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Nutritional and Sensory Evaluation of Biscuit Prepared using Palm Date Kernels and Olive Seeds Powders

By

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Abstract

This study aimed to evaluate the nutritional, physical and sensory properties of biscuit prepared using palm date kernels and olive seeds powders. Three different substituted levels of plant sources (5%, 10% and 15%) were used in preparing biscuit. The chemical composition and minerals of plant sources and prepared biscuit were determined. Bioactive compounds in plant sources were determined. Physical and sensory properties of prepared biscuit were evaluated. Results showed that the content of moisture, protein, ash, fibers, polyphenols, flavonoids, major of minerals in olive seeds powders were higher than palm date kernels, while fat, carbohydrates, saponins, calcium, magnesium content in olive seeds powders were lower than palm date kernels. Nutritive value, physical properties and sensory characteristics were differed by changing the levels of plant sources. The study concluded that utilization of palm date kernels and olive seeds powders improved the nutritional value of biscuit. **Keywords**:Palm date kernels, olive seeds, biscuit , chemical composition, bioactive compounds, mineral, physical and sensory properties.

1- Introduction Date seeds considered a waste product of many date processing plants producing pitted dates, date syrup and date confectionery. At present, seeds are used mainly for animal feeds in the cattle, sheep, camel and poultry industries. With world production of dates reaching 6.9 million tones in 2004, from this approximately 863 thousand tones of date seeds are produced **(FAO, 2007).** Thus, utilization of such waste is very important to date cultivation and to increase the income to this sector. **Al- Farsi *et al.*, (2007)** who researched the functional properties of date seeds, their reported composition was 3.1–7.1% moisture, 2.3–6.4% protein, 5.0–13.2 fat, 0.9–1.8% ash and 22.5–80.2% dietary fiber. The good nutritional value of date seeds is based on their dietary fiber content, which makes them suitable for the preparation of fiber-based foods and dietary supplements. Since a large quantity of date seeds are being produced as a waste material and the seeds contain a significant amount of dietary fiber. Olive stone is a lignocellulosic

material, with hemicellulose, cellulose and lignin as main components. The whole olive stone is a rich source of valuable components due its chemicals and physical properties in addition to its combustion heat . A large number of research articles have been published dealing with the chemical composition of olives and oliveoil. However, only a few studies have been dedicated to analyzing the components and uses of the olive stone **(Fernandez *et al.*, 2001).** Bakery products are sometimes used as a vehicle for incorporation of different nutritionally rich ingredients (**Gandhi *et al.*, 2001; Sudha *et al.*, 2007).**Biscuits are the most popular bakery items consumed nearly by all sections of the society in Egypt. Some of the reasons for such wide popularity are low cost in comparing with other processed foods (affordable cost), good nutritional quality and availability in different forms, varied taste and longer shelf-life **(Hussein *et al.*, 2011).** This investigation was done to evaluate the nutritional, physical and sensory properties of biscuit prepared using different levels of palm date kernels and olive seeds powders .

2-Materials and methods

2.1. Materials

Palm date and olive fruits, wheat flour 72% extraction, sugar powder, corn oil, sodium chloride and ammonium bicarbonate were obtained from Kafrelsheikh local market.Palm date kernels and olive seeds were separated from fruits of palm date and olive , then sun dried to complete dryness on wood trays. The dried materials were grounded into powder using pestle and mortar and then sieved through 20-mesh sieve. The powder was kept in glass containers at 4°C in the refrigerator till they chemically analysis.

2.2.Methods:

2.2.1.Biscuit Formula :

Control biscuit dough was prepared using 100 g wheat flour 72% extraction, powdered sugar 25.00 g , corn oil 15.00 g,sodium chloride 1.00 g ,ammonium bicarbonate 1.00 g and water 20.00 g. according to **(Saba, 1997).** The supplemented biscuits with palm date kernels and olive seeds powders were prepared using the same formula except for replacing the wheat flour with 5, 10 and 15% of each powder.

2.2.2.Dough Preparation

The biscuits were prepared by mixing sugar and corn oil to gether , then wheat flour (72% extraction), sodium chloride, ammonium bicarbonate and water were added to prepare dough. The dough was mixed for 15 min until a uniform smooth paste was obtained using hand **(Ihekoronye, 1999)**. Biscuits were formed by biscuit

machine (model Italy) and baked for about 30 min at 180 ˚C according to the method of **Rhona (1983).**

2.2.3.Preparation of different blends of biscuits

Blends of biscuits were prepared using wheat flour 72% extraction rate as control or those which substituted with 5 , 10 and 15% of palm date and olive seeds powders .

2.2.4. Gross chemical composition

Moisture, protein, fat, fibers and ash contents were determined according to the method described in the **A.O.A.C. (1995).** Total carbohydrates were calculated by difference according to **Pellet and Sossy (1970).** All determinations were performed in triplicates and the means were reported. The caloric value was calculated using values of 4 k.cal/g. of protein, 4 k.cal/g. of carbohydrate and 9 k.cal/g. of fat according to **Livesy (1995).**

2.2.5.Determination of total phenols

The powdered of palm date kernels and olive seeds (2 g) was extracted with methanol, at room temperature overnight. The methanol extracts were combined and concentrated under reduced pressure on a rotary evaporator. Total phenolic content of each plants extract was determined with the Folin–Ciocalteu's reagent (FCR) according to the published method. Each sample (0.5 ml) was mixed with 2.5 ml FCR (diluted 1:10, v/v) followed by 2 ml of Na_2CO_3 (7.5 %, v/v) solution. The absorbance was then measured at 765 nm after incubation at 30°C for 90 minutes. Results were expressed as Gallic acid equivalent (mg Gallic acid /g dried extract) (**Slinkard and Singleton, 1977).**

2.2.6.Determination of tannins

Five grams of the powder was extracted with 100 ml acetone–water (70/30, V/V), and the mixture was stirred continuously for 72 h at room temperature. Then, the mixture was filtrated and evaporated under vacuum at 400 C to remove acetone. The washed with 30 ml dichloromethane to remove lipid soluble remaining solution was substances. After that, the solution was further extracted with ethyl acetate at a ratio of 30/30 (V/V). The water layer was separated and extracted twice more similarly. Then the resulting water layer was evaporated to dryness, and the resulting substance was weighed. (**Zhang *et al*., 2008).**

2.2.7.Determination of alkaloids2

Alkaloids contents of the plants were determined using the method that described by **Bouchelta (2005)** by Soxhlet, ten grams of the powdered sample was extracted with 250 mL of ethanol period five hours, extracted of ethanol was

evaporated to dryness with a rotary evaporator, under reduced pressure at 40˚C., dry residue repeat by 150 mL of chloroform and acidify by HCl 5 % pH 3, it let pillow during 30 minutes in the room temperature, the phase acid aqueous were extracted by 150 ml of chloroform, basify by the NaHCO3 5 % pH 9 and lit it during 15 minutes in the room temperature.

The chloroform phase was evaporated to dryness with a rotary evaporator under reduced pressure. The dry residue is the total alkaloids.

2.2.8. Determination of flavonoids

The total flavonoid content of palm date kernels and olive seeds extracts was determined by a colorimetric method as described in the literature. Each sample (0.5 ml) was mixed with 2 ml of distilled water and subsequently with 0.15 ml of a $NaNO_2$ solution (15 %). After 6 minutes, 0.15 ml of aluminum chloride ($AlCl_3$) solution (10 %) was added and allowed to stand for 6 minutes, then 2 ml of NaOH solution (4 %) was added to the mixture. Immediately, water was added to bring the final volume to 5 ml and the mixture was thoroughly mixed and allowed to stand for another 15 minutes. Absorbance of the mixture was then determined at 510 nm versus prepared water blank (**Zhishen *et al.*, 1999).**

2.2.9. Determination of Saponins

20 g of sample was dispersed in 200 ml of 20% ethanol. The suspension was heated over a hot water bath for 4 h with continuous stirring at about 55 ºC. The mixture was filtered and the residue re-extracted with another 200 ml of 20% ethanol. The combined extracts were reduced to 40 ml over water bath at about 90 ºC. The concentrate was transferred into a 250 ml separating funnel and 20 ml of diethyl ether was added and shaken vigorously. The aqueous layer was recovered while the ether layer was discarded. The purification process was repeated. 60 ml of n-butanol extracts were washed twice with 10 ml of 5% aqueous sodium chloride. The remaining solution was heated in a water bath. After evaporation the sample were dried in the oven into a constant weight. The saponin content was calculated in percentage **(Nahapetian and Bassiri, 1974).**

2.2.10.Determination of mineral contents

The minerals contents i.e. (calcium, potassium, sodium, magnesium, iron, zinc, copper and manganese) of palm date kernels ,olive seeds powders , w and prepared biscuits were determined according to the methods described in **A.O.A.C. (1997**). The samples were wet acid digested using a nitric acid and perchloric acid mixture (HNO_3, $HCLO_4$, 2:1 v/v). The amounts of iron, zinc, copper and manganese in the digested sample were determined using a GBC Atomic Absorption 906 A as

described in **A.O.A.C. (1997).** Sodium and potassium were determined by flame photometer 410. Calcium and magnesium were determined using Double Beam Atomic Absorption.

2.2.11.Caloric value of prepared biscuits

Caloric value of biscuits was calculated according to (**Lawrence, 1965)** using the following equation:

Caloric value (K.cal/100 g.) = (protein contentx4) +(fat content x 9)+(carbohydrate content x 4).

2.2.12. Physical evaluation of prepared biscuits

Biscuits were evaluated for weight before baking, weight after baking, weight loss, width, thickness and spread ratio.

Biscuits were weighed in grams after two hours from baking as described by method 10-05 (A.A.C.C.2000).The width and thickness of biscuits were measured to the nearest (mm) according to **A.A.C.C. (1983).** The spread ratio was calculated according to **A.A.C.C. (1983)**, as follows: spread ratio = width (mm) / thickness (mm).

2.2.13. Sensory Evaluation of Biscuits

Biscuits produced by suggested blends were evaluated for their sensory characteristics by 20 panelists from nutrition and food science, Home Economic department, Faculty of Specific education, Kafrelsheikh university for the taste, flavor ,color ,texture, appearance and overall acceptabilityon a 7-point hedonic scale (from like extremely = 7 to dislike extremely = 1) **Watts *et al*., (1989).**Twenty experienced judges participated in the test.

2.2.14.Statistical analysis

Data of sensory evaluation, chemical, physical evaluation, minerals content were subjected to analysis of variance followed by Duncan's multiple range tests according to**Steel and Torrie (1980).**

3.Results and Discussion

3.1.Gross Chemical composition of palm date and olive seeds powders

Moisture content is measured for a number of reasons including legal and label requirements, economic importance, food quality better processing operations and storage stability considerations. Olive seeds recorded the highest value of moisture, protein, ash and fibers (12.47, 4.16, 21.32 g./100 g.), respectively. Palm date kernels recorded higher amounts of fat and carbohydrates than olive seeds (2.81 and 61.08 g./100 g.), respectively. Date seeds contain higher amounts of protein, fat and dietary

fiber than date flesh, as reported by **Besbes & Blecker (2004); Sawaya *et al*., (1984); Al-Farsi *et al*., (2007); Al-Farsi & Lee (2008).** The high content of dietary fiber in date seeds (22.5-80.2%) could have dietary implications for certain conditions, such as diabetes, hyperlipidemia, and obesity, and may have a protective effect against hypertension, coronary heart disease, high cholesterol, prostate cancers, and intestinal disorders **(Tariq *et al*., 2000).Saafi *et al*., (2008)** reported that the seeds of a mixture of some mature common date varieties called "Khalti" contained 6.88% moisture,8.12% total sugars, 6.63% reducing sugars, 1.49% sucrose, 5.31% protein and 8.33% fat. The following values were also obtained for Deglet Nour and Allig cultivars, respectively: protein 5.56 and 5.17%, fat 10.19 and 12.67%, ash 1.15 and 1.12% and total carbohydrate 83.1 and 81.0% **(Besbes *et al*., 2004).** Also **Amany *et al*.**, **(2012)** stated that the date seed was composed of 3.10-7.10% moisture, 2.30-6.40% protein, 5-13.20% fat, 0.9-1.80% ash and 22.50-80.20% dietary fiber.

Table (1): Gross Chemical Composition of palm date kernels and olive seeds powders as (g./ 100 g.)

Samples	Moisture %	Protein	Fat	Ash	Fibers	Carbohydrates
Palm date kernels	8.88	6.56	2.81	2.72	17.95	61.08
Olive seeds	9.79	12.47	1.75	4.16	21.32	49.49

3.2.Bioactive compound of palm date kernels and olive seeds powders

Table (2) showed the bioactive compounds content of palm date kernels and olive seeds powders as (mg/g.). Results indicated that palm date kernels recorded higher

amounts of tannins and saponins (19.08 and 7.41 mg/g.), respectively than olive seeds, while olive seeds contained higher amounts of polyphenols, alkaloids, flavonoids (4.63, 1.65 and 5.27 mg/g.), respectively , than palm date kernels. Date seeds also contain high levels of phenolics **(Al-Farsi *et al.*, 2007)**. Some of these phenolic compounds (such as phenolic acids and flavonoids) have been shown to possess many beneficial effects, including antioxidant, anticarcinogenic, antimicrobial, anti-mutagenic, and anti-inflammatory activities, and the reduction of cardiovascular disease **(Shahidi and Naczk, 2004).Abdul Afiq *et al.*, (2013)** stated that the total dietary fiber in dateseeds was 58%, with 53% of it was insoluble dietary fiber (hemicellulose, cellulose and lignin). **Table (2): Bioactive compound of palm date kernels and olive seeds powders as (mg/ g.)**

Samples	Bioactive compound (mg/g.)				
	Total phenols	Tannins	Alkaloids	Flavonoids	Saponins
Palm date kernels	2.38	19.08	1.03	0.93	7.41
Olive seeds	4.63	2.47	1.65	5.27	4.92

3.3.Minerals content of palm date kernels and olive seeds powders

Table (3) showed the minerals content in palm date kernels and olive seeds powders as (p.p.m.). palm date kernels contained higher amounts of Ca and Mg (13130.90 and 2788.67 p.p.m.), respectively than olive seeds. Olive seeds contained higher amounts of K, Na, Fe, Zn, Cu and Mn (3252.10, 92777.50, 94.07, 15.47, 4.35 and 8.29 p.p.m.), respectively.Date seeds are reported to contain many minerals such as sodium, potassium, magnesium,calcium, phosphorus, iron, manganese, zinc, copper, nickel, cobalt, chromium, lead and cadmium **(Abdillah and Andriani, 2012; Abdul Afiq *et al.*, 2013).** Potassium, phosphorus, magnesium, calcium and sodium are there in higher concentrations in date seeds (**Al-Hooti*et al.*, 1998; Devshony *et al.*, 1992, Besbes*et al.*, 2004).** Iron and then manganese, zinc and copper are also found in higher concentrations among the microelements **(Sawaya *et al.*, 1984 ;Sharma*et al.*, 2016).**

Table (3): Minerals content of palm date kernels and olive seeds powders as (p.p.m.)

Samples	Ca	K	Na	Mg	Fe	Zn	Cu	Mn
Palm date kernels	13130.90	21.94	8637.20	2788.67	24.47	1.69	1.04	1.03
Olive seeds	960.22	3252.10	92777.50	2715.04	94.07	15.47	4.35	8.29

3.4.Gross chemical composition of prepared biscuits

Bakery products are widely consumed and becoming a major component of the international food market (**Kotsianis *et al*., 2002**).Biscuits are the most popularly consumed bakery items in the world. Nowadays, incorporation of new ingredients in the traditional biscuit is a promising strategy to develop healthy and nutritious bakery products in food industry. Previous studies have demonstrated that addition of fiber rich ingredients in biscuit can improves nutritional quality of biscuit **(Ashoush and Gadallah 2011; Shiny, 2014; Huang 2015).** Data in Table (4) showed the proximate chemical composition of biscuits , it could be observed that moisture content of these products was varied .The moisture content is one of most important and commonly measured properties of different food products. Using both palm date kernels and olive seeds increased moisture compared with control . It ranged from (9.12 ±0.02 to 9.60±0.05 g./ 100 g.), while it ranged from (7.45±0.04 to7.95±0.06g./ 100 g.). There were significant differences between samples for moisture. Protein content increased by using palm date kernels and olive seeds compared with control. Control recorded the lowest value of protein (8.71±0.01g./100g.). Protein value improved with plant materials.

There were significant differences between samples for protein except for biscuit with 10% palm date kernels and control.

For fat, it could be noticed that fat increased with increasing of used materials compared with control. Control recorded the highest value of fat as (12.43±0.01 g./100g). It could be noticed that difference in the plant materials levels didn't

affected the fat content.For ash , it was observed that ash content differed with difference of plant materials used compared with control. Biscuit prepare with 15% olive seeds recorded the highest value of ash (1.66±0.03 g./100g.), while it recorded the lowest value in biscuit with5% Palm date kernels (1.25±0.02g./100g.).Using palm date kernels and olive seeds powder in preparing biscuit improved fibers content. Control recorded the lowest value of fibers, biscuits prepared with 15% Palm date kernels and 15% olive seeds powder recorded the highest value of fibers. It may be due to the fibers content in plant seeds powders. There were significant differences between samples for fibers. Carbohydrates content differed by difference of the other components. Biscuit with 5% olive seeds powder recorded the highest value of carbohydrates (69.45±0.61 g./100g.),while biscuit prepared with 10% palm date kernels recorded the lowest value (64.24±0.8 g./100g.). There were no significant differences between control and biscuit with 5% olive seeds powder, wile there were significant differences between the other samples. Date seed is a byproduct of date fruit industry. Various studies that have been conducted on date seed found that it can be as an excellent source of dietary fiber. In addition, the other component such as protein and minerals also present in considerable amount in the seed. Date seed can be as a good source of dietary fibers, phenolic component and natural antioxidant, which can be further developed into new products or already existing products. The use of date seed in fiber-based foods and dietary supplements are suggested due to the excellent content of dietary fiber in the seed **(Al-Farsi and Lee, 2008).**

Table (4):Gross chemical composition of prepared biscuits (g./ 100 g.)

Samples	Moisture	Protein	Fat	Ash	Fibers	Carbohydrates
Control	7.23±0.07 g	8.71±0.01 e	12.43±0.01 a	1.50 ±0.04 c	0.87 ±0.02 g	69.26±0.12 a
Biscuits with 5% Palm date kernels	9.60±0.05 a	8.95±0.01 c	9.94 ±0.02 bc	1.25±0.02 f	1.64 ±0.02 f	66.98±0.04 d

Biscuits with 10% Palm date kernels	9.42±0.02 b	8.73±0.01 e	11.22±0.01 ab	1.27±0.02 e	2.56±0.03 e	64.24±0.8 f
Biscuits with 15% Palm date kernels	9.12±0.02 c	8.46±0.02 f	11.65±0.03 ab	1.53±0.03 b	3.26±0.01 b	65.98±0.02 e
Biscuits with 5% Olive seeds	7.95±0.06 e	9.25±0.02 a	9.34±0.03 c	1.46±0.021 d	2.55±0.03 d	69.45±0.61 a
Biscuits with 10% Olive seeds	7.71±0.01 d	9.14±0.02 b	9.63±0.01 bc	1.48±0.05 d	3.23±0.02 c	68.81±0.07 b
Biscuits with 15% Olive seeds	7.45±0.04 f	8.83±0.01 d	10.26±0.01 b	1.66±0.03 a	3.60±0.01 a	68.20±0.04 c

3.5.Caloric values of prepared biscuits

Table (5) showed the caloric value of biscuit according to nutrient sources (k.cal./100g.).Caloric value of protein ranged from 33.84 to 37.00 k.cal./100g in prepared biscuit. It differed by difference of protein content in biscuit samples. Caloric value of fat recorded the highest value in control (111.87 k.cal./100g.) which recorded the highest value of fat (Table 3). Caloric value of fat related with fat content in biscuits. Caloric value of carbohydrates ranged from 256.96 to 277.80 k.cal./100g. Total k. calories ranged from 392.86 to 423.75 k.calorie regarded to calories of protein, fat and carbohydrates .

Table (5): Caloric values of prepared biscuits

Samples	Sources of calories			Total k. calories
	Protein	Fat	Carbohydrates	
	Caloric values			
Control	34.84	111.87	277.04	423.75
Biscuits with 5% Palm date seeds	35.80	89.46	267.92	393.18
Biscuits with 10% Palm date seeds	34.92	100.98	256.96	392.86
Biscuits with 15% Palm date seeds	33.84	104.85	263.92	402.61
Biscuits with 5% olive seeds	37.00	84.06	277.80	398.30
Biscuits with 10% olive seeds	36.56	86.67	275.24	398.47
Biscuits with 15% olive seeds	35.32	92.34	272.80	400.46

3.6.Minerals content ofprepared biscuits

Table (6) showed minerals content of biscuit prepared with palm date kernels and olive seeds powder (p.p.m) Ca, k, Na, Mg , Fe ,Zn, Cu and Mn. From results, it could be seen that calcium content increased in all samples of prepared biscuit compared with control, the highest value recorded in biscuits with 5% palm date kernels(20800.90± 0.1) p.p.m. and the lowest value was recorded in control (106.63±0.09) p.p.m.There were no significant differences between all biscuit samples in calcium content.

Potassium content recorded the highest value in biscuits with 10% palm date kernels (1482.74± 0.03) p.p.m. and the lowest was noticed in control biscuit (22.53± 0.02) p.p.m. There were significant differences between all biscuit samples in potassium content.

Sodium content recorded the highest value in biscuit prepared with 15% palm date kernels (14304.15±0.50) p.p.m and the lowest in control (129.41±0.025) p.p.m. There were no significant differences biscuit prepared with different levels of palm date kernels powder and control in sodium content. On the other hand, there were no significantdifferences between biscuits prepared with olive seeds powder in sodium content, while there were significant differences between biscuits prepared with olive seeds powder and control.

Magnesium content recorded the highest value in biscuit prepared with 15% palm date kernels (10093.73±0.15) p.p.m and the lowest in control (1958.42±0.02) p.p.m. There were no significant differences between all prepared biscuits.

Fe content recorded the highest value in biscuit prepared with 15% palm date kernels (40.97±0.02) p.p.m. and the lowest in control (12.818±-0.00) p.p.m.There were significant differences between all prepared biscuits except for biscuits prepared with 5 and 10 % olive seeds powder.

Zinc content recorded the highest value in biscuit prepared with 15% palm date kernels (14.74±0.06) p.p.m and the lowest in control (8.28±0.02) p.p.m. There were no significant differences between biscuits prepared with palm date kernels powder and control. There were no significant differences between biscuits prepared with olive seeds powder.

Cu content recorded the highest value in biscuit prepared with 15% olive seeds powder (7.20±0.02) p.p.m and the lowest in control (1.08±0.07) p.p.m.There were no significant differences between all prepared biscuits.

Mn content recorded the highest value in biscuit prepared with 15% olive seeds powder (4.34±0.02) p.p.m and the lowest in control (2.26±0.01) p.p.m.

Sodium, potassium, calcium, iron, copper, magnesium, manganese, zinc, phosphorus, lead, cadmium and chromium are the minerals that are found in date seed. The total mineral content that was found in date seed was comparable with the mineral content in barley, shows that the date seed can be as a good source of minerals, and can also be used to substitute the usage of barley in food products for the same purpose **(Ali and Khamis, 2004).**

Table (6): Minerals content ofprepared biscuits (p.p.m).

Samples	Ca	K	Na	Mg	Fe	Zn	Cu	Mn
Control	106.63±0.09 [a]	22.53±0.02 [a]	129.41±0.025 [a]	1958.42±0.02 [a]	12.818±-0.00 [a]	8.28±0.02[a]	1.08±0.07 [g]	2.26±0.01 [e]

Biscuits with 5% Palm date kernels	20800.90± 0.1 [a]	1477.33±0.5 [b]	9346.87±0.25 [ab]	4594.94 ± 0.02[a]	25.52± 0.02 [b]	9.55±0.04 [a]	1.84±0.11 [f]	3.39±0.01[c]
Biscuits with 10% Palm date kernels	16679.26± [a]	1482.74±0.03 [c]	5634.28±0.15 [ab]	3436.43 ± 0.01[a]	23.43± 0.02 [c]	13.96± 0.15 [a]	2.06±0.2 [e]	3.50±0.02 [b]
Biscuits with 15% Palm date kernels	17997.48± 0.12 [a]	1125.95±0.02 [d]	14304.15±0.5 [ab]	10093.73±0.15[a]	40.97± 0.02 [d]	14.74± 0.06[a]	2.15±0.42 [d]	2.89±0.01 [d]
Biscuits with 5% Olive seeds	4512.35 ± 0.02 [a]	438.12 ± 0.02 [e]	3327.36±0.15 [bc]	3386.70 ±0.2[a]	20.835 ±0.02 [e]	10.16± 0.01 [b]	6.03±0.25 [c]	3.69±0.02 [b]
Biscuits with 10% Olive seeds	10254.22± 0.02 [a]	761.02 ±0.02 [f]	8036.07±0.15 [bc]	3566.83 ±0.03[a]	21.10± 0.02 [e]	13.07± 0.03 [b]	6.42±0.11 [b]	4.03±0.01 [ab]
Biscuits with 15% Olive seeds	10172.92± 0.02 [a]	748.33 ±0.03 [g]	8976.42±0.15 [c]	2586.52 ±0.02 [a]	26.91± 0.07 [f]	13.46± 0.08 [b]	7.20±0.02 [a]	4.34±0.02 [a]

3.7.Physical evaluation of prepared biscuits

Table (7) showed the physical evaluation of prepared biscuits. Weight before baking ranged from 9.75±0.22 in control to 11.42±0.02 g in biscuits prepared with 5% olive seeds powder. There were significant differences between prepared biscuits in weight before baking. Weight after baking ranged from 8.30±0.20 in biscuits prepared with 10% olive seeds powder to 9.11±0.01 g. in control. There were no significant differences between prepared biscuits with 10, 15% palm date kernels and 5, 10% olive seeds powder in weight after baking. Weight loss value differed by difference of weight after baking which regard to loss of moisture from biscuits during baking. Weight loss recorded the highest value 3.26±0.01 g. in biscuits prepared with 15% palm date kernels powder, while the lowest weight loss recorded in control (0.64±0.01g.). There were no significant differences between biscuits prepared with 10,15% palm date kernels and 10,15% olive seeds powder in

weight loss. Width recorded the highest value in biscuits prepared with 5% palm date kernels powder (3.78±0.02) cm, 10% palm seed kernels (3.74±0.03) cm and control (3.73±0.10) cm. There were no significant differences between all prepared biscuits in width. Thickness value recorded the highest value in control (1.43±0.36) cm, while the lowest value recorded in biscuits prepared with 15% olive seeds powder (0.95±0.02) cm. There were no significant differences between all prepared biscuits in thickness. Spread ratio recorded the highest values in biscuits prepared with olive seeds powder (2.49±0.01, 2.51 ±0.06 and 2.53 ±0.12 %), respectively in biscuits prepared with 5, 10 , 15% olive seeds powder, while it recorded the lowest value in control (2.30±0.02 %). There were no significant differences between all prepared biscuits in spread ratio.

Table (7): Physical evaluation of prepared biscuits

Samples	Weight Before baking (g)	Weight After baking (g)	Weight loss (g)	Width cm	Thickness cm	Spread ratio %
Control	9.75±0.22 f	9.11±0.01 b	0.64±0.01 d	3.73±0.10 a	1.43±0.36 a	2.30±0.02 b
Biscuits with 5% Palm date kernels	10.94±0.025 d	8.72±0.03 a	2.22±0.01 b	3.78±0.02a	1.32±0.24 a	2.46 ±0.12 a
Biscuits with 10% Palm date kernels	10.96±0.04 d	8.51±0.17 c	2.45±0.15 ab	3.74±0.03 a	1.27±0.02 a	2.47±0.11 a
Biscuits with 15% Palm date kernels	11.62±0.03 b	8.36±0.25 c	3.26±0.01 a	3.58±0.36 a	1.16±0.15 a	2.42±0.02 a
Biscuits with 5% Olive seeds	10.46±0.02 e	8.97±0.0.20 c	1.49±0.02 c	3.64±0.01 a	1.15±0.02 a	2.49±0.01 a
Biscuits with 10% Olive seeds	11.26±0.03 c	8.30±0.20 c	2.96±0.01 ab	3.55±0.03 a	1.04±0.02 a	2.51 ±0.06a
Biscuits with 15% Olive seeds	11.42±0.02 a	8.70±0.03 d	2.72±0.15 ab	3.48±0.02 a	0.95±0.02 a	2.53 ±0.12 a

3.8. Sensory evaluation of prepared biscuits

Sulieman *et al*., (2011) used date powder at 5% and 10% replacement levels of wheat flour for production of biscuits. The sensory evaluation of the different biscuit samples revealed that there were no significant differences between biscuit made from the different blends of wheat flour and date powder. Table (8) showed sensory evaluation of prepared biscuits. Taste value ranged from4.66±0.57 in biscuits prepared with 15% palm date kernels, 15% olive seeds powder to 6.33±0.57 in control.There were no significant differences between all prepared biscuits in taste values. Flavor recorded the highest value in control (7.33±0.57), while it decreased with using tested powders. It recorded the lowest value in biscuits prepared with 15% olive seeds (4.62±0.05), using different levels of the same tested powder didn't affect significantly the flavor values. Color is added to food to replace the color lost during processing, to enhance the color already present, to minimize batch to batch variations and to color otherwise uncolored. Food colors can be classified as natural colors, nature-identical colors, synthetic colors and organic colors **(Henry, 1996**). Color is a vital quality attribute of food and plays an important role in sensory and consumer acceptance of products (**Sowbhagya *etal*., 2005**). Now days, food producers pay more attention towards colors and additives of natural origin, since many artificial colors and additives have been shown to impart negative health effects. It could be noticed that color values decreased with increasing palm date kernels and olive seeds powder. There were no significant differences between all prepared biscuits in color values. Texture recorded the highest value in biscuits prepared with 5%palm date kernels (6.50±2.00), using palm date kernels and olive seeds powders effected on texture values as it decreased with increasing of tested powders used, it may due to the content of fibers in these powders. There were no significant differences between all prepared biscuits intexture values. Using tested powders didn't affected significantly the appearance of prepared biscuits. All prepared biscuits were accepted. There were no significant differences between all prepared biscuits in appearance and overall acceptability **(Nehdi *et al* .,2010 Lin, *et al* ., 2017**).

Table (8): Sensory evaluation of prepared biscuits

Samples	Taste	Flavor	Color	Texture	Appearance	Overall acceptability
Control	6.33±0.57 [a]	7.33±0.57 [a]	6.66±0.57 [a]	6.33±1.68 [a]	6.66±0.30 [a]	6.44±1.33 [a]

Biscuits with 5% Palm date kernels	6.30±0.57 [a]	6.66±0.57 [ab]	7.00±0.01 [a]	6.50±2.00 [a]	6.66±0.30 [a]	6.17±1.54 [a]
Biscuits with 10% Palm date kernels	4.69±0.57 [a]	5.66±0.57 [bc]	6.34±0.55 [a]	6.00±2.00 [a]	6.33±0.20 [a]	5.33±2.11 [a]
Biscuits with 15% Palm date kernels	4.66±0.57 [a]	5.33±0.57 [ab]	6.33±0.57 [a]	5.78±2.07 [a]	6.20±0.50 [a]	5.33±1.71 [a]
Biscuits with 5% Olive seeds	5.33±0.57 [a]	6.33±0.57 [bc]	6.33±-.50 [a]	5.92±1.68 [a]	6.66±0.40 [a]	5.66±1.64 [a]
Biscuits with 10% Olive seeds	5.00±.57 [a]	5.66±0.57 [c]	6.00±0.01 [a]	5.72±1.80 [a]	6.50±0.50 [a]	5.27±1.87 [a]
Biscuits with 15% Olive seeds	4.66±0.57 [a]	4.62±0.05 [bc]	5.33±0.55 [a]	5.33±2.42 [a]	6.00±0.30 [a]	5.61±2.22 [a]

Conclusion

From the obtained results, it could be concluded that using palm date kernels and oliveseeds powders in preparing biscuits led to improving the nutritional value of biscuits as it considered a good source of protein, fat and fibers, also minerals.

References

A.A.C.C. (1983):American Association of Cereal Chemists.Cereal laboratory method. American Association of Cereal Chemists, INC . St .Paul. Minnesota ,USA.

A.O.A.C. (1995). Official Methods of Analysis. (15th ed.), Washington, DC: Association of Official Analytical Chemists.

A.O.A.C. (1997). Official Methods of Analysis. 16th Ed., As-sociation of Official Analytical Chemists. Arlington-Virginia, USA.

Abdillah, L. A. and Andriani, M. (2012). Friendly alternative healthy drinks through the use of date seeds as coffee powder. Paper presented at the Proceeding of ICEBMUntar Jakarta.

Abdul Afiq, M. J.; Abdul Rahman, R., Che Man, Y. B.; AlKahtani,Al-Farsi, M. A. and Lee, C. Y. (2008). Optimization of phenolics and dietary fibre extraction from date seeds. Food Chemistry 108: 977-985.

Al-Farsi, M.; Alasalvar, C.;Al-Abid,M.; Al-Shoaily, K.; Al- Amry, M. and Al- Rawahy, F.(2007):Compositional and functional characteristics of dates, syrups, and their by-products. Food Chemistry, 104, 943–947.

Al-Hooti, S.; Sidhu, J. S. and Qabazard, H. (1998). Chemical composition of seeds date fruit cultivars ofUnited Arab Emirates. Journal of Food Science andTechnology 35: 44-46.

Ali, M.A. Y. and Khamis, A. S. H. (2004). Mineral ion content of the seeds of six cultivars of Bahraini date palm (Phoenix dactylfera). Journal of Agriculture and Food Chemistry 52: 6522-6525.

Amany, M. M. B.; Shaker, M. A. and Abeer, A. K. (2012). Antioxidant activities of date pits in a model meatsystem. International Food Research Journal 19: 223-227.

Ashoush, I, S. and Gadallah, M. G. E. (2011). Utilization of mango peels and seed kernels powders as sources of phytochemicalsin biscuit. World J. Dairy Food Sci. 6: 35-42.

Besbes, S.; Blecker, C.; Deroanne, C.; Drira, N. E. and Attia, H. (2004). Date seeds: chemical composition and characteristic profiles of the lipid fraction. Food Chemistry, 84: 577-584.

Bouchelta, A.; A. Boughdad and Blenzar, A. (2005). Effets biocides des alcaloïdes, des saponines et des flavonoïdes extraits de Capsicum frutescens L. (Solanaceae) sur Bemisiatabaci (Gennadius) (Homoptera : Aleyrodidae). Biotechnol. Agron. Soc. Environ; 9(4): 259–269.

Devshony, S.; Eteshola, A. and Shani, A. (1992). Characterisation and some potential application ofdate palm (Phoenix dactylifera L.) seeds and seedsoil. Journal of the American Oil Chemists Society 69:595–597.

FAO. (2007): " Statistical Databases".http://faostat.fao. orgAccessed June 2.

FAO/WHO/UNU(1985).Energy and Protein Requirements Report of Joint FAO/WHO/UNU Expert Consulation World Health Organization ,Technical Report ,Series 724,WHO,Geneva.

Fernandez,B.; Felizon, B.; Heredia,B.; Rodrıguez, A.; Guillen, R.; Jimenez, A.(2001). Steam-explosion of olive stones:hemicellulose solubilisation andenhancement of enzymatic hydrolysis of cellulose.Bioresource Technol. 79, 53 -61.

Gandhi, A.P.; Kotwaliwale, N.; Kawalkar, J.; Srivastava, D.C.;Pari har, V.S. and Raghu ,N.P.(2001). Effect of incorporation of defatted soy flour on the quality of sweet biscuits.J. of Food Sci. and Tech., 38:502-503.

Henry, B.S. (1996). Natural food colorants. In: Hendry GAF, Houghton JD (Eds) Natural food colorants, 2nd ed n. Blackie. pp 40–79.

Huang, Y. Q. and Y. Su. (2015). Development of bean dregs biscuits

Hussein, A.M.S.; Amal, S. A.; Amany ,M. H.; Abeer ,A. A. and Gamal ,H. R.(2011). Physiochemical, sensory and nutritional properties of corn-fenugreek flour composite biscuits. Australian .J. of. Basic and Appl. Sci., 5(4): 84-95.

Ihekoronye, A.(1999). Manual on small-scale food processing 1st ed, Acad. Publishers ,Nsukka, p.32..33.

Lawrence, R.D. (1965).The diabetic life Journal & A . churchill , LTD . London.

Lin, S.; Chi, W.; Hu, J., Pan, Q., Zheng, B. and Zeng, S. (2017). Sensory and nutritional properties of Chinese olive pomace based high fibre biscuit. Emirates Journal of Food and Agriculture, 495-501.

Nahapetian, A.; Bassiri, A.(1974). Changes in concentration and interrelationship of phytate, P, Mg, Cu, Zn in wheat during maturation. Journal of Agricultural and Food Chemistry.; 32:1179-1182.

Nehdi, I.;Omri, S.; Khalil, M. I. and Al-Resayes, S. I. (2010). Characteristics and chemical composition of date palm (Phoenix canariensis) seeds and seed oil. Industrial Crops and Products, 32(3), 360-365.

Pellet, P.I. and Sossy, S. (1970). Food Composition Tables for Use in the Middle East. American University of Beirut. Beirut – Lebanon .

Rhona, A. (1983). A Guide to English Cooking. Turning Book Wikas Publishers, PVT, Ltd, Selubabbad, New York, pp: 45-78.

Saafi, E. B.; Trigui, M.; Thabet, R.; Hammami , M. and Achour, L. (2008). Common date palm in Tunisia: chemical composition of pulp and pits. International Journal of Food Science and Technology 43: 2033-2037.

Saba, N.H. (1997). Culinary is Science and Art. P. 685. Dar El-Maaref- Cairo (In Arabic).

Sawaya, W. N.; Khalil, J. K. and Safi, W. J. (1984). Chemical composition and nutritional quality of dateseeds. Journal of Food Science 49: 617-619.

Sharma, S. K.; Bansal, S.; Mangal, M.; Dixit, A. K.; Gupta, R. K. and Mangal, A. K. (2016). Utilization of food processing by-products as dietary, functional, and novel fiber: A review. *Critical Reviews in Food Science and Nutrition*, *56*(10), 1647-1661.

Shiny, L. M. and John, S. (2014).Sensory and nutritional properties of

millet based high fiber biscuit. Int. J. Sci. Res. 3: 1824-1827.
Slinkard, J. and Singleton, V. L. (1977). Total phenol analysis: automation and comparison with manual methods. Am. J. Enol. Viticult; 28: 49–55.
Steel, R.G and Torrie, J.H. (1980). Principles and Procedures of Statistics. 2nd Ed. (PP120). Mc Graw-Hill, New York, USA.
Sudha,M.L;Vetrimani, R. and Leelavathi, K. (2007). Influence of fiber from different cereals on the rheological characteristics of wheat flour dough and on biscuits quality. Food Chem.,100:1365-1370.
Watts, B.M.; Ylimaki, L.E., Jeffery L.E., and Elias, L.G. (1989). Basic Sensory Methods for Food Evaluation. IDRC, Canada. with dietary fiber. Food Res. Deve. 36: 41-44.
Zhang, S. Y.; Zheng, C. G. Yan, X. Y. and Tian, W. X. (2008). Low concentration of condensed tannins from catechu significantly inhibits fatty acid synthase and growth of MCF-7 cells. Bio chem. Bioph. Res. Co; 371: 654–658. http://dx.doi.org/10.1016/j.bbrc.2008.04.062 PMid:18435908
Zhishen, J.; T. Mengcheng and Jianming, W. (1999). The determination of flavonoid contents in mulberry and their scavenging effects on superoxide radicals. Food Chem; 64: 555–559. http://dx. doi.org/10.1016/S0308-8146 (98)00102.

التقييم الحسي والغذائي و للبسكويت المحضر باستخدام مسحوق نوى التمر وبذور الزيتون

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الملخص العربي
هدفت هذه الدراسة الى تقييم الخصائص الغذائية والطبيعية والحسية للبسكويت المحضر باستخدام مسحوق نوى التمر وبذور الزيتون . تم استخدام 3 مستويات للإحلال بالمصادر النباتية (5 , 10 ,15 %) .تم تقدير التركيب الكيميائي ،المعادن للمصادر النباتية والبسكويت المحضر .تم تقدير المركبات الفعالة في المصادر النباتية . تم تقييم الخصائص الطبيعية والحسية للبسكويت المحضر . وقد اوضحت النتائج ان محتوى الرطوبة والبروتين والرماد والالياف والفينولات العديدة والفلافونويدات اغلب المعادن كانت في مسحوق بذور الزيتون اعلى من مسحوق نوى التمر، بينما كانت الدهون ، الكربوهيدرات والصابونينيات والكالسيوم والماغنسيوم في مسحوق بذور الزيتون اقل من مسحوق نوى التمر . وقد اختلفت القيمة الغذائية ، الخصائص الطبيعية والحسية باختلاف مستويات المصادر النباتية. لقد استنتجت الدراسة ان استخدام مسحوق نوى التمر وبذور الزيتون قد ادى الى تحسين القيمة الغذائية للبسكويت .
الكلمات المفتاحية: نوى التمر ، بذور الزيتون ، البسكويت ، التركيب الكيميائي ، المركبات الفعالة ، المعادن ، الخصائص الطبيعية والحسية .