Chemical, Nutritional and Sensory Evaluation of Two Traditional Egyptian Sweet Products

Laila M. El-Zalaki[1] & Basma, M.N.[2]

[1]Hotel Studies Dept. Higher Institute of Tourism and Hotels, El-Seyouf, Alexandria, Egypt.

[2]Home Economic Dept. Fac. of Agric., El-Shatby, Alex. Univ., Alexandria, Egypt.

ABSTRACT

Treacle is consumed by some individuals in Egypt as a sweet food concentrate or as an ingredient in traditional sweets. It represents combination of certain physical properties, fine flavour, acceptable caramel colour and high nutritive value.

Treacle is used in the area of Damietta Governorate, Egypt as a basic ingredient in preparing two nutritious (home made) traditional sweet products, locally named *Halawa Sowda* (HS) and *Helba Metabakha* (HM). The basic ingredient in the formulations is treacle with the addition of mainly black seed in HS and fenugreek in HM, respectively with other seasonings and thickening agents to improve the specific sensory characteristics of each of the two products.

The present work was carried out to evaluate the two products from the view of therapeutic nutrition, overall acceptability and preference extent as new products unknown by the majority of the inhabitants in Alexandria Governorate.

The results showed that the two products can be accounted as low price nutritious foods. They are good sources of energy which 67% of it comes from carbohydrates. The protein content of HS and HM (5.8 and 5.91%, respectively on dry weight basis,) contained all the essential amino acids. Eating 50g daily can provide all the recommended daily amino acids. Fat content of HS and HM (12.91 and 13.55%, respectively on dry weight basis) are rich in fatty acids, particularly, the unsaturated fatty acids. Linoleic and oleic acids are representing 35 and 24% of the total fatty acids, respectively. They are good sources of macro and micro mineral elements, especially Na, K, P, Mg, Fe, Cu, Mn, Zn and Ca. *Helba Metabakha* is more acceptable than *Halawa Sowda*, but both were readily acceptable as food products or as cookies filler.

The results revealed that both products can be recommended to provide the diverse blend of nutrients needed for growth, during pregnancy, increasing milk excretion of nursing mothers and overall health. That is truly well known as a folk food in Damietta Governorate.

Key words: treacle, black seed, fenugreek, moughat, Katheraa', Halawa Sowda, Helba Metabakha.

INTRODUCTION

Many countries have their specific and characteristic traditional foods depending on food consumption habits and methods of processing (Kuhnlein, 1989, Basaran, 1999). The method of preparing traditional foods is generally simple, less expensive and passed through ages without either scientific technological or nutritional basis (Koleosa, 1989, Lee, 1989). Moreoever, Pearce (1990) identified traditional foods as food products that are prepared from locally available, low priced raw materials with simple cooking methods that are often depended on experiences. In Egypt, variation in traditional food products is so vast that it is difficult to treat them as a single class of foods (Khalil *et al.*, 2003).

Treacle is defined by the Egyptian Organization for Standardization and Quality Control (1993) as a heavy density sweet concentrate produced by concentrating extracted sugar cane juice, using heat to the extent that liquid does not gain burned colour or flavour. It is characterized by its low price and good nutritive value due to its high content of sugars, mineral elements, specially Fe, K, Ca, Mg, P and Na (Suomalainen & Oura, 1971, Youssef *et al.*, 1981).

Treacle is consumed as a sweet food concentrate by many individuals in Egypt (Mohamed, 1976). It is consumed either as it is or with added sesame butter (*Tehena*), or used as an ingredient in formulating some food products as *Asaliah* (a hard sweet). Treacle is used also, in some food industries to produce malted milk caramels, toffee and canned fruits (Lees, 1970, Hume, 1977, Alvarez, 1987).

In Damietta Governorate, Egypt, treacle is used as a basic ingredient in preparing nutritious and delicious two home made sweet products. The

first is locally named *Halawa Sowda* (HS) which means black sweet and the second is named *Helba Metabakha* (HM) which means cooked fenugreek. The basic ingredient in both is treacle with the addition of mainly black seed (*Nigella sativa*) in HS and fenugreek powder (*Trigonella foanum-gramecum*) in HM. Other seasonings and thickening agents are added to introduce the specific sensory characteristics of each of the two products. The HS and HM are recommended as nutritious popular folk foods for adolescents and youth as well as pregnant and lactating women.

Many herbs have been used historically as "cure-alls" or potent "tonic herbs". Among these herbs are black seed, fenugreek and aloe vera, three of the Prophet Muhammad's (Peace be Upon Him) favorite herbs (Anonymous, 2007a).

Black seed (*Nigella sativa*) is considered to be one of the important healing herbs used for millenniums (Babayan, 1979). It is a valuable source of essential fatty acids, vitamins A, B1, B2, C and niacin as well as minerals such as Ca, Fe, Na, K, Se, Mn and Zn which act as an essential factor in various enzyme functions.

The seeds are also rich in sterols, especially beta-sitosterol, which is known to have anticarcinogenic activity (American Spice Trade Association 1986, Dziezak, 1989, Sylvia, 2000).

Because of many uses and medical properties of black seed, it is included in the list of natural drugs of the *Al-Tibb Al-Nabawi* and the ancient Arabs appropriated it *habbatul barakah*, meaning "the seed of blessing" (Anonymous, 2007b). Ibn Sina in his volumes called ``The Canon of Medicine" referred black seed as the seed that stimulates the body's energy and helps recovery from fatigue or dispiritedness.

Fenugreek (*Trigonella foanum-gramecum*), the seed of an annual herb, unique in the species, was used by the ancient Egyptians, as it was mentioned in medical writings in their tombs (Rosengarten, 1973). Historically, the main use of fenugreek was medicinal, rather than as a flavour, in many parts of the world (Basch *et al.*, 2003). It is used as digestive aid, to promote lactation in women and cows, affecting the male reproductive tract and help in lowering levels of sugar, cholesterol and triglycerides in blood (Neeraja & Pajyalakshmi, 1996, Puri *et al.*, 2002, Tiran, 2003). Fenugreek contains diosgenin, a compound used as starting materials for sex hormones in the pharmaceutical industry (Tainter & Grenis, 2001). From the other hand, fenugreek should be avoided during pregnancy and from those prone bleeding (Basch *et al.*, 2003).

The chemical composition of ground fenugreek is as follows: 5.4–9.5% moisture, 23.6–28.9% protein, 6.3 – 8.8 % crude fat, 3.0-4.8% ash, 8–13% crude fibers, and 40.7 – 46.3% carbohydrates. It is rich in minerals, i.e. Ca, Fe, P, K, Na and vitamins A, B and C (Kamar, 1977, USDA, 1990, Ravindran, 1997).

Fenugreek powder is added to certain food products for its surface properties as it reduces surface tension (Benichou *et al.*, 1999), also as a source of fiber which forms viscous gel in the stomach, so decreasing the absorbability of carbohydrates (Shankaracharya & Natarajan, 1972, Ohr, 2006) and in preparing a traditional Arabian dish named fenugreek dip by using soaked fenugreek seeds with onion and garlic saute' (Al-Hashimi, 1993).

Moughat (*Glossostemon bruguleri*) is a plant with high nutritious value used as hot drink in almost Arabian countries. In Egypt, it is the main drink during celebration with new born babies and giving to nursing and lactating mothers with milk, sugar and nuts (Attia, 2004). It contains 25% starch, 23% mucilage, 3% sugars, 5% cellulose, 7.5% pectic substances, 5% ash and 5% fat (Osman, 2002).

Seasoning mixture consists of sesame, cardamon, caraway, fenugreek and nutmeg is added to increase nutritious value and enhancing *Moughat* flavour.

Katheraa' is a gum extracted from a mountain herb plant; it is used in cosmetic and medical products and for treating cough, chest diseases and smoothening the skin. Its white type is used in food as thickening agent (Anonymous, 2006).

The present work was carried out to estimate physical properties, chemical composition and the main nutrients of two traditional products in Damietta Governorate; namely, *Halawa Sowda* (HS) and *Helba Metabakha* (HM). Sensory evaluation was carried out to demonstrate the extent of acceptance of those two products as new sweet products unknown in Alexandria Governorate, and compared with *Helba Maa'koda* (HMK), a slightly similar traditional food known in Alexandria, Egypt.

MATERIALS & METHODS

Materials

Treacle as well as all the ingredients; namely, black seed, fenugreek, *Moughat*, seasonings mixture, coarse coconut, sesame seeds, *katheraa*', corn oil and wheat flour were purchased from Alexandria local market, Egypt, in December, 2006.

Each of black seed and fenugreek was finely grounded using multiquick grinder, and then mixed with a little amount of warm water to form a heavy suspension of each before use. *Katheraa*' was soaked overnight in hot water in ratio of 1 : 50 (w/v) before use.

Methods

Sweet products: *Halawa Sowda* (HS) was prepared as shown in Fig. (1) and the preparation of *Helba Metabakha* (HM) was carried out in the same manner, except using fenugreek suspension instead of black seed suspension. The preparation of *Helba Maa'koda* and the weighed ingredients used for making the three products are also shown in Fig. (1).

Baked patties: Patties filled with either Hal*awa Sowda* or *Helba Metabakha* were prepared using the dough recipes and baking method described by Cracknell & Kaufmann (1991).

Physical and physico-chemical properties of HS and HM: Apparent viscosity of the sweet products (HS and HM) were measured at 30ºC using a viscosimeter type RN, produced by MLW, Germany, at speed factor 4. Colour was measured by using Lovibond- Schofield Tintometer, produced by the Tintometer Ltd, England. The pH was measured by Cole Parmer pH meter. The total soluble solids were determined by using an Abbe' refractometer, Model 2WAJ, China.

Chemical composition of HS and HM: Proximate analysis of both products was carried out according to AOAC (1990) to determine moisture, ether-extract, crude protein (NX 6.25), crude fiber and total ash. Carbohydrates were calculated by difference. All determinations were carried out in triplicates.

Total and reducing sugars were determined by Lane-Eynon volumetric method (AOAC, 1990) and non reducing sugar as sucrose was calculated by difference using 0.95, as a conversion factor.

The method described by AOAC (1990) was followed to estimate the minerals of both products. Gallen-Kamp Flam analyzer was used to estimate

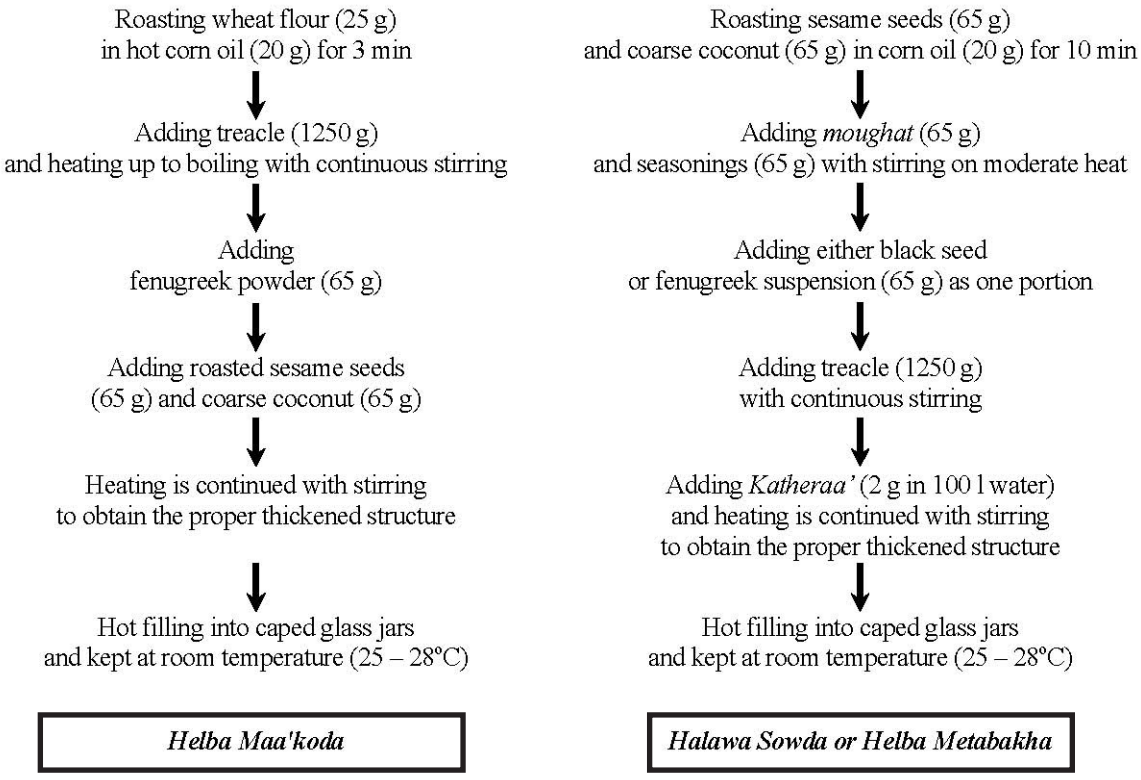

Fig. 1. Flow sheet for preparing home made *Halawa Sowda*, *Helba Metabakha* and *Helba Maa'koda*

Na and K, while Ca, Fe, Mn, Zn, Cu and Mg were determined using Perkin Elmer Atomic Absorption Spectrophotometer. Total phosphorous was assayed calorimetrically at a wave length of 630 nm using a Spectronic-20 Spectrophotometer.

Preparation of fatty acid methyl esters from total lipids was performed according to the procedure of Radwan (1978) using a Perkin-Elmer gas chromatography (GC-8410) with flame ionizing detector and glass column 2.5 m x 3 mm i.d, under the following conditions: column, 5% DEGS on 80/100 Chromo Q; column-temp.: 170°C, Detector temp.: 270°C, H2 flow rate: 75 ml/min., N_2 flow rate: 20 ml/min, Air flow rate: 0.5 ml/min, Chart speed: 2.5 mm/min and sensitivity: 16×10^2. Standard fatty acid methyl esters were used for identification. The area under each peak was measured by the triangulation method as percentage of each fatty acid with regard to the total area.

Amino acids were determined according to the method described by Duranti & Cerletti (1979) using Beckman amino acid analyzer (Model 119CL). The colourimetric method of Miller (1967) was used to determine the tryptophan in the alkaline hydrolyzate using p-dimetyhyl amino benzaldehyde. Amino acid composition was compared with RDA reported by FAO/WHO/UNU (1985). Energy value (Calories) was calculated by multiplying carbohydrates, protein, and fat by 4, 4 and 9, respectively (Drummond, 1997).

Sensory Evaluation: Taste, odour, colour, texture as well as overall acceptability of *Halawa Sowda*, *Helba Metabakha*, *Helba Maa'koda* and baked patties were tested by 30 panelists of Home Economics Department, Faculty of Agriculture, Univ. of Alexandria. The panelists were randomly chosen between staff members, employees or students and were asked to score the above attributes according to a standard hedonic rating scale from 10 (like extremely) to 1(dislike extremely) according to Kramer & Twigg (1970) and Meilgaard *et al.* (1999). The organolyptic values were analyzed statistically using SPSS (1999) version 9 to calculate the mathematical average and the standard deviation to determine the significantly difference at $P > 0.05$.

RESULTS AND DISCUSSION

Chemical composition of treacle:

Moisture, total solids, sucrose, reducing sugars and ash content of the treacle used in the present study were 22.4, 72.8, 43.2, 26.8 and 1.0%, respectively. Amin (1997) stated that the high quality treacle is that having the following main composition: 25–30% moisture, 70–75% total solids, 40–45 sucrose, 20–25% reducing sugars and 1–2% ash. Thus, the treacle used in the present work is classified as a good quality treacle.

Physical and physico-chemical properties of HS and HM

The results shown in Table (1) indicate that the viscosity of *Halawa Sowda* (HS) is higher than that of *Helba Metabakha* (HM) and both products are highly viscous as compared to peanut butter, which is 177 centipoises (El-Zalaki *et al.*, 1995).

The colour measurements of both products consist of matching red, yellow and blue colour fractions with high values. Yellow represented the dominant colour, while the complementary one was blue in HS and was red in HM. Generally, the visual colour of HS is nearly black and HM has slight reddish brown colour due to the addition of black seed and fenugreek, respectively. *Halawa Sowda*

Table 1: Physical and physico-chemical properties of *Halawa Sowda* and *Helba Metabakha*

Properties	*Halawa Sowda*	*Helba Metabakha*
Viscosity (Centipoise)	449 ± 1.6	234 ± 2.1
Lovibond colour		
Red	10.0	12.0
Yellow	33.2	33.0
Blue	12.0	11.2
pH	6.2 ± 0.03	5.8 ± 0.06
Total soluble solids (%)	63.2 ± 0.73	68.4 ± 0.46
Total solids	72.9 ± 0.80	75.0± 0.61

* Means ± standard deviations

has pH of 6.2 with neutral the taste as compared to *Helba Metabakha* which is slightly acidic, with a pH value of 5.8. Total soluble solids accounted 86.7 and 91.2% of the total solids in HS and HM, respectively.

Chemical composition of HS and HM: Moisture content of both products represent nearly one quarter of the total composition, as shown in Table (2). The main constituent is carbohydrates, reaching about three quarters of the total components, on dry weight basis, followed by fat, crude protein, crude fibers, then total ash.

The results in Table (2) reveal that HS and HM had 38.8 and 40.1% total sugars, in which 86.6 and 87.9% were non reducing sugars, respectively. Generally, the percentage of chemical components of both products is nearly similar.

Mineral composition of HS and HM

Data presented in Table (3) show that the mean of the macro-elements content of HS can be ranked in the following descending order: K, Mg, Na, P then Ca, whereas the micro-elements can be arranged in descending order as follows: Fe, Zn, Cu and Mn.

Potassium and sodium were the most abundant minerals in both products. This reflects that eating of HS and HM has a role in blood pressure, a fact which is known traditionally. On the other hand, it is worth to mention that 100g of HS provide lactating woman from Fe, Mg, Cu and Mn more than Recommended Daily Allowance (RDA) and 84.2% of RDA from Zn and 25% of RDA from P, according to National Academy of Sciences (2001). About 75g of HM is found to contain all the RDA from Cu and Mn and 120g of HM provide RDA from Fe and Mg.

Generally, the results indicate that the products are considered as good sources of Na, K, Mg, P, Fe, Cu, Zn and Mn but poor sources of Ca.

Amino acid composition of HS and HM

The results presented in Table (4) show the amino acids composition in the prepared HS and HM protein, as compared to human milk protein (HMP) and RDA for adults as suggested by FAO/WHO/UNU (1985). Essential amino acids (EAA) account, more than one third of the total amino acids of both products being 36.6%, and nearly similar to EAA ratio (39.9%) in the human milk protein (HMP).

Halawa Sowda protein is found to be a good source of isoleucine, methionine, phenyl alanine, tryptophan and valine as compared to HMP. Whereas HM protein contains higher amounts of lysine, phenyl analine and tryptophan than HMP.

Although, HS and HM contain only 4.25 and 4.45%, respectively of their wet weight protein (Table 2), less than 50g of HS or HM can provide all the recommended daily EAA for adults. These results rank HS and HM protein as high biological valuable protein.

Fatty acid composition of HS and HM

Data presented in Table (5) give the fatty acid composition of oils extracted from HS and HM. Linoleic acid (C18:2) was found to be the dominant fatty acid in HS and HM oils (35.94 and 35.42%,

Table 2: Approximate chemical analysis* of *Halawa Sowda* and *Helba Metabakha*

Constituent	*Halawa Sowda* %		*Helba Metabakha* %	
	WWB	**DWB**	**WWB**	**DWB**
Moisture	26.7 ± 0.39	---	24.7 ± 0.44	---
Crude protein	4.25 ± 0.24	5.81 ± 0.31	4.45 ± 0.31	5.91 ± 0.46
Fat	9.46 ± 0.33	12.91 ± 0.19	10.20 ± 0.41	13.55 ± 0.33
Ash	1.45 ± 0.18	1.98 ± 0.25	1.49 ± 0.35	1.98 ± 0.18
Crude fiber	4.34 ± 0.21	5.92 ± 0.51	3.44 ± 0.41	4.57 ± 0.39
Carbohydrates	53.84 ± 0.36	73.45 ± 0.43	55.76 ± 0.37	74.05 ± 0.51
Reducing sugars	3.42 ± 0.09	4.67 ± 0.19	4.02 ± 0.61	5.34 ± 0.21
Non-reducing sugars	33.61 ± 0.61	45.85 ± 0.61	35.26 ± 0.35	46.83 ± 0.51
Total sugars	38.80 ± 0.48	52.93 ± 0.71	40.12 ± 0.81	53.28 ± 0.61

*Expressed as mean ± S.D. WWB: On wet weight basis DWB: On dry weight basis

Table 3: Mineral contents (mg/100g) of *Halawa Sowda* and *Helba Metabakha* and their evaluation as % RDA

Elements	RDA* (mg)	*Halawa Sowda*		*Helba Metabakha*	
		mg/100g	Provided RDA %	mg/100g	Provided RDA %
Macro-elements					
Na		205.0		220.1	
K		455.2		510.3	
Ca	1000	173.4	17.3	160.8	16.1
P	700	180.1	25.7	350.4	50.1
Mg	310	390.0	125.8	218.1	70.4
Micro-elements					
Fe	9.0	12.3	136.7	7.2	80.0
Cu	1.3	3.1	238.5	2.0	153.8
Zn	12.0	10.1	84.2	5.7	47.5
Mn	2.6	2.6	100	4.5	173.1

* RDA for lactating woman according to National Academy of Sciences (2001).

Table 4: Amino acid (A.A) composition of *Halawa Sowda* and *Helba Metabakha* (mg/g crude protein)

Amino acids	*Halawa Sowda*	*Helba Metabakha*	Human milk	RDA*
Essential A.A.				
Isoleucine	45.5	47.8	52	13
Leucine	71.2	83.2	96	19
Lysine	38.8	72.3	69	16
Methionine	30.4	13.7	16	17
Phenyl alanine	56.5	45.3	35	19
Threonine	42.0	39.3	46	9
Tryptophan	16.3	18.4	17	5
Valine	63.7	48.0	60	13
Semi-essential A.A.				
Arginine	84.8	75.1	35	
Glycine	31.1	40.7	20	
Histidine	32.2	24.2	23	
Serine	31.8	38.0	46	
Tyrosine	45.4	31.1	45	
Cysteine	19.2	10.9	23	
Non-essential A.A.				
Aspartic acid	102.1	112.5	92	
Glutamic acid	180.2	203.1	203	
Alanine	28.5	38.4	34	
Proline	79.8	63.0	104	
Total A.A.	999	1005	1016	

* RDA for adults suggested by FAO/WHO/UNU for adults (1985).

Table 5: Fatty acid composition* of oil extracted from *Halawa Sowda* and *Helba Metabakha*

Acids	*Halawa Sowda*	*Helba Metabakha*
Caprylic C8:0	5.012	6.641
Capric C10:0	2.765	3.776
Lauric C12:0	9.217	8.767
Myristic C14:0	3.283	2.604
Palmitic C 16:0	11.406	10.677
Palmitoleic C 16:1	0.576	0.868
Stearic C 18:0	4.632	3.689
Oleic C 18:1	24.078	22.439
Linoleic C 18:2	35.944	35.417
Linolenic C 18:3	3.111	4.688
Arachidic C20:0	0.576	0.434
Total saturated %	36.291	36.588
Total unsaturated %	63.291	63.412
U/S ratio**	1.8:1	1.7:1

* as % of total fatty acids. ** Unsaturated / saturated ratio.

respectively) followed by oleic acid (C 18:1), which represents slightly less than 25% of the total fatty acids. The presence of high amounts of oleic and linoleic acids in both products suggests that they are highly recommended to be rich in the unsaturated fatty acids and hence they can be considered as valuable healthy foods, and classified in the oleic-linoleic acid group namely; olive, sesame, peanut, corn and cotton seed which is reported previously by Hamilton & Rossell (1986) and Nasirullah *et al.* (1991).

On the other hand, Purseglove *et al.* (1981) found that black seed oil increases the milk output of breast feeding mothers and this could be attributed to a combination of lipid portion and hormonal structures found in the black seed as reported by Luetjohann (2000). This is in agreement with the traditional use of HS and HM in Damietta Governorate as a food recommended daily for lactating women and also the use of *Moughat* as main component in a hot drink consumed daily by lactating women, as both to enhance and stimulate the excretion of breast milk.

Energy value of HS and HM

The recommended energy allowance (REA) for males or females at age 19 to 50 years are 2900 and 2200 Cal./day, respectively according to WHO (1985).

The REA is exceeded by 300 Cal, during pregnancy, and the lactating woman requires an additional 640 and 510 Cal./day in the first and the second 6 months, respectively, as approximately 85 Cal. are required for every 100ml milk produced (Sadurkis *et al.*, 1988). The estimated calories produced from eating 100g of either HS and HM are shown in Table (6). The main source of energy is carbohydrate, which account about 67% of the total calculated calories in both products followed by fat (one quarter of total calories). Generally, 100g of HS or HM provide one tenth of REA, which introduced them as fast and good sources for energy.

Sensory evaluation: The organolyptic evaluation of the prepared products; namely *Halawa Sowda* (HS), *Helba Metabakha* (HM), *Helba Maa'koda* (HMK) and the baked patties filled with either HS or HM are shown in Table (7).

All the attributes including colour, taste, odour, texture and overall acceptability of HS and HM were moderately good, having average score around 7.0. Whereas that of HM is around more than 8. This preference to HMK is mainly attributed to that HMK is considered as a traditional food known more in Alexandria, where the sensory evaluation test was carried out. On the other hand the statistical analysis showed that the calculated Chi square was 5.09 with 4 degree of freedom and it was significant at 0.05. This means that no significant difference was detected among the three products from the stand point of all examined attributes. Patties filled with either HS

Table 6: Calculated energy value of *Halawa Sowda* and *Helba Metabakha* (as Cal./ 100g)

Source	*Halawa Sowda*			*Helba Metabakha*		
	g/100g	Cal/100g	% of total produced calories	g/100g	Cal/100g	% of total produced calories
Carbohydrates	53.84	215.36	67.8	55.76	223.0	67.1
Fat	9.46	85.14	26.8	10.20	91.8	27.6
Protein	4.25	17.0	5.4	4.45	17.8	5.3
Total calories		317.5	100.0		332.64	100.0

Table 7: Sensory evaluation* of *Halawa Sowda* (HS), *Helba Metabakha* (HM), *Helba Maa'koda* (HMK) and patties filled with HS or HM

Product	Colour	Taste	Odour	Texture	Overall acceptability
Halawa Sowda	6.79 ± 0.32 ^{a}	6.93 ± 0.58 ^{a}	7.14 ± 0.41 ^{a}	7.21 ± 0.33 ^{a}	7.07 ± 0.19 ^{a}
Helba Metabakha	7.50 ± 0.62 ^{b}	7.21 ± 0.68 ^{b}	7.29 ± 0.20	7.71 ± 0.39 ^{a}	7.43 ± 0.44 ^{a}
Helba Maa'koda	8.57 ± 0.46 ^{b}	8.57 ± 0.37 ^{c}	8.50 ± 0.34 ^{ab}	8.86 ± 0.41 ^{b}	8.79 ^{a}
Patties filled with HS	7.7 ± 0.43 ^{a}	6.6 ± 0.51 ^{a}	6.3 ± 0.21	7.4 ± 0.35 ^{b}	7.4 ± 0.37 ^{a}
Patties filled with HM	6.5 ± 0.26 ^{ab}	6.5 ± 0.33 ^{b}	6.3 ± 0.40	7.2 ± 0.28 ^{b}	6.3 ± 0.41 ^{ab}

* Mean ± SD

Means, in a column which are not sharing the same letter is significantly different at $P < 0.05$.

or HM were also moderately good, having average score around 7, and no significant difference was detected among them.

Economic evaluation

The total cost of recipes used in preparing 500g *Halawa Sowda* or *Helba Metabakha* was about 2 L.E. According to Kinton & Ceserani (1993), the cost of raw materials nearly equals to 40% of the sale price of food products. So, the suggested price of 500g HS or HM is estimated to be 5.0 L.E., a price which is nearly the same or even less than that of the other sweet products, like jam or *Halawa Tehenia* (sesame sweet), which are sold in the Egyptian market at around 6 L.E. per 500g.

CONCLUSION

Halawa Sowda and *Helba Metabakha* are moderately priced, popular traditional products made in Damietta Governorate especially for adolescent girls and for women during pregnancy and breast-feeding. They are prepared mainly from treacle with the addition of black seed or fenugreek powder, respectively as well as, seasoning and thickening agents. They are characterized by their high nutritional value: a good source of energy, high content in carbohydrates, recommended dietary essential amino acids and unsaturated essential fatty acids. Moreover, they are good sources of minerals such as Na, K, P, Mg, Fe, Cu, Mn, Zn and Ca.

Therefore, further studies are recommended to introduce these products in the therapeutic catering field, especially for those suffering from weakness or thinness as well as during growth, pregnancy and lactation.

REFERENCES

Al-Hashimi, M., **1993**. Traditional Arabic Cooking. Garnet publishing limited, UK.

Alvarez, F.F. **1987**. The production of syrups from sugarcane. Focusing and experiences. International American Sugarcane Proceeding, Miami, USA.

American Spice Trade Association **1986**. What you should know about black seed. American Spice Trade Association, Englewood Chiffs, NJ.

Amin, W., **1997**. Chemical and Technological Studies on Treacle (black honey). Ph.D. Thesis. Faculty of Agriculture, Alexandria University.

Anonymous **2006**. Herbs and spices. www.Lakii. com 18/12/2006.

Anonymous **2007a**. Natural Remedies, www.islam-online.net/English /science /2000/3/article2. shtml, 5/1/2007.

Anonymous **2007b**. Black seed, http://en.wikipedia. org/wiki/Nigella_sativa . 5/2/2007.

AOAC **1990**. Association of Official Analytical Chemists. Official methods of analysis. 15th Ed. Washington, D.C. USA.

Attia, M. **2004**. Egyptian Environment. Postan El-Maarafa, Alexandria, In Arabic.

Babayan, V. **1979**. Medical plants. J. Food Sci., **43**: 1314-1316.

Basaran, P. **1999**. Traditional Foods of the Middle East. Food Techno., **53**:60-65.

Basch, E., Ulbricht, C. & Kuo G. **2003**. Therapeutic applications of fenugreek. Altern Medical Review, **8**: 20-27.

Benichou, A., Aserin, A. & Garti., N. **1999**. Steroid-saponins from fenugreek seeds: extraction, purification and surface properties. J. Dispersion sciences and technology, **20**: 581-605.

Cracknell, H.L. & Kaufmann, R.J **1991**. Practical Professional Cookery. 2nd ed. Mac Mrllan. London.

Drummond, K.E. **1997**. Nutritional for the Food Service. Professional. Van Nostrand Reinhold. USA.

Duranti, M & Cerletti, P. **1979**. Amino acid composition of seed protein, J. Agric. Food, Chem., **27**: 977-978

Dziezak, J.D. **1989**. Species. Food Technol., **43**: 102-116.

Egyptian Organization for Standardization and Quality Control **1993**. Sugarcane syrup. Egyptian Standard No. 356.

El-Zalaki, Laila, Gomaa, E.G. & Abdel-Rahman, A.Y. **1995**. Texture measurements of peanut butter. La Rivista Italiana Delle Sostanze Grasse. LBXII: Octobre, 461-463.

FAO/HWO/UNU **1985**. Energy and protein requirements: report of join FAO/WHO/UNU Expert Consolation. World Health Organization Technical Report Series 724, WHO, Geneva. 935-1015.

Hamilton, R.J. & Rossell J.B. **1986**. Analysis of Oils and Fats. Elsevier Applied Sci. Pub. New York.

Hume, J. **1977**. Notebook of a practical confectioner, manufacture of toffees, caramels and high boiling products. Confectionery Production, October, 419-420.

Kamar, A., **1977**. Chemical and Technological Studies on Fenugreek Powder. M.Sc. Thesis. Fac. of Agric. Alex. Univ.

Khalil, K., Doma, N., Moustafa, M. & Abeer Rehan **2003**. Microbiological and nutritional properties of Tammia, a traditional Egyptian food. The 4th International Conference on Culinary Arts and Sciences III. June, 23-27. cairo, 122-134.

Kinton, R. & Ceserani, V. **1993**. The Theory of Catering 7th ed. El-BS London.

Koleosa, O.A. **1989**. Integration of traditional food technologies with emerging trends in developing countries. In-Trends in Food Science and Technology. (Eds., M.R. Raghavendra Rao, N. Chandrasekhara, and K. Ranganth,. Proceedings of the 2nd Inter. Food Convention. (IFCON-88). Feb., 18-23 Mysore, India.

Kramer, A. & Twigg, B.A. **1970**. Quality Control for the Food Industry. 3rd ed,., AVI publishing Co., England.

Kuhnlein, H.V. **1989**. Factors influencing use traditional foods among the Nuxalk people. J. Can. Diet Association, Toronto, Ont. The association. Spring, **50**: 102-106.

Lee, C.H. **1989**. Extrusion technology for production of traditional foods. In-Trends in Food Science and Technology. M.R. Raghavendra Rao, N. Chandrasekhara & K. Ranganth (Eds.). Proceedings of the 2nd Inter. Food Convention. (IFCON-88). Feb., 18-23 Mysore, India.

Lees, M.A. **1970**. Manufacture of high boiled sweets, centers with/or without filler units. Confectionery Production, September, 374-376.

Luetjohann, S. **2000**. The healing power of black cumin. Jelsoft Enterprises Ltd.

Meilgaard, M., Civille, G.V. & Carr, T. **1999**. Sensory Evaluation Techniques. 3rd ed, CRC Press, New york.

Miller, E.L. **1967**. Determination of tryptophan content of feeding-stuffs with particular reference to cereals J. Sci. Food. Agric., **18**: 381-386.

Mohamed, M.A. **1976**. An attempt to obtain clarified sugar solutions from Egyptian treacle. Assuit Journal of Agric. Sci., **7**: 73-82.

Nasirullah, A., Ankaiah, K. N., Krishananurthy, M.N. & Nagarja, K.V. **1991**. Quality characteristics of edible oil blends. J. Am. Oil Chem. Soc., **86**: 446-447.

National Academy of Sciences, **2001**. Dietary references intakes. National Academy Press, D.C., Washington.

Neeraja A. & Pajyalakshmi, P. **1996**. Hypoglycemic effect of processed fenugreek seed on humans. J. Food Sci., **33**: 427-430.

Ohr, Linda M. **2006**. Targeting the glycemic index. Food Technol., **60**: 67-70.

Osman, H. **2002**. Encyclopaedia of Food Science and Technology. Moultaka El-Fakr, Alexandria, In Arabic.

Pearce, R. **1990**. Traditional food crops in Sub Saharan Africa. Food Policy, **15**: 374-377.

Puri, D., Prabhu, KM & Murthy, P.S. **2002**. Mechanism action of hypoglycemic from fenugreek seeds. Indian J. Physiol. Pharmacol., **46**: 457-462.

Purseglove, J.W., Brown, E.G., Green, C.L. & Robbins, S.R. **1981**. Spices. Vol.2. Longman Scientific and Technical, Essex, England.

Radwan, S.S. **1978**. Coupling of two dimension thin layer chromatography with gas chromatography for the quantitative analysis of lipids classes and their constituent fatty acids. J. Chromatography Science, **16**:538-542.

Ravindran., P. **1997**. Fenugreek. Indian Spices., **34**: 8-11.

Rosengarten, F. **1973**. The Book of Spices. Pyramid Books, New York.

Sadurkis, A., Kabir, N., Wagner, J. & Forsum, E. **1988**. Energy metabolism, body composition and milk production in healthy Swedish women during lactation. Am.J. Clin. Nutr., **48**: 44-49.

Shankaracharya, N.B. & Natarajan C.P. **1972**. Fenugreek-Chemical composition and use. Indian Spices, **9**: 2-12.

SPSS **1999**. Statistical Package for Social Sciences. SPSS Inc. 444 North Michigen Avenue, Chicago, IL 606 11, USA.

Suomalainen, A. & Oura, E. **1971**. Yeast nutrition and solute uptake. In: The Yeasts. Rose, A.H. & Harrison, J.S. (Eds). Vol. 2. Academic Press, USA.

Tainter, D. & Grenis, A. **2001**. Spices and Seasoning. 2nd ed., A Food Technology Handbook, John Wiley and Sons, INC., Publication, New York.

Tiran D. **2003**. The use of fenugreek for breast feeding women. Complement Therapeutic Midwifery, **9**: (155-156).

USDA **1990**. Composition of foods: Spices and Herbs, USDA Agriculture Hand Book 8-2.

WHO (World Health Organization) **1985**. Energy and protein requirements. Report of a joint FAO/WHO/UNU expert consultation. Technical report series 724. world health organization, Geneva.

Youssef, K.E, El-Rify, M.N. & Abou El-Hawa, S.H. **1981**. Evaluation of proximate compositions and mineral content of Egyptian treacle. Assuit J. Agric. Sci., **12**: 49-56.

التقييم الكيماوي و التغذوي و الحسى لصنفين من منتجات الحلوى الشعبية المصرية

ليلى الزلاقي[١]، محمد نبيل بسمه[٢]

[١] قسم الدراسات الفندقية - المعهد العالي للسياحة والفنادق - السيوف - الإسكندرية

[٢] قسم الإقتصاد المنزلي - كلية الزراعة - الشاطبي - جامعة الأسكندرية

الملخص

يعتبر العسل الأسود غذاء من الأغذية التي يقبل عليها المصريون ويستخدم كأحد مكونات الحلوى الشعبية لما يتصف به من خواص مقبولة ونكهة ولون مميز ولقيمته التغذوية العالية. ويدخل العسل الأسود كمكون أساسي في إعداد صنفين شعبيين من الحلوي بمحافظة دمياط هما الحلاوة السوداء والحلبة المطبوخة، ويتم إعدادهما بإضافة مطحون حبة البركة أو الحلبة (على التوالي) إلى العسل الأسود مع بعض الإضافات للنكهه والقوام.

و تهدف هذه الدراسة إلى تقييم هذين المنتجين من الناحية التغذوية ودراسة مدى تقبلهما كأصناف جديدة غير معروفة لمعظم المقيمين بمحافظة الإسكندرية.

و أوضحت النتائج أن هذين المنتجين منخفضان في تكلفتهما ولهما قيمة تغذوية عالية - وهما مصدران غنيان بالطاقة والتي يأتي ٦٧٪ منها من الكربوهيدرات. وتحتوى بروتينات الحلاوة السوداء والحلبة المطبوخة (٥,٩١،٥,٨٪ على أساس وزن جاف على التوالي) على جميع الأحماض الأمينية الأساسية، وعند تناول ٥٠ جراما يوميا من أي منهما فإن الجسم يحصل على جميع إحتياجاته اليومية من هذه الأحماض الأمينية الأساسية، كما يعتبر المحتوى من الدهون (١٣,٥٥،١٢,٩١٪ على أساس وزن جاف على التوالي) غنى بالأحماض الدهنية الأساسية غير المشبعة حيث يمثل حمضا اللينولييك والأوليك ٣٥، ٢٤٪ من إجمالي الأحماض الدهنية على التوالي كما تمثل المنتجات مصدرا جيدا للأملاح المعدنية وخاصة الصوديوم والبوتاسيوم والفوسفور والمغنسيوم والحديد والنحاس والمنجنيز والزنك والكالسيوم.

و قد كان تقبل الحلبة المطبوخة أعلى من الحلاوة السوداء ولكن كليهما كان مقبولا كما هما أو كحشو للفطائر الحلوة.

وتوصلت الدراسة إلى أنه يمكن التوصية بتناول الحلاوة السوداء والحلبة المطبوخة كأغذية شعبية مقبولة ذات قيمة تغذوية عالية نظرا لإحتوائهما على العناصر الغذائية اللازمة للنمو وإنتاج الطاقة وخاصة للسيدات في فترات الحمل ولزيادة إفراز اللبن عند الرضاعة وهو المتعارف عليه عن هذه الأغذية الشعبية بمحافظة دمياط.