60
Flavour and Taste	6.82	7.32	8.44	7.12
Body and Texture	8.13	8.24	8.84	8.01
Overall Acceptability	7.20	8.62	8.72	7.54

Ash

The maximum Ash (1.74) was observed in T Almond flour (30%) + Whole-wheat flour (20%)+ Banana (50%). Whereas the minimum Ash (1.45) was observed in T All-purpose flour (80%)+ Banana (20%).

Dietary fiber

The maximum Dietary fiber (10.25) was observed in T Almond flour (30%) + Whole-wheat flour (20%)+ Banana (50%). Whereas the minimum Dietary fiber (9.86) was observed in T All-purpose flour (80%)+ Banana (20%).

Nutritional Value

Vitamin-B6

The maximum vitamin-B6 (0.98) was observed in T Almond flour (30%) + Whole-wheat flour (20%)+ Banana (50%). Whereas the minimum vitamin-B6 (0.15) was observed in T All-purpose flour (80%)+ Banana (20%).

Potassium

The maximum potassium (457.8) was observed in T Almond flour (30%) + Whole-wheat flour (20%)+ Banana (50%). Whereas the minimum potassium (156.2) was observed in T All-purpose flour (80%)+ Banana (20%).

Microbial Parameters

Standard plate count score (cfu/g × 10³)

The maximum standard plate count score (cfu/g × 10³) (6.2) was observed in in T Almond flour (30%) + Whole-wheat flour (20%)+ Banana (50%). Whereas the minimum standard plate count score (cfu/g × 10³) (4.1) was observed in T All-purpose flour (80%) + Banana (20%).

Yeast and mould (cfu/g × 10³)

The yeast and mould (cfu/gm × 10³) (1.95) was observed in T Almond flour (30%) + Whole-wheat flour (20%) + Banana (50%). Whereas the minimum standard plate count score (cfu/gm × 10³) (0.85) was observed in T All-purpose flour (80%)+ Banana (20%).

Organoleptic Parameters

Colour and appearance

The maximum colour and appearance (8.9) was observed in T Almond flour (30%) + Whole-wheat flour (30%)+ Banana (40%). Whereas the minimum colour and appearance (7.8) was observed in T All-purpose flour (80%)+ Banana (20%).

Flavour and Taste

The maximum Flavour and Taste (8.5) was observed in T Almond flour (30%) + Whole-wheat flour (30%)+ Banana (40%). Whereas the minimum Flavour and Taste (6.7) was observed in T All-purpose flour (80%)+ Banana (20%).

Body and Textural

The maximum Body and Textural (8.9) was observed in T Almond flour (30%) + Whole-wheat flour (30%)+ Banana (40%). Whereas the minimum Body and Textural (8.01) was observed in T Almond flour (30%) + Whole-wheat flour (20%)+ Banana (50%).

Overall Acceptability

The maximum Overall Acceptability (8.8) was observed in T Almond flour (30%) + Whole-wheat flour (30%)+ Banana (40%). Whereas Minimum Overall Acceptability (7) was observed in T All-purpose flour (80%) + Banana (20%).

Cost analysis

The maximum cost analysis (Rs.30.94) was observed in T Almond flour (30%) + Whole-wheat flour (40%)+ Banana (30%). Whereas the minimum cost

analysis is (Rs.11.54) was observed in T All-purpose flour (80%) + Banana (20%).

CONCLUSION

According to the experimental results obtained during the study on this topic Development and quality evaluation of Banana cake incorporated with Almond flour, and Whole-wheat flour, it can be concluded from the result obtained that the Banana cake can be successfully prepared by using Almond flour, Whole-wheat flour and banana. During the preparation of banana cake incorporated with Almond flour, Whole-wheat flour and banana were added in ratio T(20:80) T (30:40:30), T (30:30:40), and T (30:20:50) and Control sample was prepared with all-purpose flour. The treatments were evaluated for various organoleptic properties, physico-chemical properties, nutritional properties and microbial properties. Based on finding of the present experiment it is concluded that T Almond flour (30%) +Whole-wheat flour (30%) + Banana (40%) was found superior in respect of the physico-chemical parameters like Moisture (26.80%), Total solids (73.20%), Carbohydrate (57.48%), Protein (5.64%), Fat(8.84%), Ash (1.64%), Dietary fiber (10.18%), Vitamin-B6(0.65%) and Potassium (456.30%). After sensory evaluation banana cake having **T2(30:30:40)** was found to have highest overall acceptability score is **(8.72)** of as well as physico-chemical properties, nutritional properties and microbial properties.

The cost of production of control product T0(Rs. 11.54) with all-purpose flour. The cost of production for T1(Rs. 30.94) of Almond flour, Whole-wheat flour and banana. The cost of production for T2(Rs.30.89) of Almond flour, Whole-wheat flour and banana. The cost of production for T3(Rs. 30.84) of Almond flour, wheat flour and banana. The cost of Almond flour, Whole-wheat flour and banana of T2(30:30:40) with best sensory treatment is (Rs. 30.89).

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