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NUTRITIONAL EVALUATION OF MENUS OFFERED AT FIRST CLASS HOTELS

BY

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ABSTRACT

In this investigation, the chemical composition, vitamin C, B_1 and B_2 and calcium, sodium, potassium and iron of meals served at first class hotels in Cairo (Meridian, Safier and Novotel hotels) were evaluated. The highest energy value was found in Safier hotel meal (852.2 KCal/100 gm sample), while the lowest was in Novotel hotel sample (809.5 KCal/100 gm sample). All meals served were rich in vitamin C content. While meals contents of B_1 were below 70% of RDA. Riboflavin content in meals showed less values. The percentage of iron compared to RDA was higher in sample C (Novotel) 73% followed by sample A (Meridian) 68%, while the lowed percentage was found in sample B (Safier) 53%. Potassium covered 69%, 75%, and 72.6% of RDA in the three meals A, B, and C; respectively.

For adult male and female, protein and vitamin C content of the meals represented more than 10% of their RDA. While, calcium content of the meals represented less than 23% of RDA for both adults male and female.

INTRODUCTION

As more and more meals are consumed away from home, the need to document nutrient value of typical restaurant meals is becoming increasingly important (Appledorf, 1973). Menus served at hotels are designed to suit the majority of people, their food habits, food customs and also their nationalities. Menus usually consists of starters (salad), soup, meat, fish or poultry and fruits or kind of dessert. Starters are considered one of the essentials of special occasion dinner or lunch (Eckskin, 1983).

Waheed et al , (1986) found that vitamin A, B_1, B_2, and C contents were high in leafy vegetables (Cabbage, lettuce, spinach). Roots and tubers (Beet root, carrot, onion, radish, potatoes) and also okra, cauliflower, peas, tomatoes and cucumber are rich in vitamins.

The main objective of the present study was to evaluate the nutritive value of a selected meal served at three different hotels (5 stars) in Cairo).

MATERIALS AND METHODS

MATERIALS

Food items were purchased from three different hotels (5 stars) in Cairo. These hotels were: (A) Meridian Cairo, (B) Safier Dokiey and (C) Novotel Cairo Airport. Meals were purchased once a week over a three weeks period from the hotels under investigation in Cairo. The meals consisted of grilled beef fillet, french fried potatoes, vegetable salad and bread (white bread). Salad contained lettuce, tomatoes, cucumber, green pepper, onion and salad dressing.

The meals were transferred directly to the laboratory, weighed, and homogenized separately in a blender. They were kept frozen at -18 °C for chemical analysis.

CHEMICAL ANALYSIS

Meal samples were chemically analyzed to determine the following:

A. Gross Chemical Composition

The moisture content, crude protein (N X 6.25, Macro-Kjeldahl method), fat (hexane solvent, Soxhlet apparatus), and ash were determined according to the methods described by the A.O.A.C. (1985). Carbohydrates were determined by difference. Energy value was calculated by multiplying protein plus carbohydrates by 4.0 and fat by 9.0.

B. Mineral Determination:

Calcium was determined by precipitation as oxalate using the method of Pearson (1981). Sodium, iron and potassium were determined according to the method of A.O.A.C. (1985) using Dye Unicom/19000, Atomic Absorption Spectrophotometer.

C. Vitamin determination:

Ascorbic acid was determined by 2,6 dichlorophenol titration method as described by the Association of Vitamin Chemists (1955). Thiamine was determined according to the method of Pearson (1981). Riboflavin was determined by using the modified fluorometeric method of Arnold (1945).

The nutrient data for those meals were also compared with the Recommended Dietary Allowances (R.D.A., 1989) for the 23-50 years old adult man and woman in order to assess the nutritional value of the meals studied.

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STATISTICAL ANALYSIS

Data were reported on a total meal weight basis. The results of this study were represented as percentage and means ± SD.

RESULTS AND DISCUSSION

The weight of the total meals and its individual components are shown in Table (1). The mean weight of meal (A) components in descending order were: potato 250±10 gm, beef fillet 175±5 gm, salad 142.6±7 gm and bread 57.4±6 gm. The mean weight of meal (B) components was 268±17 gm for potatoes, 180±5 gm for beef fillet, 148±7.6 gm for salad and 68.3 ±22.5 gm for bread. The mean weight of meal (C) components was similar to that of meal (B). The values were 261±11 gm for potatoes, 180±5 gm for beef fillet, 132±8.2 gm for salad and 59.3±14 gm for bread. The weight of meal from hotel B was higher from those served at A and C hotels. The reason could be due to the bigger amount of bread, potatoes and salad.

Table (1): The Average Weight of Selected Meal Served at 3 Hotels (Meridien, Safire and Nbrotel).

Hotel	Beef fillet	Bread	Potato	Salad	Total Meal
	Mean S.D.	Mean S.D.	Mean S.D.	Mean S.D.	Mean S.D.
A	175±500	57.4±10	250±10	142.6±7	624.6±24
B	180±5	68.3±22.5	260±17	148±7.6	664.3±34
C	180±5	59.3±14	261±11.05	132±8.2	633.1±29

The proximate composition of the meals are shown in Table (2). Differences were noticed among chemical composition of meals from the 3 hotels. The highest values of proximate components were found at hotel B which can be explained by the corresponding high weight of meal components at this hotels.

The protein content in meal B (68±2 gm) is higher than what were found in both meals A and C (60±2 gm and 64±1 gm for meal A and C, respectively). Fat values were 28.6±0.9 gm, 23±0.5 gm and 22.7±3 gm in meals A, B, and C; respectively. Although meal A contained a higher value of fat, energy value was found to be lower than that of meal B. This may be related to the big weight of carbohydrates in meal B (93.3±14 gm). The energy values of the three meals were 814.2±45, 852.2±68 and 809.5±45 Kcal, respectively.

Table (٤): **Chemical Composition Of The Selected Meals from the Three Hotels.**

Hotel	Weight Mean S.D.	Protein Mean S.D.	Fat Mean S.D.	Cab Mean S.D.	Energy Mean S.D.
A	624±24	60.0±2.3	28.6±0.9	79.2±6.8	814.2±45
B	664±34	68.0±2	23 ±0.5	93.3±14	852.2±68
C	633±29	64.0±1	22.7±3	86.6±7	809.5±45

As shown in Table (3) meal B was found to contain the highest value of calcium (186.8 mg), while the lowest value was found in meal C (165 mg). Moderate amount of calcium was detected in meal A (174 mg). These differences may be related to the variation in the amount of green vegetables of the salads that served.

Meal B was also found to contain higher value of potassium and sodium as compared to meal A and C. On the other hand, meal B contained lower value

of iron. Potassium content in the three meals were 1385 mg, 1504.9 mg, and 1453 mg in meal A, B, and C, respectively. Sodium content in meals served at the hotels
under the study were 478.4 mg, 515.0 mg, and 450 mg, respectively. Regarding iron content, meal C was found to contain the highest value (7.3 mg) followed by meal A (6.8 mg), while the lowest value was found in meal B (5.3 mg). It is worthy to mention that meal C had the lowest content of all pervious minerals except iron.

Table (3): Micro Elements of Meals Sellected From Three Hotels (Meridian, Safir and Novotel).

Sample	Fe mg	Na mg	K mg	Ca mg	Vit. B_1 mg	Vit. B_2 mg	Vit. C mg
A	6.8	478.4	1388.5	174.0	1.06	0.98	93.0
B	5.3	515.0	1504.9	106.8	0.92	0.93	90.9
C	7.3	450.0	1453.0	165.0	0.84	0.84	80.9

Vitamin contents of the meals from the three hotels under study were also presented in Table (3). It was found that vitamin B_1 content was higher in meal A (1.06 mg). While the lowest value was found in meal C (0.84 mg). Meals A and B contained nearly similar value of vitamin B_2 (0.98 mg, and 0.93 mg, respect-ively). Lowest value of vitamin B_2 was detected in meal C (0.84 mg). Regarding vitamin C, meal A was found to contain the highest value (93 mg) followed by sample B (90.9 mg). While the lowest value was found in meal C (80.9 mg).

Table (4) shows that carbohydrates provided similar percentage of Kilo calories in both meal B and C (43.8% and 43.1%, respectively), while meal A provided less percentage (39.9%). The same trend was found in calories provided from protein, it provided 31.9% and 31.6% of Kcal for B and C meals, respectively. Meal A provided the lowest value (29.5% of Kcal) derived from

protein. Fat provided 31.6% of Kcal in meal A, while it provided 24.2% and 25.2% of Kcal in meal B and C. These variations are contributed to the high content of fat in meal A (28.6 gm). According to U.S.A. dietary goals, the current macro nutrient provision of Kilo calories in the Americans diet were 46% carbohydrate, 42% fat, and 12% protein. These values should be modified to 60% carbohydrates, 30% fat and 10% protein for developing countries (Select Committee on nutrition and human needs, 1977). Meals under investigation were suitable for persons on a restricted diet, as therapeutic diet carbohydrates are less than 50% of Kilo calories (Table 4).

Table.(4): Percentage Of Kilo Calories Derived From Carbohydrate, Fat, And Protein For Selected Meal From Three Hotels.

Hotels	Energy K/cal	Carbohydrate %	Protein %	Fat %
A	814.2	39.9	29.5	31.6
B	852.2	43.8	31.9	24.2
C	809.5	43.1	31.5	25.2

Nutritive value of selected meal compared to RDA for males is presented in Table (5) and Figure (1). The energy values of meal A, B, and C, represented 27%, 28%, and 27% of the RDA. Protein values of meals A, B, and C represented 95%, 101%, and 107% RDA. The percentage of vitamin C of meal A and B are similar (155.6% and 151.5% of RDA, respectively). While meal C gave 134.8% of RDA. However, these meals (A, B, and C) were rich in vitamin C content and this was due to vegetable salad served with the meal. Regarding the percentage of vitamin B_1 in the meals studied, it was found to be 70% and 61% of RDA for meal A and B, respectively, while B_1 content in meal C represented 56% of RDA. The percentage of B_2 were 57%, 74% of RDA

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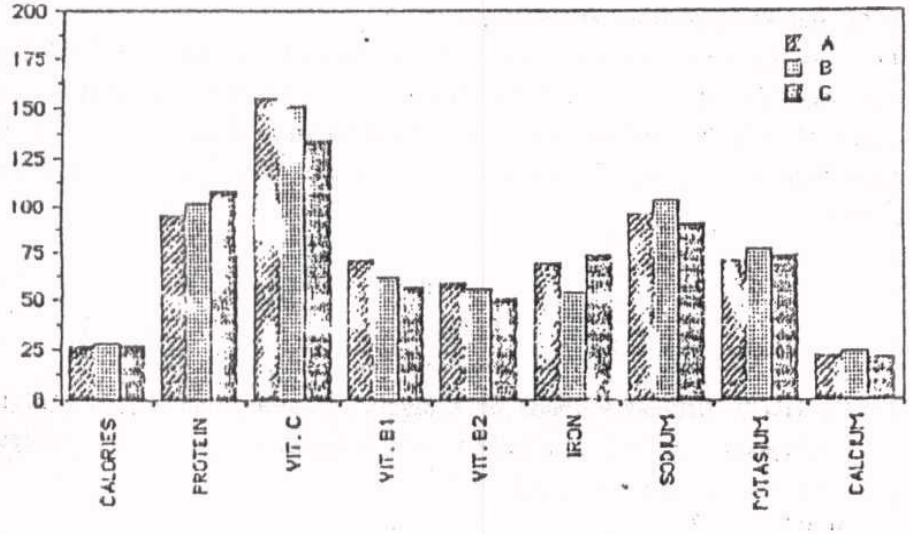
Table (5): Nutritive value of Selected Meal Compared to R.D.A. for Males (W.H.O., 1989).

Nutrint	R.D.A.	A	B	C	A%	B%	C%
Calories K/Cal	3000	814.2	852.2	809.5	27	28	27
Protein gm	63	60	68	64	95	101	107
Vit C mg	60	93	90.9	80.9	155	151	134.8
Vit. B_1 mg	1.5	1.06	0.92	0.84	70	61	56
Vit. B_2 mg	1.7	0.90	0.93	0.84	57	74	49
Fe mg	10	6.8	5.3	7.3	68	53	73
Na mg	500	478.4	515	450	95	103	90
K mg	2000	1380.5	1504.9	1453	69	75	72.6
Ca mg	800	174	186.8	165	21.7	23	20.6

Nutritive value of selected meal compared to R D A of males



in meal A and B, respectively. Vitamin B_2 in meal C represented lower percentage (49% of RDA).

As it is recommended that the lunch meal covers 30% of the recommended dietary allowance (Select Committee on Nutrition and Human Needs, 1977), these meals cover more than the requirement. The percentage of iron compared to RDA was higher in meal C (73%) followed by meal A (68%) and then meal B (53%).

Potassium covered 67%, 75% and 72% in meal A, B, and C, respectively. Sodium covered 95%, 103% and 90% of RDA in meal A, B, C, respectively. The percentage of calcium compared to RDA were 21.7%, 23%, and 20.6% in meals A, B, and C, respectively. This reduction in calcium content is contributed to lack of serving milk or its products with meals.

Table (6) and Figure (2) revealed that calories in the three meals are nearly similar: 37%, 38.7% and 36.7% of RDA for women. Percentage of protein in meals were higher than the requirement. It ranged from 120% to 136% of RDA. The percentage of vitamin C in the three meals were the same. The percentage of vitamin B_1 in meal A was higher than of meals B and C (96%, 83.6% and 76%, respectively). Vitamin B_2 of meals A, B, and C represented 75%, 71.5% and 64.6% of RDA, respectively.

As the RDA of calcium, potassium and sodium for males and females are the same, yet there is no difference in the percentage of these minerals compared with RDA of female. Iron content in meals under study was much lower than RDA for female. The percentage ranged from 35% in meal B to 48.6% in meal C.

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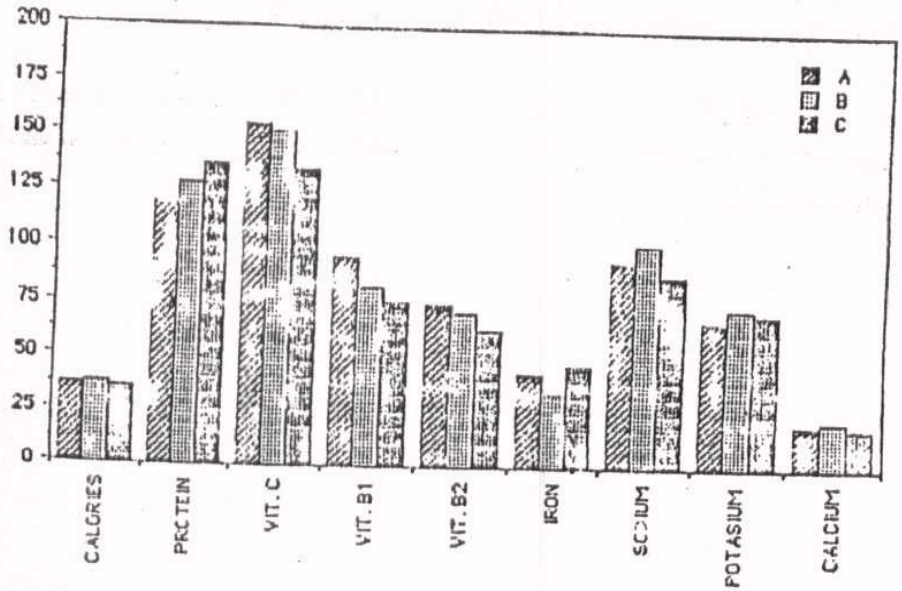
Nutrint	R.D.A.	A	B	C	A1	B1	C1
Calories K.Cal	2200	814.2	852.2	809.5	37	38.7	36.7
Protein gm	50	60	68	64	120	128	136
Vit C mg	60	93	90.9	80.9	155	151	134.8
Vit. B1 mg	1.1	1.06	0.92	0.84	96	83.6	76
Vit. B2 mg	1.3	0.98	0.93	0.84	75	71.5	64.6
Fe mg	15	6.8	5.3	7.3	45	35	48.6
Na mg	500	470.4	515	450	95	103	90
K mg	2000	1300.5	1504.9	1453	69	75	72.6
Ca mg	800	174	186.8	165	21.7	23	20.6

Nutritive value of selected meal compared to R D A of females



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التقييم الغذائى لقوائم الطعام المقدمة فى فنادق الدرجة الاولـــــــــى

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وعيـــد علـــى زكـــــى .

الملخـــــــــص

تم فى هذا البحث تقييم الوجبة الغذائية المقدمة فى فنادق الدرجة الاولى بالقاهـــرة (ميردين ـ سفير ـ نوفوتيل) وقد شمل التقييم دراسة التركيب الكيماوى ـ تقدير فيتامين ب١ ، ب٢ ، والعناصر المعدنية مثل الكالسيوم ، الصوديوم ، البوتاسيوم والحديـــد .

وكانت أعلى قيمة للطاقة كانت فى الوجبة المقدمة فى فندق سفير حيث كان ٨٥٢,٢ كيلـــو كالورى، وأقل قيمة لها كانت ٨٠٩,٥ كيلو كالورى وذلك فى الوجبة المقدمة فى فنـــدق نوفوتيـــل كل الوجبات المقدمة غنية بفتامين (جـ) بينما كان محتوى فيتامين ب١ أقل من التوصيـــات الدولية بـ ٧٠٪ . وكان محتوى الريبوفلافين كان أيضا قليلا فى الوجبات . كما أظهرت النتائج أن محتوى الحديد فى الوجبة المقدمة فى فندق نوفوتيل أعلى بنسبة ٧٣٪ من التوصيات الغذائيـــة يليها الوجبة المقدمة فى فندق الميردين ٦٨ ٪ بينما أقل نسبة كانت فى الوجبة المقدمة فى فنـــدق سفيـــر ٥٣ ٪ وقد وجد أن محتوى البوتاسيوم فى الوجبات المقدمة فى الفنادق الثلاثـــة ـ ميردين ، نوفوتيل ، سفير وهى تغطى حوالى ٦٩ ٪ ، ٧٥ ٪ و ٧٢٪ من الاحتياجـــات الغذائية على التوالـــــى .

كما وجـــد أن الوجبة المقدمة من الفنادق الثلاث تغطى أكثر من ١٠٠ ٪ من الاحتياجـــات (فيتامين جـ) بالنسبة للبالغين من ذكور واناث بينما محتوى الكالسيوم يغطى أقل نسبـــــة ٢٣٪ من الاحتياجات بالنسبة للذكور والانـــاث .

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