



Daffodil
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A Project Work on

Development of a novel cake with date fruits and quality assessment.

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Certificate of Approval

This is certified that the project report on “**Development of a novel cake with date fruits and quality assessment**” conducted by Shariful Islam bearing ID: 171-34-620, Department of Nutrition and Food Engineering, Faculty of Allied Health Sciences, Daffodil International University has been carried out under supervision in Department of Nutrition and Food Engineering, Daffodil International University. It is further certified that the research work presented here is suitable for submission for partial fulfillment of the degree Bachelor of Science in Nutrition and Food Engineering.



Professor Dr. Md. Bellal Hossain

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Letter of Transmittal

Date:

Professor Dr. Md. Bellal Hossain

Head

Department of Nutrition and Food Engineering

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Daffodil International University

Subject: Submission of Project Report.

Dear Sir,

With respect, I would like to inform you that I have completed my project report on “Development of a novel cake with date fruits and quality assessment”. I have tried to my level best to focus the project report for consistency with the optimal standard under your valuable direction.

I express my gratitude to you for your kind supervision and I hope that you will consider all my mistakes generously.

I therefore, would like to place this report to your judgment and suggestion.

Sincerely yours

.....

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Letter of Authorization

Date:

To

Professor Dr. Md. Bellal Hossain

Head

Department of Nutrition and Food Engineering Daffodil
International University.

Subject: Declaration regarding validity of the Project Report.

Dear Sir,

I would like to inform you that the project report titled “Development of a novel cake with date fruits and quality assessment”, I have prepared is not a copy of any project report previously made any other students.

I also express my honest confirmation in support to the fact that the said project report has neither been used before to fulfill my other courses nor it will be submitted to any other authority in future.

Sincerely Yours,

Shariful Islam

ID: 171-34-620

Department of Nutrition and Food Engineering

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Acknowledgement

At first, I would like to express my gratitude to my creator the almighty Allah for enabling me the strength and opportunity to complete the report in time successfully.

I am grateful to my parents without whom I cannot be here. Without the support of my parents, I could not be able to achieve my objectives and goals.

My Deep gratitude and sincere thanks to the honorable ma'am, senior lecturer, Department of Nutrition and food engineering, **Nasima Akter Mukta, my project supervisor** for his kind cooperation and to accept this Degree.

I am deeply indebted to my Prof. **Dr. Md. Bellal Hossain**, Head of Department of Nutrition & Food Engineering, Daffodil International University for his whole-hearted supervision during my organizational attachment period.

I would also like to express my great respect & warmest thanks to my project Co-supervisor, Senior Scientific Officer ,Fish Technology Research Section (BCSIR) &another Co-supervisor, Lecturer of Department of Nutrition & Food Engineering for her whole-hearted help and supervision during my project work and organizational attachment period.

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I would also like to give thanks to my seniors, juniors and my classmates for their help, advice, and suggestions, inspiration and support.

I also thankful to, Scientific Officer, Fish Technology Research Section of BCSIR for her cordial help.

Finally I wish to express immense gratitude & humble convey my heart-felt respect.

Dedication

All the hard work behind this project only possible by the grace of almighty Allah. This project is dedicated to my father, who taught me that the best kind of knowledge to have is that which is learned for its own sake. It is also dedicated to my mother, who taught me that even the largest task can be accomplished if it is done one step at a time. I also dedicated this to my wife, who always appreciate me. I dedicate this to my supervisor who helped me to complete this project.

Abstract:

Cake is one of the widely consumed baking products and highly acceptable to all types of consumers. Date fruits are also well known for its high mineral contents and fiber. The present study was taken to develop a novel cake by using paste of date fruits as 20% (sample 1), 30% (sample 2), and 40% (sample 3) along with other ingredients and to specify the quality parameters of the products by proximate analysis. A control sample was also prepared without date fruits. Moisture content of the products were increased as the percentage of the dates increased and were found as 18.25%, 26%, and 27.5% for the samples 1, 2 and 3 respectively. But moisture content was determined as 16% for control sample. Ash content of the samples also showed positive variation with the change of the weight percentage of date fruits in products and the value for sample-1 was 1.7%, sample-2 was 1.6% and sample-3 was 1.9%. Ash content for control sample was found as 1.65%. Protein content of the developed samples were decreased as percentage of date fruits increased and the value for the date incorporated samples was found as 6.56%, 4.3% and 2.18% respectively. Protein content for control sample was determined as 14.21%. Fat contents were also increased as the date fruits percentage increased and it was determined as 3.5%, 4.16%, 5.1% for sample-1,2 and 3 respectively whereas the value for control was found as 3.15%. Sensory analysis was carried out by using nine points hedonic scale in which 9 for like extremely and 1 for dislike extremely in terms of qualities such as color, taste, flavor, texture and overall acceptability with ten assessors. Color and texture were found high scores for control sample whereas other attributes such as taste, flavor and overall acceptability were high in case of enriched samples specially in sample-1.

Chapter no-01: Introduction.

1.1 Introduction:

Dates are contains higher amount of carbohydrates, minerals, vitamins, fatty acids, proteins and fiber (Akhtar et al., 2013). Development of dates can be categorized into four types 1) 'Kimir' 2) 'Khalal' 3) 'Rutab' and s 4)'Tamer'. The tamer type date is the final stage of maturation, with the consideration of darker color dried date (El Sharnouby et al., 2014).

Development of fruits in food preparation can be a alternative way for sweet taste. And also a wise research and development to reduce the added sugar intake. For the purpose of substitution of sugar Dates can be marked as idle fruit (Al shahib et al., 2003).

Nowadays consumers are becoming more concern about food consumption because of the high rates of chronic diseases, such as diabetes, obesity and celiac disease. Low in sugar, fat, cholesterol and calories containing food demand is increasing day by day along with health promoting components, such as protein, unsaturated fatty acids and fiber (Oyeyinka et al., 2014)

Most of the Arab countries are being more precious to Date palm fruits (*Phoenix daetylifera L.*) production in the world. Date palm fruits (*Phoenix daetylifera L.*) are mainly grown in the Middle East for eating fresh, also some of them are processed as dried and compressed fruit item. Hard dates has a nick name as called bread or camel dates, in dried condition and even when fresh, but the dried palm becomes extremely hard and intensely sweet, they may be added whole and ground in powder form into the flour. They can be kept for years as staple food of the Arab world, significantly the nomads and has a rich organoleptic taste (Barreveld et al., 1993). It can be eaten as dry or soft out of hand. Also can be added in form of stiffed or chopped and used as a great variety of ways: on cereals, in the pudding, cakes, bread, cookies, ice-cream coating and candy bar or chocolate (shahib et al., 2002).

Dates has high amount of minerals, with the percentage of low in fat and high in carbohydrates and dietary fiber (Al Farsi et al., 2007).

1.2 Aim of this Study:

The main purpose of this study that -

- 1) To develop a cake product with date fruits.
- 2) To do the proximate analysis of the product for the assessment of the quality.
- 3) To do the organoleptic assessment for finding the consumer acceptability.

1.3 Uses of date's fruit:

All dates, fresh or dried, contain different types of antioxidants. It is an excellent substitute for sugar to giving sweetness to other foods. It can be used in cheer, milk, sheered, even partly mixed in cake & cookies dough.

1.4 Health benefits of dates fruits:

A good source for proteins and help us stay fit and keep muscles strong. Dates can help lower cholesterol in the blood. Dates contain vitamin- B1, B2, B3, B5, all and C. Dates increase our energy level. Dates improve bone health and protects our from osteoporosis. A good source for iron and recommended for people who suffer from iron deficiency. Dates help strengthen the nervous system. Dates help keep our skin youthful. Dates keep our teeth healthy.

Useful properties of dates due to their rich chemical composition are the following: simple carbohydrates (fructose, sucrose) are more than in other fruits (according to various sources from 40-80%); complex carbohydrates namely fiber; protein includes 23 amino acids, many of them are irreplaceable; vitamins such as A, C, E, almost all the vitamins of group B; micro- and macronutrients, for example, selenium, phosphorus, fluorine, calcium, zinc, potassium, copper, sulfur, cobalt, iron; Tannins namely astringents, tannins, which suppress inflammatory processes in the body.

Chapter no-2: Review of Literature

2.1 varieties of date's fruits:

Sagha-these wintry dates are farmed in Riyadh. The appearance of this type of date is brown & light yellow at the tip. They are small but do not shrink. Anbara -these large dates are popular due to their high plump and small seed. They are sweet and brown and also contain large amount of protein and one of the most expensive fruit. Barhi-the texture and appearance of this date is yellow and crunchy. Flavor of ripe date is like caramel and brown sugar. These creamy dates are really delicious and often sold while they're still on the thin branches. These seasonal dates can be preserved for months in frozen condition. Safawi-these black dates are sweet, fleshy & packed with vitamins. These dates are soft and cultivate in Madinah. These dates are known for their healing properties. If eaten on an empty stomach. They kill stomach worms. This dates also famous for their high mineral content. These dates are known to have healing properties & in a habits, the prophet is reported to have said that having seven ajwa dates in the morning protects a person from magic and poison until the evening. Dry dates-dry dates are yellow and crunchy. The date tastes like brown sugar. Its sweetness like brown sugar .So that's ways it's similar to brown sugar (Lukas et al., 1977).

Chapter no 03: Methodology

3.1 Materials and Methods:

The study was conducted in the NFE Laboratories of Daffodil International University, Dhaka

3.2 Collection of Raw Materials:

The fresh date fruits of origin Maryam Al-Madina were purchased from the super shop. The paste of dry date's fruits were used to prepare cake.

3.3 Chemicals and Ingredients used in product development:

- ✓ Dates
- ✓ Flour
- ✓ Milk
- ✓ Condensed Milk
- ✓ Sweet yogurt
- ✓ Oil
- ✓ Nuts
- ✓ Baking Powder

3.4 Preparation of novel cake with date fruits:

Preparation of products with date fruits were made using the following equipment's, Ingredients and utensil.



Figure no-1: Products developed with date fruits.

3.5 Apparatus and Equipment's:

- 1) Blender Machine
- 2) Oven
- 3) Digital Balance
- 4) Knife
- 5) Mixture Machine
- 6) Spoon
- 7) Tray
- 8) White paper
- 9) Dies
- 10) Chopping board
- 11) Sieve

3.6 Preparation of novel cake with dates fruit:

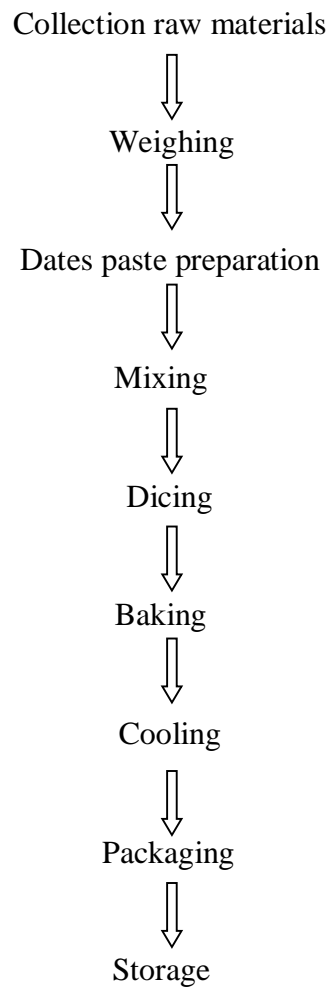
Novel cake with date fruits were prepared by the following steps:

- ❖ Oven was preheated to about 180 degree at 25-30 minutes.
- ❖ Milk was then slightly warmed and the dates were soaked in it for about 1 hours.
- ❖ Smooth paste was made from that soaked dates and milk mixture.
- ❖ Oil & condensed milk were added into the paste & mixed well in a blender machine.
- ❖ Flour and baking powder were sieved together.
- ❖ Blended mixture, yoghurt, sieved flour and baking powder were placed together in a hand mixture and mixed well.
- ❖ Dough was then prepared and weighed as 370gm which was then poured into the dice to fill up in a proper way.
- ❖ Resultant was then baked in an oven at 180°C for 25-30 min.



Figure no-2: Picture: Slice nuts & dates cake.

3.7 Flow chart:



3.8 Table: Preparation of cakes with variable percentage/gm of date fruits

Raw Materials:								
Sample No:	Flour (gm)	Raw Milk (gm)	Condensed Milk (gm)	Sweet Yogurt (gm)	Dates (gm)	Oil (gm)	Almond (gm)	Baking powder (gm)
Control (C)	250	100	200	100	-	100	25	8
Sample-1 (S-1)	250	100	200	100	50	100	25	8
Sample-2 (S-2)	250	100	200	100	75	100	25	8
Sample-3 (S-3)	250	100	200	100	100	100	25	8

4.1 Proximate Analysis

Moisture, Ash, Fat, protein of developed cakes with date fruits were determined by following methods: moisture content by Digital moisture Analyzer wet method at 120⁰C for 5-7 minute; Ash content by muffle furnace ignition method at 600⁰C for 6 hours & protein by Kjeldahl method for 24 hours, and fat by Soxhlet method with n-hexane for 6 hours.

4.2 Determination of moisture test by novel cake with date fruits:

Instrument: Digital Moisture Analyzer.

Materials: Sample was 2-3 gm.



Figure-3: Digital Moisture Analyzer Machine.

Procedure:

Samples from each products were weighed to around 2 gm. and were kept inside the digital moisture analyzer to obtain the percent of moisture.

4.3 Determination of Ash test by novel cake with date fruits:

A silica dish was heated at 60°C for 1 hour and then cooled in a desiccator. About 3 gm. of each sample was put into the silica dish and then kept into the furnace. The temperature of the furnace was then allowed to reach about 600°C after placing the dish in it. The temperature was maintained until the water was fully removed indicating that all the organic matter content of the sample has been destroyed. The silica dish was then brought out from the furnace & cooled in the desiccators & re-weight.



Figure-4: Muffle Furnace Machine.



Figure-5: Crucible Apparatus.



Figure-6: Desiccator Apparatus.

Calculation:

$$\% \text{ Ash Content} = \frac{C-A}{B-A} \times 100$$

Here,

A=Weight of empty dish

B= weight of empty dish + sample before ash

C= weight of dish + Ash

4.4 Determination of protein by Kjeldahl method:

Protein content of different novel cake with date fruits sample were determined by following the method of Micro- Kjeldahl.



Figure-7: Digestion Apparatus.



Figure-8: Distillation Apparatus.

Reagents and Equipment's:

- 1) Sulfuric acid
- 2) Digestion mixture(2g Copper sulphate+98g Potassium sulphate)
- 3) 40% NaOH
- 4) 0.05 H₂SO₄
- 5) Methyl red indicator
- 6) 0.1N NaOH
- 7) Distilled water
- 8) Kjeldahl apparatus
- 9) High capacity electronic balance etc.



Figure-9: Reagents Apparatus.

The Method:

The protein content was determined by Kjeldahl method. The principle of this procedure involved digestion of the sample with concentrated sulfuric acid (H₂SO₄) and digestion mixture , which

causes oxidation and destruction of protein and conversion of the organic nitrogen to ammonia that remains in the acid mixture as ammonium sulphate.

The amount of ammonia nitrogen was determined by making the digest alkaline followed by distillation of the liberate ammonia into standard acid solution and estimated titrimetrically.

Cleaned and dried 500 ml Kjeldahl flasks were taken along with 0.4g sample in it with about 10 ml of concentrated sulfuric acid (H_2SO_4) and 2gm digestion mixture were added then the digestion chamber was heated about (6-8 hours) until the end point will be no white smoke of sulfuric acid (H_2SO_4) and the solution will be crystal clear. After completing the digestion, the flask was cooled and digested mixture was transferred in a 100 ml volumetric flask and diluted up to make with distilled water. Ten (10 ml) of that solution was transferred in a Kjeldahl distillation apparatus after adding 50 ml distilled water, 10 ml ($0.05H_2SO_4$), 2 drops methyl red indicator in a conical flask and the opposite of Kjeldahl distillation apparatus added 150 ml distilled water, 10 ml ($0.1 NaOH$) solution. Set up the condenser and distillation for 30 minutes. Cooled the sample and titration with $0.1N NaOH$ the end point will be color changes from pink to light yellow.

Calculation:

The percentage of nitrogen in the sample was calculated by the following equation

$$\% \text{ Nitrogen} = (B-S) \times 1.4 \times 10 \times 6.25 \times 0.1 / \text{Sample weight}$$

Where,

S= Titration reading for sample

B= Titration reading for blank sample

Nitrogen factor= 6.25

4.5 Determination of fat by Soxhlet apparatus:

The Method:

Fat content of novel cake with date fruits were determined following the methods by Mehlenbacher. The principle of this method lied in mixing with a solvent N-Hexane which was then removed by distillation and the residue was dried and weighed. The extraction procedure was carried out in soxhlet apparatus.

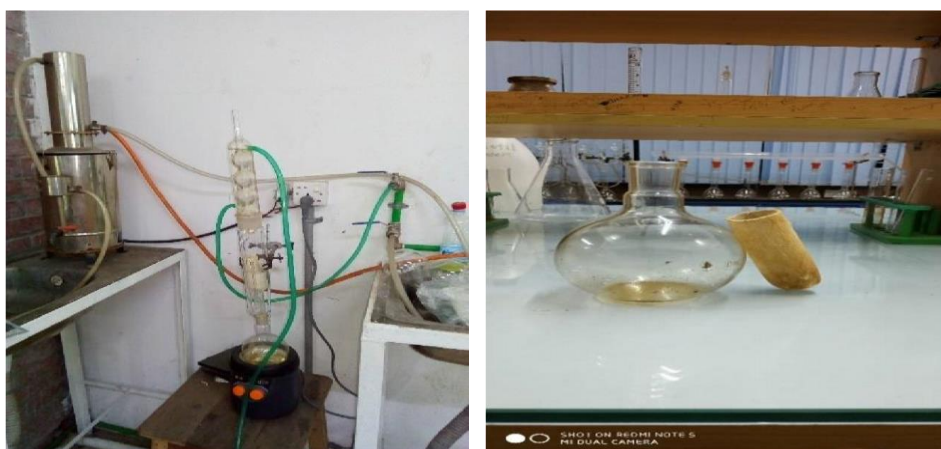


Figure no-10: Soxhlet Apparatus.

Procedure:

The fresh samples around 2 gm. of cake products with date fruits were weighed accurately, mashed slightly and it was taken in extraction thimble. The thimble was placed in an n-hexane for about six hours.

Calculation:

$$\% \text{ of fat content} = A/B \times 100$$

Where,

A = weight of fat

B = weight of sample take

Chapter no-05: Results and discussions

5.1 Sensory Evaluation:

Sensory tests of each product in terms of color, texture, taste, flavor and overall acceptability was carried out by taking 10 assessors who were students & teachers of Daffodil International University with 9 point hedonic scales. The data were summarized below.

5.1a Color

9 = like extremely, 8 = like very much, 7 = like moderately, 6 = like slightly, 5 = neither like or dislike, 4 = dislike slightly, 3 = dislike moderately, 2 = dislike very much, 1 = dislike extremely.

Panelist no	Control	Sample-1 (20% dates)	Sample2(30% dates)	Sample3(40% dates)
1	8	8	7	6
2	6	8	6	7
3	5	6	8	1
4	9	8	7	8
5	9	8	7	7
6	9	5	6	8
7	8	9	8	8
8	6	6	3	5
9	9	9	9	9
10	8	8	7	8
Total	77	75	68	67
Mean	7.7	7.5	6.8	6.7

Table No 5.1a shows that 4 panelists gave the score ‘like extremely’ to control sample whereas 5 panelists liked very much’ the Sample-1 and 4 panelists liked moderately sample-2. The result of overall color analysis showed that the control sample got the higher score among the samples followed by sample-1.

5.1b Texture

9 = like extremely, 8 = like very much, 7 = like moderately, 6 = like slightly, 5 = neither like or dislike,

4 = dislike slightly, 3 = dislike moderately, 2 = dislike very much, 1 = dislike extremely.

Panelist no	Control	Sample-1 (20% dates)	Sample-2 (30% dates)	Sample-3 (40% dates)
1	5	8	7	7
2	6	8	6	7
3	5	6	9	1
4	8	8	8	7
5	9	6	6	7
6	9	5	5	9
7	9	9	7	7
8	6	5	2	5
9	8	8	8	7
10	8	8	7	7
Total	73	71	65	64
Mean	7.3	7.1	6.5	6.4

Table No 5.1b shows that 3 panelists gave the score ‘like extremely’ to control sample whereas 5 panelists liked very much the Sample-1 and 3 panelists liked moderately to sample-2. The result of overall texture analysis showed that the control sample got the higher score among the samples followed by sample-1.

5.1c Taste

9 = like extremely, 8 = like very much, 7 = like moderately, 6 = like slightly, 5 = neither like or dislike,

4 = dislike slightly, 3 = dislike moderately, 2 = dislike very much, 1 = dislike extremely.

Panelist no	Control	Sample-1 (20% dates)	Sample-2 (30% dates)	Sample-3 (40% dates)
1	5	8	7	6
2	6	8	6	7
3	1	4	9	3
4	7	7	6	7
5	8	7	7	8
6	7	6	6	8
7	8	8	9	6
8	5	5	2	3
9	9	9	9	9
10	7	8	7	7
Total	63	70	68	64
Mean	6.3	7.0	6.8	6.4

Table No 5.1c showed that 1 panelists gave the score ‘like extremely’ to control sample whereas 4 panelists liked very much the Sample-1 and 3 panelists liked moderately to sample-2. The result of overall taste analysis showed that the sample-1 got the higher score among the samples followed by sample-2 and sample-3. Assessors liked taste of enriched samples more than the control sample.

5.1d Flavor

9 = like extremely, 8 = like very much, 7 = like moderately, 6 = like slightly, 5 = neither like or dislike, 4 = dislike slightly, 3 = dislike moderately, 2 = dislike very much, 1 = dislike extremely.

Panelist no	Control	Sample-1 (20% dates)	Sample- 2(30% dates)	Sample- 3(40% dates)
1	5	8	7	6
2	6	8	6	7
3	1	3	8	4
4	8	9	8	8
5	9	8	7	9
6	8	7	7	7
7	6	8	8	9
8	6	5	2	3
9	8	8	8	8
10	7	8	6	7
Total	64	72	67	68
Mean	6.4	7.2	6.7	6.8

Table No 5.1d showed that 1 panelist gave the score ‘like extremely’ to control sample whereas 6 panelists liked very much the Sample-1 and 3 panelists liked moderately to sample-2. The result of overall flavor analysis showed that the sample-1 got the higher score among the samples followed by sample-3 and sample-2. Assessors liked flavor of enriched samples more than the control sample.

5.1e Over all acceptability

9 = like extremely, 8 = like very much, 7 = like moderately, 6 = like slightly, 5 = neither like or dislike,

4 = dislike slightly, 3 = dislike moderately, 2 = dislike very much, 1 = dislike extremely.

Panelist no	Control	Sample-1 (20% dates)	Sample-2 (30% dates)	Sample-3 (40% dates)
1	5	8	7	6
2	6	8	6	7
3	1	2	7	2
4	6	8	7	7
5	8	8	7	8
6	8	6	6	8
7	7	9	8	8
8	6	5	2	3
9	9	9	9	8
10	7	8	7	7
Total	61	71	66	64
Mean	6.1	7.1	6.6	6.4

Table No 5.1e showed that 1 panelist gave the score ‘like extremely’ to control sample whereas 5 panelists liked very much the Sample-1 and 5 panelists liked moderately to sample-2. The result of overall acceptability showed that the sample-1 got the higher score among the samples followed by sample-2 and sample-3. Investigators accepted highly the cake enriched with date fruits than the control sample.

5.2 Proximate analysis:

Sample No.	Parameter			
	Moisture %	Ash%	Protein	Fat%
Control	17	1.3	13.12	3.25
	16.5	1.5	15.31	3.2
	15	1.4	Average=14.21	3
	Average= 16.17%	Average= 1.4%		Average=3.1%
Sample-1	18	1.6	4.37	3.8
	18.5	1.8	8.75	3.5
	18.25	1.7	Average=6.56	3.2
	Average=18.25%	Average=1.7%		Average=3.5%
Sample-2	26.5	1.7	6.56	4.35
	26	1.5	2.18	4.15
	25.5	1.6	Average=4.37	4
	Average=26%	Average=1.6%		Average=4.1%
Sample-3	28	2	2.18	5.2
	27.5	1.9	2.18	5.1
	27	1.9	Average=2.18	5
	Average=27.5%	Average=1.93%		Average=5.1%

Moisture content of the products varied within the range 16.17% -27.5%. Moisture percentage for control sample was found as 16.17% whereas the value for sample-1, sample-2 & sample-3 was observed as 18.25%, 26%, and 27.5% respectively. The value of moisture content for the traditional cake is maximum of 18 %. Moisture content of samples enriched with date fruits was showed as

high value than the control. It was observed as increasing as increased percentage of date fruits. Low moisture content is closely related to quality and durability of these products. Ash content of the products varied within the range 1.4% -1.93%. Ash percentage for control sample was found as 1.4% whereas the value for sample-1, sample-2 & sample-3 was observed as 1.7%, 1.6%, and 1.93% respectively. The value of ash content for the traditional cake is maximum of 1.6 %. Ash content of samples enriched with date fruits was showed as high value than the control. It was observed as increasing as increased percentage of date fruits.

Protein content of the products varied within the range 14.21-2.18. Protein for control sample was found as 14.21 whereas the value for sample-1, sample-2 & sample-3 was observed as 6.5, 4.37, and 2.18 respectively. The value of protein content for the traditional cake is maximum of 6.5. Protein content of samples enriched with date fruits was showed as low value than the control. It was observed as decreasing as increased percentage of date fruits.

Fat content of the products varied within the range 3.1% -5.1%. Fat percentage for control sample was found as 3.1% whereas the value for sample-1, sample-2 & sample-3 was observed as 3.5%, 4.1%, and 5.1% respectively. The value of fat content for the traditional cake is maximum of 3.5%. Fat content of samples enriched with date fruits was showed as high value than the control. It was observed as increasing as increased percentage of date fruits.

Chapter no-6: Conclusions

In the study, cakes with variable percentage of date fruits were developed to get optimum composition of the product. Developed products were analyzed to check several attributes such as moisture percentage, ash content, protein content and fat content for quality evaluation. All evaluated qualities were found as increased with increased percentage of date fruits except protein content. As moisture percentage of enriched cakes was observed high enough, further study to reduce moisture percentage and to assess other qualities such as dietary fiber content and total phenolic content should be carried out. Fiber content would be higher in the products. Thus, further study can be carried out to evaluate all the required parameters of the products before market research for commercialization. Developed products can be a good alternative of nutritive contents.

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