



Chemical assessment of some traditional Qatari dishes

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Seventeen traditional Qatari dishes, prepared by the Home Economics Department of Qatar University were chemically analysed. The moisture, crude protein ($N \times 6.25$), crude fat, ash, nitrogen-free extract (NFE), (carbohydrate), and mineral contents were determined. The energy content was also calculated. The results indicated that in general the foods had a high moisture, low protein, high fat and variable carbohydrate content. Also, a low mineral content was observed. The relationship between these findings and possible health problems is discussed in relation to the findings of other workers in this field of study. Recommendations are also made for improvement of these traditional Qatari dishes for the health and well-being of the Qatari population.

INTRODUCTION

The importance of food composition and food consumption data in the analysis of human dietaries and for an understanding of the nutritional status of the population has been recognised (Windham *et al.*, 1983). Therefore studies on the nutrient composition and nutritional quality of some native Saudi Arabian meals have been undertaken (Al-Jebrin *et al.*, 1985 *a,b*; Sawaya *et al.*, 1986; Salji *et al.*, 1987; Ewaidah, 1988; Al-Kahtani, 1989; Musaiger *et al.*, 1990). Similar investigations have also been carried out in Bahrain (Musaiger & Sungpuag, 1985; Musaiger *et al.*, 1990).

Since no similar studies have been undertaken in Qatar, the present investigation was carried out to study the nutrient composition of some of the popular dishes commonly consumed by the native Qatari people.

MATERIALS AND METHODS

Seventeen traditional dishes were prepared by the students of the Home Economics Department of Qatar University. The dishes were prepared according to traditional Qatari methods of cooking, during the regular practical classes under the supervision of a qualified dietitian. The general methods of cooking are similar to those described by Al-Jebrin *et al.* (1985*a*) and Sawaya *et al.* (1986) for Saudi Arabian dishes. The ingredients of the dishes are shown in Table 1. Three

groups of students prepared different lots of each dish using the same weights of each ingredient and following the same methods of preparation. The results of the chemical analyses presented in this investigation represent the mean of the analytical results of the three lots of each dish.

The freshly prepared dishes were freeze-dried then kept frozen until they were analysed. The bones were removed from the chicken. Before analysis each lot of each dish was homogenized until completely homogeneous before weighing the samples taken for chemical analysis. Five samples were taken from each lot and the mean value of the five results was considered to be one result for the lot. Thus, three results each representing the mean result of five chemical analyses were obtained. In the tables presented in this investigation, we present the mean of these three results and we provide sufficient information to support the general reproducibility of the methods of measurement.

Moisture, crude protein ($N \times 6.25$), crude fat, ash and nitrogen-free extract (NFE) (carbohydrate) by difference were determined according to the procedures of the AOAC (1980). Energy contents (kcal/100 g) were calculated using factors of 4, 9 and 4 for protein, fat and NFE, respectively, and converting to megajoules (MJ) by multiplying the number of Cals by 0.004184 (NAS-NRC, 1980). For mineral analysis, 1–2 g samples were ashed (AOAC, 1980) and dissolved in 20% HCl. Iron, magnesium and calcium were determined using an atomic absorption spectrophotometer, Model 2380, Perkin-Elmer (flame technique). The other elements were determined using an A.A.S. Model SP 1900 series (Unicam).

Table 1. Ingredients of Traditional Qatari Dishes.

Dish	Ingredients	Dish	Ingredients
Sagau	Sagau (soaked in water for 1 h (Palmstarch)	Eash Abiad & Dahal	Rice
	Sugar (sucrose)		Onion (finely chopped)
	Oil (pure corn oil)		Potatoes (cut into medium pieces)
	Cardamom (<i>Elettaria</i> sp.)		Tomatoes (cut into medium pieces)
	Water		Tomato paste
Khanfaroooshe	Flour (wheat flour)	Mohamer	Lentils
	Ground rice		Mixed Spices
	Egg		Cumin
	Oil (pure corn oil)		Water
	sugar (sucrose)		Rice
	Cardamom (<i>Elettaria</i> sp.)		Sugar (sucrose)
	Baking powder		Oil (pure corn oil)
Water	Water		
Biryani Dajaj	Rice	Dahal	Lentils
	Chicken (cut into medium pieces)		Oil (pure corn oil)
	Hot pepper (finely chopped)		Tomatoes (cut into small pieces)
	Onion (finely chopped)		Onion (finely chopped)
	Nuts		Cumin
	Potatoes (finely chopped)		Water
	Oil (pure corn oil)		Spices
	Yoghurt		Salounah Dajaj
	Tomatoes (finely chopped)		Tomatoes (cut into small pieces)
	Water		Hot pepper
Eash Abiad	Rice	Kabab Nakhi	Nakhi flour
	Onion (finely chopped)		Green onion (finely chopped)
	Oil (pure corn oil)		Onion (finely chopped)
	Spices		Hot pepper (finely chopped)
	Water		Oil (pure corn oil)
Qurs Al Tabbi	Flour (wheat flour)	Assedah	Flour (wheat flour)
	Sugar (sucrose)		Ghee (cows ghee)
	Oil (pure corn oil)		Sugar (sucrose)
	Egg		Cardamom (ground)
	Cardamom (<i>Elettaria</i> sp.)(ground)		Ginger (ground)
	Baking powder		Water
	Water		
Mashkhoul	Rice	Ballelet	Vermicelli
	Chicken (cut into medium pieces)		Sugar (sucrose)
	Potatoes (chopped)		Oil (pure corn oil)
	Onion (finely chopped)		Dried cardamom (ground) (<i>Elettaria</i> sp.)
	Tomatoes		Water
	Oil (pure corn oil)		
	Dried lemon		
	Cinnamon		
	Mixed Spices		
	Water		
Khabeese	Semolina	Makbouse Dajaj	Rice
	Sugar (sucrose)		Onion (finely chopped)
	Ghee (cows ghee)		Hot pepper (finely chopped)
	Cardamom (ground)		Dried lemon
	Water		Tomatoes (finely chopped)
Aigalee	Flour (wheat flour)	Markhoukah Dajaj	Potatoes (finely chopped)
	Egg		Chicken (cut into medium pieces)
	Sugar (sucrose)		Mixed spices
	Sesame seeds		Potatoes (cut into medium pieces)
	Ghee (cow ghee)		Bread
	Cardamom (<i>Elettaria</i> sp.)		Dried lemon
Markhoukah Dajaj	Tomatoes (cut into small pieces)	Water	Water
	Onion (finely chopped)		
	Oil (pure corn oil)		
	Tomato paste		
	Chicken (cut into medium pieces)		
	Mixed spices		
	Potatoes (cut into medium pieces)		
	Bread		
	Dried lemon		
	Water		

Table 2. Chemical Composition (g/100 g fresh weight) of Traditional Qatari Dishes

Diet	Moisture	Protein (N × 6.25)	Fat	Ash	NFE
Sagau	59.4	0.1	4.8	0.05	35.4
Khanfarooshe	17.4	5.6	27.2	0.61	49.0
Biryani Dajaj	56.1	8.6	10.4	1.19	23.2
Eash Abiad	53.1	2.8	4.7	0.26	38.7
Qurs Al Tabbi	56.5	7.6	29.5	0.57	5.5
Mashkhoul	59.1	10.5	3.1	2.57	18.5
Khabeese	33.9	4.5	20.9	0.58	39.9
Aigalee	38.3	8.4	35.8	0.50	19.1
Markhoukah Dajaj	72.7	2.7	6.2	0.93	17.3
Eash Abiad & Dahal	76.3	3.1	5.0	0.74	14.1
Mohamer	50.7	1.8	33.1	0.06	15.0
Dahal	74.4	4.3	6.1	0.52	14.2
Salounah Dajaj	74.1	5.9	13.5	1.43	4.1
Kabab Nakhi	32.2	7.4	9.2	1.62	49.3
Assedah	50.1	3.1	29.2	0.15	17.1
Ballaleet	60.6	2.3	23.6	0.11	13.2
Makbouse Dajaj	64.4	11.0	14.4	0.93	9.2

RESULTS

The chemical composition, the energy content and the mineral content of the traditional Qatari dishes are shown in Tables 2, 3, and 4.

DISCUSSION

The high moisture content of the traditional diets of the Gulf States suits the hot weather most prevalent in this area.

Other common features of the traditional Qatar dishes we analysed are their low protein, high fat and variable carbohydrate contents (Table 2).

Only Biryani Dajaj, Mashkhoul, Dahal, Salounah, Dajaj and Makbouse Dajaj can be considered to be dishes of adequate protein content. For most situations

a diet in which 12% of the energy is supplied as protein is adequate (Murray *et al.*, 1990). The percentage of protein calories in these dishes ranged between 13.3 (Dahal) and 21.3 (Mashkhoul).

The Food and Nutrition Board (NAS-NRC, 1980) has suggested that the total fat intake, particularly in diets below 8.4 MJ(2000 kcal) should provide no more than 35% of energy. Only Sagau, Eash Abiad and Kabab Nakhi accord with this suggestion. All the other dishes can thus be considered of high fat content (Table 3). This could therefore be an explanation of the findings of Musaiger and Sungpuag (1985) that overweightness is a common public health concern in the Gulf area. In this respect we must also recall the numerous studies that have shown a correlation between coronary heart disease, blood cholesterol and the consumption of fat. High fat consumption is also associated with cancer of the breast and colon. Also, a minimum daily intake of carbohydrate of between 50 and 100 g is recommended in humans to prevent ketosis and loss of muscle protein. A balanced diet should contain more polysaccharide in order to reduce the amount of fat that would otherwise be required for energy (Murray *et al.*, 1990).

The mineral contents of the dishes are presented in Table 4. A quantity of any of 100 g of these dishes does not provide the recommended dietary allowances provided by the Food and Nutrition Board (NAS-NRC, 1989). The low iron content of Arabian Gulf foods has been considered by Amine, (1980) and Miladi and Autret (1980) to be a factor that contributes to the widespread occurrence of anaemia in the Arabian Gulf States. Al-Jebrin *et al.* (1985b) reported low iron contents in Saudi Arabian dishes. He attributed this to the low iron concentration in polished white rice (Watt & Merrill, 1963). Also Pellet and Shadarevian (1970) reported low iron content of boiled rice. However, Al-Jebrin *et al.* (1985b) noted that additional iron in the Saudi Arabian dishes may have been contributed

Table 3. Energy Content (per 100 g wet weight) of Traditional Qatari Dishes.

Diet	Protein			Fat			NFA			Total	
	kcal	MJ	% of total	kcal	MJ	% of total	kcal	MJ	% of total	kcal	MJ
Sagau	0.6	0.002	0.3	43.2	0.18	23.3	141.7	0.59	76.4	185.5	0.78
Khanfarooshe	22.4	0.094	4.9	245.4	1.03	53.2	193.2	0.80	41.9	461.1	1.93
Biryani Dajaj	34.5	0.144	15.7	93.6	0.39	42.5	92.7	0.39	41.8	220.7	0.92
Eash Abiad	11.1	0.047	5.4	42.5	0.18	20.4	154.6	0.65	74.2	208.2	0.87
Qurs Al Tabbi	30.5	0.128	6.6	265.8	1.11	83.5	22.0	0.09	6.9	318.3	1.33
Mashkhoul	42.2	0.177	21.3	81.3	0.34	41.2	74.1	0.31	37.4	197.8	0.83
Khabeese	18.0	0.07	4.9	188.2	0.79	51.5	159.7	0.67	43.5	365.9	1.53
Aigalee	33.6	0.141	8.2	299.8	1.25	73.4	76.6	0.32	18.3	410.0	1.72
Markhoukah Dajaj	10.7	0.045	7.9	56.4	0.24	41.5	69.2	0.29	50.6	136.4	0.57
Eash Abiad & Dahal	12.5	0.052	11.0	44.7	0.19	39.6	56.6	0.24	49.4	113.8	0.48
Mohamer	7.2	0.117	2.0	298.2	1.25	82.2	57.2	0.24	15.8	362.6	1.52
Dahal	17.1	0.072	13.3	55.2	0.23	42.9	57.1	0.24	43.8	129.5	0.54
Salounah Dajaj	23.5	0.1	14.6	121.4	0.51	75.4	16.6	0.07	10.0	161.6	0.68
Kebab Nakhi	28.7	0.12	9.4	80.9	0.34	26.4	197.2	0.83	64.3	306.8	1.28
Assedah	12.3	0.05	3.6	263.0	1.10	76.5	68.6	0.29	19.9	343.8	1.44
Ballaleet	9.2	0.04	3.3	212.7	0.89	77.5	52.7	0.22	19.2	274.7	1.15
Makbouse Dajaj	44.1	0.18	21.0	129.3	0.54	42.8	37.1	0.16	17.5	210.5	0.88

Table 4. Mineral Content (mg/100 g wet weight) of Traditional Qatari Dishes

Diet	Na	K	Ca	Mg	Fe
Sagau	28.3	20.2	52.4	9.4	1.6
Khanfaroooshe	188	129	131	35.9	2.8
Biryani	157	129	60.1	67.2	1.7
Eash Abiad	119	50.7	39.0	8.2	2.0
Qurs Al Tabbi	83.4	67.1	40.2	19.7	1.4
Mashkhoul	191	139	123	19.0	1.4
Khabeese	20.7	12.3	94.8	79.0	3.5
Aigalee	95.5	14.5	140	58.5	2.5
Markhoukah Dajaj	300	11.0	42.2	49.9	1.9
Eash Abiad & Dahal	231	21.5	35.1	32.7	1.1
Mohamer	16.0	3.4	37.0	9.7	1.3
Dahal	125	10.3	22.8	31.3	1.3
Salounah Dajaj	324	20.6	156	54.2	2.0
Kabab Nakhi	464	30.4	188	112	5.4
Assedah	13.2	6.9	113	44.3	3.4
Ballaleet	9.2	4.6	70.7	21.8	1.8
Makbouse Dajaj	155	8.1	46.7	52.2	1.3

by some of the minor ingredients, such as cumin (66.4 mg Fe/100 g), cardamom (14.0 mg Fe/100 g) and Chilli powder (14.3 mg Fe/100 g) used in some of the dishes (Marsh *et al.*, 1977).

The low mineral content of the dishes now analysed could be related to the low dry matter content that has also been noted by Sawaya *et al.* (1986) in some Saudi Arabian dishes. Al-Jebrin *et al.* (1985b) noted that the low sodium level in some Saudi Arabian dishes (despite the added salt) could be explained by the use of large quantities of water and subsequent straining.

The low potassium content can be attributed to the low potassium level of polished rice (FAO/USDA, 1982). A low potassium content of Saudi Arabian Ruz Mufalfal has been reported by Al-Jebrin *et al.* (1985b). In a similar dish (boiled rice) a low level of potassium has also been reported by Pellett and Shadarevian (1970).

Accordingly, it is highly recommended to increase the mineral content, the amount of polysaccharides and the percentage of protein energy in relation to the total energy and to decrease the percentage of energy derived from fat in the Qatari dishes in general.

Many committees throughout the world have investigated the composition of human diets and made recommendations for improvement that included a general shift away from fat consumption to consumption of complex carbohydrates in the form of polysaccharides and less as simple sugars. Also, it is highly recommended that dietary fibre should be increased (Murray *et al.*, 1990).

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