Research Journal of Agriculture and Forestry Sciences _____ ISSN 2320-6063
Vol. **3(11),** 6-9, December **(2015)** *Res. J. Agriculture and Forestry Sci.*

Effects of different levels of Jackfruit Seed Flour on the Quality Characteristics of Chocolate cake

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Available online at: www.isca.in, www.isca.me
Received 17nd October 2015, revised 19th November 2015, accepted 28th November 2015

Abstract

Food is the basic necessity of life and everyone in this world is interested in it. A recent survey stated that consumers are concerned about limiting the amount of calorie and cholesterol in daily diet as higher fat intake results into cardiovascular diseases which are highly pernicious. The jackfruit seed flour is rich in protein and carbohydrate while low in fat and calorific value it is relevant to convert seed into flour and use it in different convenience food products. Conversely, it was adapted to blend 5-15% JFS for cake preparation on wheat flour replacement basis. In the present experiment jackfruit seed flour and wheat flour were used in the formulation of low calorie cake. The wheat flour and jackfruit seed flour were mixed in the ratio of 95:5, 90:10, 85:15 and 100% wheat flour (control) JFS was used in the formulation of chocolate cake. The chocolate cake samples of different treatments and control, chemical analysis moisture, Protein, Fat and ash was done for estimating its nutritional content and safety and Organoleptic characteristics like (flavor and taste, body and texture, color and appearance, overall acceptability) by hedonic scale. The treatments containing 10% level of JFS score the highest value. Thus product acceptability judged by Organoleptic evaluation and therapeutic value, the treatment can be rated as T2>T0>T1>T3.

Keywords: Jackfruit, seed, flour, calorie, cake, chocolate.

Introduction

Cake is very important product in the baking industry and consumers all over the world like it. Cake is high in calorific content and overconsumption leads to obesity among consumers demand for reduced or low calorie and high fiber products are increasing day by day due to awareness on nutrition and health among consumers[1]. The appearance texture and flavor of the product will be affected by altering the level of ingredients and increasing the fibre content these changes will be noticeable by consumers and influence their preferences. Numerous high fibre additives have been introduced as ingredients in various foods, especially baked products for satisfying the consumers demand for increased fibre foods, without sacrificing preferred sensory properties high fiber can be finely ground bran seed hulls or purified cellulose fraction derived from wood pulp for increasing the fibre content jackfruit seed flour will replace the wheat flour in certain level for meeting consumer expectations for increasing the fibre content. The jackfruit seed flour can be extensively used as a cheap source of fibre. The *Artocarpus heterophyllusis* a species of tree of Malaysian origin and is commonly known as jackfruit. The seeds of JF are rich in protein contains 6.6% protein and 38% carbohydrate and 0.4% fat. They are high in starch, low in calcium and iron and good source of vitamin B[2]. Conversion of seeds to flour gives extra benefit as the jackfruit have shorter shelf life and highly seasonal so it can be used in intermediatory products and blended with other flours for value addition and sensory properties of final product. The addition of jackfruit seed flour to deep fat products has reduced the fat content remarkably. the jackfruit is known as poor man's food and people in some areas preferred it over rice for their daily meal[3]. The seedscan be eaten after boiling or roasted, dried and salted[4].

Table-1
Proximate composition of Jackfruit seed flour (g/100 g)[5-11]

Composition	%
Moisture	14.00
Protein (g)	9.00
Fat (g)	1.10
Crude fibre (g)	2.55
Total mineral matter (g)	3.01
Total carbohydrates (g)	70.26
Calorific value (K. cal)	327

Material and Methods

Material required for preparation of control and experimental chocolate cake. Flour, Milk, Jackfruit seed flour, Sugar, Salt, Flavor (vanilla), Butter, Baking powder, Baker´s yeast, Egg, Cocoa powder, Procurement and collection of ingredients, All-purpose flour -was procured from local market Allahabad. Sugar- was procured from local market of Allahabad. Salt- sold under the brand name of TATA SALT was obtained from local market of Allahabad.

Milk-Whole milk packet manufactured by Aggies dairy sold under the brand name of "Aggies-pure" was obtained from dairy. Vanilla essence –vanilla essence sold under the name of Weikfield was obtained from local market of Allahabad. Butter-sold under the name of AMUL was obtained from local market of Allahabad. Eggs- were purchased from local market of Allahabad. Baking powder – sold under the name of Weikfield was obtained from local market of Allahabad.

Jackfruit seed (JFS) flour preparation[5]: The seeds were cleaned steeped and then boiled for 15 minutes. The seeds were cooled and outer skin (hilum) was peeled off manually. The seeds were sliced using knife. Raw jackfruit flourwas made from seeds, which were dried (60 C, 24 h). The dried seeds were then ground into flour and milled to pass through a 0.5 mm sieve[6].

Cake preparation[14-16]: Raw material was cleaned→ Mixed the dry Ingredients → Wheat flour, Baking Powder and jackfruit seed flour (5, 10 and 15%) → Cream, fat and sugar till light colour paste forms → Beat the Eggs with fat and Sugar when mixed → Add Flavorings agent and blend to Maida to get batter→ Baked at 190 o C for 15- 25 min. → Cool it at room temperature → Low Calorie Cake.

Table-1
Treatment combination

Treatment	Wheat flour and JFSF ratio
T_0	100:0
T_1	95:5
T_2	90:10
T_3	85:15

Table-2
Average of All Parameters Studies

Chemical Analysis					
Parameters	**T0**	**T1**	**T2**	**T3**	**C.D value**
Protein (%)	7.71	7.82	8.16	8.48	0.35
Fat (%)	14.86	13.75	13.06	12.57	0.36
Ash (%)	1.43	1.56	1.95	2.43	0.27
Moisture (%)	19.13	20.63	21.67	22.20	0.25
Carbohydrate (%)	56.87	56.26	55.72	54.31	0.96
Total solids (%)	80.87	79.37	78.33	77.80	0.26
Organoleptic analysis					
Parameters	**T0**	**T1**	**T2**	**T3**	
Flavor and taste	7.64	8.04	7.88	7.80	0.35
Body and texture	7.88	7.76	8.04	7.72	0.46
Color and Appearance	8.00	7.92	7.84	8.06	0.43
Total acceptability	8.04	8.16	8.12	8.12	0.41
Microbial analysis (cfu/g)					
Coliform count (10^{-2})	Nil	Nil	Nil	Nil	_
Yeast and mold count (10^{-1})	3.40	3.80	4.00	4.40	0.88

Parameters[22-23] **Chemical parameters: Ash percentage**[22]**:** Significant differences were observed in ash content of different treatment combinations. Maximum ash of 2.43% was recorded in T_3 followed by T_2 (1.95), T_1 (1.56%) and T_0 (1.43%).

Fat percentage[22]: Significant differences in fat content were observed in different treatment combinations. Maximum fat of 14.86% was found in the T_0 followed by T_1 (13.75), T_2 (13.06%) and T_3 (12.57%).

Protein percentage: Significant differences in protein content were observed in different treatment combinations. Maximum protein of 8.48% was found in the T_3 followed by T_2 (8.16%), T_1 (7.82%) and T_0 (7.71%).

Moisture percentage[22]**:** Significant differences in moisture content were observed in different treatment combinations. Maximum percentage of 22.20 was recorded in the T_3 followed by T_1 (21.67), T_2 (20.63) and T_0 (19.13).

Carbohydrate percentage[23]**:** Significant differences in carbohydrate content were observed in different treatment combinations. The highest mean carbohydrate percentage was recorded in the chocolate cake sample of T_0, (56.87), T_1, (56.26), followed by T_2 (55.72), and T_3 (54.31).

Total solids percentage[23]**:** Significant differences in carbohydrate content were observed in different treatment combinations. the highest mean total solids percentage was recorded in the chocolate cake sample of T_0, (80.87), T_1, (79.37), followed by T_2 (78.33), and T_3 (77.80).

Organoleptic parameters: Flavor and taste: Significant difference was found in average flavor and taste scoreof different treatment combinations. (T_1) had the highest average score of 8.04 followed by T_2 (7.88), T_3(7.80) and T_0 (7.64).

Body and texture: Significant difference was found in average body and texturescoreof different treatment combinations. T_2 had the highest average score of 8.04 followed by T_0 (7.88), T_1 (7.76) and T_3 (7.72) respectively.

Color and appearance: Significant difference was found in the average color and appearance score of different treatment combinations. T_3 had the highest average score of 8.06 followed by T_0 (8.00) andT_1 (7.92) and T_2 (7.84).

Total acceptability: Significant difference was observed in the total acceptability of the different treatment combinations. T_1 had the highest average score of 8.16 followed by T_2 (8.12), T_3 (8.12) and T_0 (8.04).

Microbiological Analysis: Coliform count: All samples of chocolate cake in control and treatment did not show presence of coliform.

Yeast and mold count: The significant different in yeast and mold count (10^{-1}) cfu/g percentage was found amongst the treatments. Experimental chocolate cake (T_3) had highest average yeast and mold count (10^{-1}) cfu/g of 4.40 percent followed by T_2 (4.00), T_1 (3.80) and T_0 (3.40).

Conclusion

From this experiment it can be concluded that 10% jackfruit seed flour can be successfully incorporated in chocolate cake.

It has been observed that there was significant effect of replacement of wheat flour with jackfruit seed flour to chocolate cake there was an increase in protein and reduction in fat content.

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