

AN ENHANCED SPONGE CAKE WITH PUMPKIN PASTE OR SWEET POTATO PUREE

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ABSTRACT

The potential use of pumpkin or yellow sweet potato in sponge cake was of great interest as vegetables rich in functional or bioactive compounds and minerals. Current work interested in improving sponge cake for the appearance, flavor, texture and tenderness at levels of 5, 10, 15, 20 and 25% pumpkin paste or potato puree of the used flour in making the sponge cake. Baked cakes were tested for weight, height, volume, specific volume, over-run and shelf-life at both room temperature or at the refrigerator. The experimental analyses also include chemical composition for macronutrients and organoleptic properties.

Resultant data illustrated that cooked, blended pumpkin improved the contribution of produced cakes to the daily requirements of ash and fibers up to the level of 25% addition. However, these ratios covered daily requirements of ash and fibers at magnitude levels for children from 4-6 years, adults from (23-50 years) and old adults from (51-70 years) respectively. The same estimates were higher when sweet potato puree was used for the same categories.

On physico - chemical and sensory characteristics, there was higher improvements in pumpkin cakes than potato ones up to the level of 20% addition in over-run, cake volume, height, flavor, color and tenderness. The shelf - life also increase at both room temperature and at the refrigerator and the pumpkin cakes superiored potato cakes.

Keywords: sponge cake, pumpkin paste, potato puree.

INTRODUCTION

Recently, there are trends to healthy foods, named functional foods which provide a health benefit beyond basic nutrition that fortify vitamins, minerals or fibers (few specific or combination of substances, that proved to reduce the risk of disease including anti-cancer, lowering blood cholesterol, reducing the risk of cardiovascular disease ,anti-hypertension, improving the renal function and diabetes. Among these substances, phytochemicals, (including, phenolic compounds, flavonoids and phytoestrogens) from natural sources such as fruits, vegetables and herbs in functional foods (*Dillard and German, 2000*), (*Dufresne and Farnwrth, 2001*) and (*Arvantoyannis and Houwelingen- Koukaliaroglou, 2005*),). Flavonoids have been reported as antibacterial, antiviral, anti-inflammatory, anti-allergenic, anti-cancer, vasodilatation and anti-thrombotic action (*Davalos et al., (2006)*). Carotenoids in diet as potent anti-oxidants appear to be associated with better health reduction of some types of cancer, cardiovascular disease and macular degeneration. A dehydrated product based on dried milk and pumpkin flakes has been developed in Brazil to act as a carotene source particularly during weaning periods (*Olson, 1986*) and (*Hughes, 1995*) and (*Fernandez et al., (1998)*). Epidemiologically, dietary fibers is associated with several disorders of

the human body including diverticular disease and cancer of the colon, constipation, heart disease, diabetes and other diseases of gastrointestinal tract (Cummings and Englyst, (1991) Pumpkin and yellow sweet potato are among vegetables rich in these previously mentioned functional compounds and some minerals have the great benefits in lowering hypertension such potassium (340.23,325),sodium (1.01),calcium (21.35)mg/g for pumpkin, B-carotene (17.6mg/100g) and (578 and 756Mg/100g)for α and B- carotene respectively Tee&Lim (1991), (Velijkovic,1992) and (Gafour,etal.,2007),. also mentioned that loric acid is decreased in pumpkin(90 mg/100g)and it used as anti diarrhea. In biological technology (Borowitzka, 1993) indicated that carotenoides can be used in colored foods and in medicine that it appeared strong agent as anti- bacteria and anti-fungal (Farrag et al., 1985). (Samaha, 2002) also evaluated pumpkin fruits as a promising crop in food processing. Morton et al., (1990) found that 10-40% of carotenoids in pumpkin loss during cooking and it is also a higher anti-oxidants. Femenia et al., (1998) mentioned that the extraction of pumpkin free from nitrogen contains 50.2%total soluble sugars and starch (34.67 and 15.13%nonstarchy carbohydrates, pectic substances and nutritive fibers has an important role as protective from heart disease and cancer. Moreover, phytic acid content in pumpkin is very low and most of minerals are soluble that increase the adsorption in the body. Natural sugar from pumpkin and yellow sweet potato are preferable for reducing the risk of diabetes, potato starch gives softness and retard staling of the bakery products. Sweet potato is one of the foods rich in vitamin A, C, and fibers; it contains 3.9, 3.5, 4.1, 3.6 and 2.2% fibers based on dry matter for the categories. (Abd El-Magied et al., (1992); also mentioned that pumpkin contains high content of potassium. The pumpkin is among the more important plant families that supply human with carotenoids, dietary fibers and carbohydrates (Hassan, 2005). Naser et al., (2002) mentioned that the pulp of pumpkin fruits has become a base for a healthy drink characterized by accepted flavor in Korea and use in Latin and Central America and in Eastern European countries

The objective of this study, was to improve the organoleptic, nutritive values, freshness, retard staling, and minimizing of consuming sugars through producing acceptable and functional sponge cake with pumpkin and yellow sweet potato being one of the most favorable and wide spread among sweet bakery products in breakfast, birthdays, takeaways and.....ect. for all ages.

MATERIALS AND METHODS

Raw materials:

Wheat flour of 72% extraction was obtained from Alkawther Company, Menofia for mills produced according to quality control 12012 January 2005. Fresh chicken whole eggs, fat (butter and corn oil). Baking powder (foaming agent-sodium bicarbonate and sodium pyrophosphate), vanilla and sodium chloride, pumpkin (*Cucurbita pepo Oleum*) and yellow sweet potato (*Solanum tuberosum*), local varieties were obtained from the local market of Tanta city

Methods:

Cake batters preparing and baking:

The preparing and baking cake batters was done according to *Nagao et al., (1976)* with some modifications. 150gm of whole fresh eggs were beaten with a wire whip two dimensional speed settings for 15 sec. at the first speed, the ground sugar (150gm) was added to the whipped eggs and the mixture was beaten in the mixture at the second speed for ten min., peeled cooked beaten pumpkin or roasted , peeled and beaten sweet potato was added at ratios of 5,10,15,20 and 25% of flour and beaten again for 5 min. at first speed. The mixing solution (water and whole cow's milk) was added at this speed and mixing process continues for another min. (the amount of mixing solution was added slowly at two intervals during mixing after about 15 sec. between the first amount and the second). The sifted flour was added to the whipped ingredients (eggs, sugar for the control and eggs/sugar and cooked or roasted beaten pumpkin or sweet potato and mixed slowly with hand until getting a batter with a body nearly the same of the control. The amount of mixing solution decreased by increasing the added pumpkin, while it increased with the sweet potato. The baking powder and vanilla are added immediately before baking. Prepared cake batters were poured into circular baking pans with diameters of 22-24 cm. and a depth of 5-6 cm. baked in an automatic home oven at 170-190°C for 25-35 min. The baked cakes were removed immediately and left to cool for 1-1.30 hr. at room temperature, then weighed. The cake volumes were measured using clover seeds displacement according to the method of *AACC (1983)*.

Preparing the Pumpkin Paste and potato puree:

Pumpkin (*Cucurbita pepo Oleum*) were carefully washed, manually peeled and uniformly sliced and cooked in electric oven at 195 for 15 min., then well mixed in a laboratory type blender (Monilex, France).

Potato were also carefully washed and roasted in the same oven for 30 min and manually peeled , then well mixed in the same blender .Both pumpkin paste and potato puree were frozen stored until use.

Table (1): The formula of the Sponge Cake Supplemented with Pumpkin or Yellow Sweet Potato.

Ingredients	pumpkin						Sweet potato				
	Control	T ₅	T ₁₀	T ₁₅	T ₂₀	T ₂₅	T ₅	T ₁₀	T ₁₅	T ₂₀	T ₂₅
Flour(gm)	150	150	150	150	150	150	150	150	150	150	150
Sugar(gm)	150	150	150	150	150	150	150	150	150	150	150
Fat(gm)	75	75	75	75	75	75	75	75	75	75	75
Pumpkin gm)	0	7.5	15.0	22.5	30.0	37.5	7.5	15.0	22.5	30.0	37.5
Whole eggs (gm)	150	150	150	150	150	150	150	150	150	150	150
Vanilla(gm)	1	1	1	1	1	1	1	1	1	1	1
Salt(gm)	1	1	1	1	1	1	1	1	1	1	1
Baking powder (gm)	10	10	10	10	10	10	10	10	10	10	10
Mixing solution (ml)	150	120	80	40	0	0	140	120	110	120	140

T₅ = Control + 5% cooked pumpkin or yellow sweet potato of the cake flour.

T₁₀ = Control + 10% cooked pumpkin or yellow sweet potato of the cake flour.

T₁₅ = Control + 15% cooked pumpkin or yellow sweet potato of the cake flour.

T₂₀ = Control + 20% cooked pumpkin or yellow sweet potato of the cake flour.

T₂₅ = Control + 25% cooked pumpkin or yellow sweet potato of the cake flour

Over Run: This parameter was calculated by the following formula according to El-Gammal,(2001) which was modified to volume(cm³)

$$\text{Over-run}\% = \frac{V_t - V_c}{V_c} \times 100$$

Where: V_t = the volume of treatments

V_c = the volume of the control

Specific Volume Was Calculated According To The Equation:

$$\text{Specific volume} = \frac{\text{Volume (cm}^3\text{)}}{\text{Weight (gm)}}$$

After an hour of baking according to A.A.C.C. (1983).

Shelf-life: The baked cakes were packaged in polyethylene sacks after cooling for an hour of baking then stored at room temp.(27-32°C) or at the refrigerator(5± 2° C) and examined daily for the latter and after 3 days at room temperature till spoilage.

Chemical analysis:

Crude protein (Nx6.25), fat, ash, fibers and moisture contents were determined according to AOAC (1995); total carbohydrates were calculated by difference.

Organolyptic Evaluation:

Ten panelists judged the produced cakes for flavor, appearance, tenderness, texture and general acceptability according to Amerine *et al.*, (1995) with some modifications.

Statistical analysis: Tabulated data were calculated as average values of three replicates.

RESULTS AND DISCUSSION

Chemical composition of the main ingredients used in making cakes:

Table (2) illustrates the gross chemical composition of flour 72% extraction, cooked pumpkin, whole fresh eggs and roasted yellow sweet potato. The tabulated data have agreed with the work of *Abou El-Naga* (2002) and *Abd El- Daim* (2005) for flour 72% and & *Samaha* (2002) for pumpkin and *Abd El- Magied et al.*, (1992) and *Manal et al.*, (2001) for sweet potato.

Tables (2) Gross Chemical Composition of the Main Ingredients Used In Making Sponge Cakes / 100gm.

Ingredients	Moisture	Crude protein	Ether extract	Fibers	Ash	Total* carbohydrates
Flour72% extraction	12.86	10.76	1.57	0.49	0.53	86.64
Cooked pumpkin	18.67	1.43	0.35	1.88	0.82	76.85
Whole fresh eggs**	75.07	13.46	12.65	-	1.03	0.45
Roasted yellow sweet potato	9.30	5.77	1.51	4.82	3.61	84.29

* Calculated by difference

**Determined as wet weight.

Physico- chemical properties:

Table (3) demonstrates some physico – chemical properties of pumpkin and sweet potato cakes compared to the control. The sponge cakes supplemented by pumpkin at level of 5, 10, 15, 20, and 25% have improved the height, volume, specific volume , over – run and shelf-life. These results have agreed with that reported by *Gafour, et al.(2007)* who found that the ice

cream mix containing 10 and 15% pumpkin puree achieved the highest overrun compared to the control and the other treatments containing red grape or black mulberry. The treatments 15 and 20% gained the highest volume, height and over – run. On the other hand, using yellow sweet potato in sponge cakes has slightly improved the same parameters up to the level 10% then decreased up to 25%. Both volume and over – run appeared great decrease because of increasing viscosity and higher water capacity of fibers in the cake butters of sweet potato. These results are in agreement with the trends of (Metwally, 1994) and (Vani and Zayas, 1995). The tabulated data of shelf- life appeared considerable increase by 3 to 10 days for potato and pumpkin cakes respectively compared to the control as the pumpkin appears a strong agent as anti-bacterial and anti-fungal (Farrag et al.,(1985).

Table (3) Physico – Chemical Properties of Sponge Cakes Containing Different Levels of Pumpkin or Yellow Sweet Potato.

Items	Pumpkin cakes						Potato cakes					
	Control	5%*	10%	15%	20%	25%	5%	10%	15%	20%	25%	
Weight (gm)	610	608	597	592	586	560	629	654	660	680	690	
Height (cm)	1.90	1.93	2.80	2.63	3.67	3.50	3.10	2.57	2.50	2.50	2.37	
Diameter (cm)	22.25	22.30	22.25	22.30	22.40	22.30	22.20	22.33	22.37	22.20	22.27	
Volume (cm ³)	1386	1390	1395	1407	1416	1406	1392	1389	1379	1363	1360	
Specific volume	2.27	2.29	2.34	2.38	2.42	2.51	2.21	2.12	2.09	2.00	2.30	
Over-run	0.00	0.29	0.65	1.52	2.16	1.44	0.43	0.22	-0.51	-1.66	-1.88	
Shelf-life (days)	27-32 C	3	3	4	5	6	6	3	4	5	4	3
	5+2 C	15	17	19	22	25	24	14	18	15	14	15

*As illustrated in table (1)

Chemical composition of Macronutrients of Cakes:

Data in table (4) showed that there was slightly decrease in moisture up to the treatment 20% pumpkin, then increased up to the treatment 25%, while protein and fat showed a considerable decrease. On the other hand, ash and fiber contents of the pumpkin cake samples showed considerable increase by increasing the added pumpkin puree, while there was highly increase by increasing the added sweet potato puree for the two latter estimates. Likely, calculated carbohydrates in treated samples showed negligible increase by increasing the added pumpkin or sweet potato puree. These results agreed with the findings of *El-Nemr and Fahmy (1979)*, who found that the addition of potato flour or sweet potato flour increased water absorption and increased dough development of biscuit.

Table (4) Gross Chemical Composition of Sponge Cakes Supplemented by pumpkin or yellow sweet potato.

Contents per 100 gm	Pumpkin cakes						Sweet potato cakes				
	Control	T ₅ *	T ₁₀	T ₁₅	T ₂₀	T ₂₅	T ₅	T ₁₀	T ₁₅	T ₂₀	T ₂₅
Moisture	27.90	27.37	27.27	27.71	28.06	30.00	28.06	29.16	30.36	31.77	32.36
Protein	9.06	8.39	8.15	8.00	7.83	7.94	8.39	8.47	8.47	8.39	8.42
Fat	20.71	19.27	19.29	18.98	19.04	19.27	19.11	19.65	20.10	20.70	21.08
Fibers	0.82	1.00	1.10	1.20	1.36	1.73	0.96	1.11	1.34	1.60	2.41
Ash	0.96	1.03	1.07	1.24	1.33	1.60	1.15	1.18	1.39	1.60	1.97
***T. carbohydrates	68.46	70.31	70.38	70.56	71.82	69.44	70.38	69.57	68.69	67.64	66.11

*As illustrated in table (1) ** on dry matter.

***Total carbohydrates by difference.

Sensory evaluation:

Data in table (5) revealed the evaluation of organoleptic properties of sponge cakes supplemented by pumpkin paste or sweet potato puree. Scored degrees showed that increasing the added pumpkin or sweet potato improved flavour up to the treatment 25% pumpkin, while this improvement was achieved for color, texture, tenderness and general acceptance up to the treatment 15% for sweet potato and at the levels of 5, 10,15 and 20 % for pumpkin. The treatment 20% pumpkin achieved the highest score of crust and crumb color (pleasant characterized) , texture, tenderness and overall acceptability. These results are in agreement with those of *Naser et al., (2002)* and *Gafour et, al., (2007)* pumpkin and yellow sweet potato sponge cakes were characterized by a pleasant yellow color owing to their contents of carotene which was acceptable by all panelists. The pumpkin cakes superioered potato ones in this parameter. The cross section of pumpkin cakes were granual and easy to cut, moreover, good in chewing (the porosity and elasticity improved by increasing the added amount of pumpkin). While these improvements in potato cake did not exceed the ratio15% then decrease at remarkable degrees, on the other hand, there was increase in the elasticity of potato cakes and retard ness in stainless of the product. This result has an agreement with those of *El- Nemr and Fahmy (1979)*,

Table (5) Organodeptic Evaluation of the Sponge Cakes with Pumpkin or Yellow Sweet Potato puree.

Items	Pumpkin cakes						Sweet potato cakes					
	Control	T ₅	T ₁₀	T ₁₅	T ₂₀	T ₂₅	T ₅	T ₁₀	T ₁₅	T ₂₀	T ₂₅	
Flavor(10)	9.67	10.00	10.00	10.00	10.00	10.00	9.20	9.33	9.50	9.67	9.76	
Color	Crust (10)	8.30	8.80	9.00	9.10	9.20	7.60	8.20	7.70	7.90	6.00	5.70
	Crumb (10)	8.90	9.00	9.30	9.40	9.60	8.20	8.70	8.00	8.60	7.00	6.70
Texture (10)	9.00	9.20	9.30	9.30	9.40	9.15	8.60	7.60	7.90	6.80	6.65	
Tenderness (10)	7.20	8.00	8.60	9.20	9.30	8.40	8.20	7.60	7.70	6.60	5.90	
Overall acceptability (50)	43.07	45.00	46.20	46.20	47.50	43.35	42.90	40.23	41.60	36.07	34.71	

*As illustrated in table (1)

Contribution to the Daily Requirements:

a) Effect of fortifying sponge cakes with pumpkin or sweet potato puree on the daily requirements of macro nutrients for children (4-10) years.

Calculated data in table (6) revealed that supplementing sponge cake with pumpkin or sweet potato puree at the illustrated levels showed that the increase in the contribution to the daily requirement of energy was negligible while this contribution of ash showed remarkable increase in this affair as increasing the added pumpkin paste or potato puree at the illustrated levels for children were ranging from 4-6 and 7-10 years.

Presented results showed that this contribution of ash from pumpkin cakes covered percentages ranging from 51.01 to 80.80% (by an increase 32.32% compared to the control) to the daily requirements for children from (4– 6 years) and 52.06 to 82.47% (by an increase 32.97%) for those from (7- 10 years) respectively.

Table (6) Contribution of Macronutrients and Energy per 100 gm of pumpkin or Sweet Potato Cakes to the Daily Requirements for Children from (4 – 6 years).

	Treatments	Contents (g/100g)				Contribution to Dairy Requirements %							
		Protein	Fat	Ash	Energy (Kcal)	Children (4 – 6 years)				7 – 10 years			
						Proteins 56 g	Fats 15 g	Ash 1.98 g	Energy 2700 Kcal	Proteins 46 g	Fats 15 g	Ash 1.94 g	Energy 2000 Kcal
Pumpkin %	Control	9.06	20.71	0.96	496.47	16.18	138.06	48.48	18.39	19.69	138.06	49.48	24.82
	T ₅	8.39	19.27	1.01	488.23	14.98	128.47	51.01	18.08	18.24	128.47	52.06	24.41
	T ₁₀	8.15	19.29	1.07	487.73	14.55	128.60	54.04	18.06	17.72	128.60	55.15	24.39
	T ₁₅	8.00	18.98	1.24	485.06	14.28	126.53	62.63	17.96	17.39	126.53	62.63	24.25
	T ₂₀	7.83	19.04	1.33	489.96	13.98	126.93	67.17	18.14	17.02	126.93	68.55	24.50
	T ₂₅	7.94	19.27	1.60	482.95	14.18	128.47	80.80	17.89	17.26	128.47	82.47	24.15
Yellow Sweet Potato %	T ₅	8.39	19.11	1.15	487.07	14.98	127.40	58.08	18.04	18.24	127.40	59.28	24.35
	T ₁₀	8.47	19.65	1.18	489.01	15.12	131.00	59.59	18.11	18.41	131.00	60.82	24.45
	T ₁₅	8.47	20.10	1.39	498.06	15.12	134.00	70.20	18.45	18.41	134.00	71.65	24.90
	T ₂₀	8.39	20.70	1.66	490.42	14.98	138.00	83.84	18.16	18.24	138.00	85.56	24.52
	T ₂₅	8.42	21.08	1.97	487.84	15.03	140.53	99.49	18.07	18.30	140.53	101.54	24.39

*As illustrated in table (1)

Source: Recommended Dietary Allowance for Indian Swaminathan (1993).

Table (7) Contribution of pumpkin or Potato Cakes to Daily Requirements of Macronutrients for adults (23 – 50 years) and Old Adults (51 – 70 Years) per / 00 gm of the products.

Treatments	Components %						Contribution to daily requirement for adults %														
	Protein	Carbohydrate	Fibers	Ash	Energy Kcal	T. fat	Adults (23 – 50 years) **					Old adults (51 – 70 years) ***									
							Males		Females			Males		Females							
control	9.06	68.46	0.82	0.96	496.47	20.71	14.38	48.48	18.39	18.12	50.00	24.82	16.18	52.66	2.73	22.53	19.69	52.66	3.9	25.10	
Pumpkin Cakes	T ₅	8.39	70.31	0.98	1.01	488.23	19.27	13.32	51.01	18.08	16.78	51.04	24.41	14.98	54.08	3.26	22.15	18.24	54.08	4.76	24.68
	T ₁₀	8.15	70.38	1.10	1.07	487.73	19.29	12.94	54.04	18.06	16.30	55.73	24.38	14.55	54.14	3.67	22.13	18.24	54.14	5.24	24.66
	T ₁₅	8.00	70.56	1.20	1.24	485.06	18.98	12.70	62.63	17.96	16.00	64.58	24.25	14.29	54.27	4.00	22.01	17.39	54.27	5.71	24.52
	T ₂₀	7.83	71.82	1.36	1.33	489.96	19.04	12.60	67.17	18.15	15.66	69.27	24.49	13.98	55.25	4.53	22.23	17.02	55.25	6.47	24.77
	T ₂₅	7.94	69.44	1.73	1.60	482.92	19.27	12.60	80.80	17.89	15.88	83.33	24.15	14.18	53.41	5.76	21.91	17.26	53.41	8.23	24.42
Potato Cakes	T ₅	8.39	70.38	0.96	1.15	487.07	19.11	13.32	58.08	18.04	16.78	59.89	24.35	14.98	54.14	3.20	22.10	18.24	54.14	4.57	24.62
	T ₁₀	8.47	69.57	1.1	1.18	489.01	19.65	13.44	59.59	18.11	16.94	61.46	24.45	15.12	53.52	3.70	22.19	18.41	53.52	5.28	24.72
	T ₁₅	8.47	68.69	1.34	1.39	498.06	20.10	13.44	70.30	18.45	16.94	72.39	24.90	15.12	52.87	4.46	22.59	18.41	52.87	6.38	25.18
	T ₂₀	8.39	67.64	1.60	1.66	490.42	20.70	13.32	83.84	18.16	16.78	86.46	24.52	14.98	52.03	5.33	22.25	18.24	52.03	7.62	24.79
	T ₂₅	8.42	66.11	2.41	1.97	487.87	21.08	13.26	99.49	18.07	16.84	103.60	24.39	15.03	50.85	8.03	22.13	18.30	50.85	11.47	24.66

*As illustrated in table (1).

**Recommended Dietary Allowances (1989).

***Dietary Reference intakes for Older Adults (2002).

The same contribution of ash from potato puree covered from 58.08 to 99.495% (by an increase reached 51.01% and from 59.28 to 101.54 % (by an increase 52.02%) respectively for the same categories. Similar results were reported by Velukovic (1992), El-Gammal (2001), Hassan (2005) and Gafour et al., (2007).

b) Effect of supplementation of sponge cake with pumpkin or potato puree on contribution to the daily requirements of macronutrients for adults (23–50 years) and old adults (51–70 years).

Data shown in table (7) illustrate that both pumpkin and potato cakes showed considerable contribution to the daily requirements for ash, carbohydrates and fibers for young adults (23–50 years) and old adults (51-70 years). These contributions of pumpkin cakes ranged from 51.01 to 80.80% of ash for males, 51.04 to 83.33% for females, by an increase 31.52% and 33.33% respectively for those of young adults. These contributions of potato cakes ranged from 58.08 to 99.49% and 59.89 to 103.6% by an increase 51.01 and 53.45% compared to the control respectively for the same categories.

Fibers also showed magnitude contribution to the daily requirements for those of old adults (51-70) ranged from 3.26 to 5.76% and from (4.67 to 8.24% by an increase 3.03 and 4.34% respectively for males and females of the same category with pumpkin cakes. Higher levels of contribution of fibers shown in the same table with potato cakes ranged from 3.20 to 8.03% and 4.57 to 11.47% by an increase 5.30 and 8.57% respectively, for males and females of the same category.

With respect to the contribution of total carbohydrates to daily requirements for old adults, it was observed that these contributions achieved lower numbers reached to 2.59 % for males and females alike of old adults (51 - 70 years), as well as the same contributions of energy for the two categories, the results presented in the same table showed no differences of contributions.

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تحسين جودة الكيك الاسفنجي باستخدام بيوريه القرع العسلي والبطاطا

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يعتبر القرع العسلي والبطاطا من الخضروات الواعدة لاحتوائها على العديد من المركبات الوظيفية والمعادن الهامة التي تلعب دوراً هاماً في الوقاية من العديد من الأمراض العضوية وتغطية الاحتياجات اليومية من العناصر المعدنية والفيتامينات الهامة للجسم. لذا فقد استهدفت هذه الدراسة تحسين الخواص الحسية والوظيفية للكيك الاسفنجي باعتباره من أهم منتجات المخازن المحببة لجميع الفئات العمرية ولا تخلو منه موائد المناسبات المختلفة وذلك عن طريق اضافة القرع العسلي أو البطاطا بهدف تحسين المظهر العام والتركيب الداخلي وخواص الطعم وخواص الاسفنجية عند مستويات اضافة ١٠، ١٥، ٢٠، ٢٥% من دقيق القمح المستخدم في عمل الكيك لبيوريه أي منهما

تم اختيار المنتج النهائي بالنسبة للارتفاع والحجم والحجم النوعي والرياح وكذلك فترة الحفظ على درجتى التلجة والغرفة. أوضحت النتائج المتحصل عليها تحسناً واضحاً في الخواص الحسية للمنتج من ناحية الطعم وخواص المظهر الجذاب والتركيب الداخلي وكذلك الحجم والرياح. وقد حققت النسبة ٢٠% قرع عسلي أعلى زيادة في الحجم والرياح والارتفاع وكذلك فترة الحفظ على درجتى الغرفة والتلجة. وعلى الجانب الآخر لم يتعد هذا التحسن في الخواص السابقة في كيك البطاطا ١٥% وعلى النقيض فقد تفوق بيوريه البطاطا على القرع العسلي في تحسين محتوى المنتج من الرمد والألياف بزيادة نسبة الاضافة بالمقارنة بنظيره من القرع العسلي مما ترتب عليه ارتفاع المساهمة في الاحتياجات اليومية من هذه المحتويات بدرجة كبيرة بالنسبة للاطفال في الفئة العمرية ٤-١٠ سنوات وكذلك الشباب وكبار السن الذين تتراوح أعمارهم بين ٢٣-٥٠، ٥١-٧٠ سنة

مما سبق يمكن القول أن هذا العمل أوضح نجاحاً حقيقياً في تحسين خواص المنتج المستهدفة دون أي تأثيرات سلبية على خواص المنتج خاصة مع استعمال القرع العسلي.