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Quality characteristics of breads fortified with date (*Phoenix dactylifera* L.) paste

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Abstract

This study evaluated the quality of bread fortified with Date Paste Breads with added full fat and Date Paste were baked and analyzed for nutrient compositions, physical and sensory properties and storage stability. A date is one of the best and choicest foods of the nature and is the treasure house of highly soluble natural iron, calcium, potassium and other vitamins. The dates were rich in sugar (71.2–81.4% dry weight), while ash represented 1.68–3.94%; they contained low concentrations of protein and lipid (1.72–4.73% and 0.12–0.72%, respectively); Fat (gm)0.4; Minerals (gm)2.2; Crude fiber (gm) 3.9 Carbohydrates (gm) 75.8; Energy (Kcal) 317; Calcium (mg) 120; Phosphorus (mg) 50; Iron (mg) 7.3. Fortification with Date Paste improved the nutrient composition, storage stability, physical and sensory properties of bread. Now a day, Bread is widely used as a sweet in home so it is needed to make Breads healthy. Bread is ideal for nutrient availability, palatability, compactness and convenience.

Keywords: Bread, date, fortification, date paste quality, qualitative parameters, shelf-life

Introduction

Multinational food industries, especially baking industries have responded well to the increased interest in nutrition and are developing products that meet the nutritional requirement and dietary recommendations of the consumers. Baking products especially bread form an important part of Indian dietary (Morris *et al.* 1977). Bread is mixture of wheat flour, sugar, shortening agent, salt and water made into dough raised by the action of added yeast followed by fermentation and final baking. It is used as staple food in many countries. It is principal source of nutrition. The purpose of bread making is to present the cereal flour to consumers in an attractive, palatable and digestive form. Bread is made by different procedures which depend upon many factors including tradition, cost, type of energy available, the type and consistency of the flour available, the type of bread desired and the time between baking and eating (Neelam Khetarpaul *et al.* 2005)^[13].

Bread is the fermented product. Fermentation causes changes in food qualities indices including texture, flavour, appearance, nutrition. The benefits of fermentation may include improvement in palatability and acceptability by developing improved flavours and texture, also preservation through formation of alcohol and antibacterial compounds. Enrichment of nutritive content by microbial synthesis of essential nutrient and improving digestibility of protein and carbohydrates.

Demand for fortified bread has increased considerably in last few years in advanced countries because of its better nutritional and sensory qualities.

Date is staple food in many countries. Date has botanical name *Phoenix dactylifera* L. belongs to the family Areaceae. It is widely grown in Middle East of Asia and North Africa and an important commercial crop. Date fruits (*Phoenix dactylifera* L.) are cultivated mostly in the dry region of Gujarat, Rajasthan, Punjab, Uttar Pradesh, Andhra Pradesh and Karnataka. Date fruits are rich in sugars, vitamins and eaten fresh or dried. They are widely used in bakery, confectionery, jams and even in brandy preparation. The current production of dried dates in the world is 5.46 million tons in 2001.

A date is one of the best and choicest foods of the nature and is the treasure house of highly soluble natural iron, calcium, potassium and other vitamins. Date contain dietary fibers, vitamins like B1, B2, C, folic acid and nicotinic acid in good amount. Date has less fat content hence heart patients also consume as such or their products (H. Panda, 2001)^[9].

Dates are high in dietary fibers, low in fat, cholesterol and sodium and it contain more potassium. This is one of the best healthful combinations. The National Cancer Institute recommends that the low fat and high fiber diet help to reduce the risk of some type of cancers.

Dates contain high amount of dietary fiber. This fiber helps to control the diabetes by decreasing the blood glucose levels and helps to lower the blood cholesterol level.

Role of fiber in human nutrition became increasingly apparent from the independent findings of many workers during the last two decades. The classical approach in determining crude fiber in foods under drastic acid-alkali digestion conditions has given way to more realistic methods involving detergents and enzymes. The enzymatic methods simulate more or less the conditions prevalent in human gastrointestinal tract for reflecting the fate of food, including its fiber components. (Potty 1996) [16].

Dates contain 75 gm of carbohydrates, making them a powerhouse of energy. Carbohydrates include sugars such as fructose, glucose, sucrose to provide a quick energy and are readily used by the body. Dates perfect energy source. Today's healthy diets recommended that eating foods that are low in sodium, fat, cholesterol and high in fiber Hence, Dates fit perfectly into the healthy lifestyle.

Materials and Method

The present investigation entitled "Preparation of bread with the fortification of date (*Phoenix dactylifera* L.) Paste was undertaken at Department of Warner college of Dairy technology (Food Sciences and Technology) SHUATS, Prayagraj (U.P). The details of the materials and methods followed are indicated here under.

2.1 Materials

2.1.1 Raw materials

2.1.1.1 Flour

Refined wheat flour obtained from the local market. The flour was of creamy white colour and Free from bean fragments.

2.1.2 Date paste (*Phoenix dactylifera* L.)

Date paste was obtained from dried date by using procedure given by Sawate *et al.* (2007).

2.1.3 Yeast

Yeast (Baker's yeast) was purchased from local market of Prayagraj.

2.1.4 Shortening

Sunflower trade hydrogenated vegetable oil (Hindustan Lever Ltd) was used for bread making, this was purchased from local market of prayagraj.

2.1.5 Sugar

Sugar was obtained from local market of prayagraj.

2.1.6 Salt

Salt was obtained from local market of prayagraj.

2.1.2 Processing Equipments

1. Baking Oven.
2. Weighing balance
3. Containers
4. Sieves
5. Kneading machine

The Processing Equipments stated above were utilized from Department of Warner college of Dairy Technology (Food Sciences and Technology) SHUATS, Prayagraj (U.P).

2.1.3 Packaging material

The low density polyethylene bags were used for packaging of cake. It was purchased from local market of Prayagraj.

2.2 Method

Date paste blend Preparation Commercial wheat flour was blended with 15%, 25% or 35% of either Date Paste and the blends are shown in Table 1.

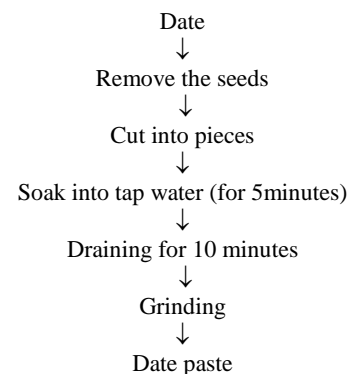
2.2.1 Formulation table

Table 1: Blend preparation commercial wheat flour was blended

Ingredients	Control (T ₀)	Sample A(T ₁)	Sample B(T ₂)	Sample C(T ₃)
Refined wheat flour (gm)	500	500	500	500
Yeast (gm)	12.5	12.5	12.5	12.5
Salt (gm)	10	10	10	10
Hydrogenated Veg. oil (gm)	15	15	15	15
Sugar (gm)	30	9.75	7.25	3.75
Date paste (gm)	-	15	25	35

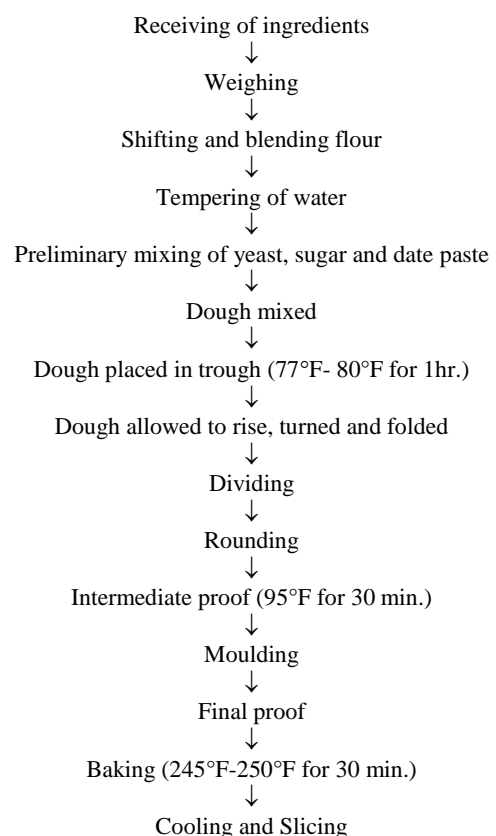
3.2.1 Preparation of date paste

Suggested the method for preparation of Date paste is as follows –



2.2.2 Preparation of bread

Neelam Khetarpaul *et al.* (2005) [13], suggested the method for bread preparation as follows -



Date paste bread**Physical Characteristic****1. External feature**

- Colour:** It was calculated by sensory evaluation.
- Crumb texture:** It was calculated by sensory evaluation.

2. Internal features

- Taste:** It was calculated by sensory evaluation.
- Flavour:** It was calculated by sensory evaluation.

3. Chemical Analysis

The following parameters of date paste bread were checked.

- Moisture content:** Moisture content was determined by method given by Ranganna (1995) [20].
- Protein:** The protein of sample was determined by Micro-kjeldhal method according to A.O.A.C-30.010 procedure (1975) [3].
- Fat content:** Fat was determined by the A.O.A.C-30.006 (1975) using petroleum ether Solvent in soxhlet apparatus.
- Crude fiber:** Crude fiber was determined by using A.O.A.C-30.017 (1975) [3] method.
- Ash content:** Ash content of the sample was determined by using A.O.A.C.-30.006 (1975) [3] procedure.

4. Sensory evaluation of date paste bread

The fresh samples of Date paste bread was subjected to organoleptic evaluation by a panel of judges. The sensory characteristics such as colour, taste, crumb texture, flavour and overall acceptability was evaluated. The judges was provided with Hedonic scale, described in I.S: 6273 (part-II) 1971.

5. Storage studies

The storage study of five bread samples with 100% wheat flour, 15%, 25% and 35% substituted Date Paste were evaluated by 15-member trained panel lists who scored for softness, springiness, moisture and flavour on the 2nd, 4th and 6th day of storage at ambient condition ($26 \pm 2^\circ\text{C}$) after baking, using a seven-point hedonic scale.

Result and Discussion

To evaluate the quality as well as acceptability of bread fortified with date paste. Chemical analysis and Organoleptic evaluation of date paste bread had been carried out similarly the quality of the date paste used for manufacturing of bread was evaluated.

The results of the present research work are tabulated, presented and discussed under following.

Table 2: Moisture content of Date paste Bread (Percent)

Treatments	Replications			Mean
	R1	R2	R3	
T ₀	36.59	36.10	37.00	36.56
T ₁	37.24	37.00	37.34	37.19
T ₂	38.10	37.98	38.46	38.18
T ₃	38.45	38.26	38.87	38.52
Average	37.59	37.33	37.91	37.61

It would be seen from the above table, that the variation in moisture content of date paste bread due to level of date paste. Date contain about 15.3 percent moisture which increased the bread moisture.

The average moisture content of bread at 3, 5, 7 percent level was 37.19, 38.18, 38.52 respectively. The average Moisture

content of date paste bread of all treatments and replications was 37.61 percent. The moisture content of bread increase with increase in level of date paste.

Table 3: Protein content of Date paste bread (percent)

Treatments	Replications			Mean
	R1	R2	R3	
T ₀	6.34	6.27	6.30	6.30
T ₁	7.36	7.42	7.48	7.42
T ₂	7.54	7.68	7.59	7.60
T ₃	7.80	7.77	7.74	7.77
Average	7.26	7.28	7.27	7.27

The average protein content of date paste bread at 3, 5, 7 percent level was 7.42, 7.60, 7.77 respectively from above table shows that the protein content increased with increase in level of date paste.

Table 4: Fat content of date paste bread (percent)

Treatments	Replications			Mean
	R1	R2	R3	
T ₀	2.43	2.4	2.35	2.39
T ₁	2.57	2.63	2.61	2.60
T ₂	2.62	2.67	2.65	2.64
T ₃	2.67	2.72	2.70	2.69
Average	2.57	2.60	2.57	2.58

It would be seen from the above table that, the variation in fat content of bread due to level of date paste. The average fat content of date paste bread at 3, 5, 7 percent level was respectively. The fat content decreased with increased in level of date paste. As compared to the standard composition of bread fat content of bread was low due to date has low fat content i.e. 0.4 percent.

Table 5: Ash content of date paste bread

Treatments	Replications			Mean
	R1	R2	R3	
T ₀	2.10	2.36	2.13	2.19
T ₁	3.29	3.33	3.30	3.30
T ₂	3.48	3.47	3.50	3.48
T ₃	3.68	3.60	3.63	3.63
Average	3.13	3.14	3.14	3.15

From table showed that the average total ash content of all the treatments and replications was 3.15 percent. It was the highest in treatment T₃ i.e. bread containing 7 percent date paste (3.63 percent) and lowest in Treatment to i.e. control (2.19 percent). From this table it was seen that the mineral matter of bread increased due to the addition of bread which contain 2.1 percent mineral, hence it was seen that bread become nutritious.

Organoleptic evaluation of date paste bread**Table 6:** Score for Overall acceptability of date paste bread

Treatments	Replications			Mean
	R1	R2	R3	
T ₀	7.30	7.45	7.62	7.45
T ₁	7.35	7.47	7.43	7.41
T ₂	7.75	7.76	7.72	7.74
T ₃	7.50	7.86	7.29	7.55
Average	7.47	7.63	7.51	7.53

From average figures of overall acceptability in Table it is

seen that bread prepared by fortification with 5 percent, date paste scored the highest points (7.46) followed by bread prepared by fortification with 3 percent date paste (7.34). Bread prepared by fortification with 7 percent date paste (7.09) scored lowest points.

Conclusion

From the results of present investigation, it may be concluded that-

1. The study of chemical characteristics of the different treatment levels of bread prepared revealed that the amount of nutrients is highest in the treatment level T₃, i.e protein content, moisture content and crude fiber and ash content. The higher ash content showed that the dates has good mineral value which is retained even after baking. Hence, it can be concluded that the bread prepared by incorporation of date paste can retain good amount of nutrients with minimum baking losses.
2. The study of sensory characteristics showed different in level showed that the acceptability is more in case of the treatment level T₂. This treatment showed highest scores for parameter like texture, flavour and overall acceptability. Hence it can be concluded that according to sensory characteristics. The T₂ is the best level treatment level.

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