

Determination of Fats in Pakistani Meals

Irfana Mariam, M. Rafiq Khan and Tanveer Mukhtar
Department of Chemistry, G. C. University Lahore, Pakistan

Abstract: In this paper, we report the determination of nutritional status of Pakistani meals with special reference to fat contents. The daily meals, each including breakfast, lunch and dinner were collected for about a week. The intake of these nutrients per day was calculated by summing up the three values and comparing with the recommended daily requirements by the recognized experts in nutrition. From the daily intakes of the nutrients under study the daily caloric requirements were also calculated and compared.

Key words: Determination, fats, pakistani meals

Introduction

Nutritional status of a nation suffering from malnutrition is always subject to nutritional deficiency, which translates into lack of resistance, which makes the victim subject to infectious diseases (Margery, 1970). That is why the determination of the nutritional status of a country has been assigned the top priority by World Health Organization (WHO) and Food and Agriculture Organization (FAO). The member nations have been advised to carry out the nutritional surveys. The nutritional surveys have been successfully carried out by the technologically advanced countries (Barriost, 2001). Here the data has been computed and published. Unfortunately, most of the developing countries including Pakistan have not been able to carry out this activity due to lack of economic sanctions and technical know-how.

The fats are almost as widely distributed in nature as are the carbohydrates, and constitute a much more concentrated form of fuel to supply energy. Fats are glycerol esters of fatty acids or monobasic, a normal gluceride is a tri-glyceride (Etsukokozukue, 1981). That is why, on hydrolysis, the triglyceraldehydes yield three molecules of fatty acids and one molecule of glycerol. Fat furnishes about 9 calories of energy for each gram consumed. Their fuel value is more than double if compared with calories with 4 calories furnished by each carbohydrates and proteins. About 2-5 % of fat is normally contained in the food consumed by the human beings and thus fat usually provides from 20 to 30 % of the total caloric intake. Fat is one of the required nutrients in the daily diet. It has an important physiological function and is one of the most fascinating ingredients important for survival. Fats serve as a carrier for various micronutrients and are deposited into the body as a reserve energy depot (Kerry and Bodwell, 1998).

The main objective of the present work is to determine the nutritional status of Pakistani meals with reference to fats as well as the per day caloric intake. The investigations were carried out at different class levels i.e., the poor, middle class and rich families (classified according to their annual income).

Materials and Methods

Collection of Samples: The food samples for analysis were collected from rich, middle and poor class people of Pakistan. It was planned to collect the full meals, daily taken by above-mentioned classes as breakfast, lunch and dinner for one week. The samples were collected, homogenized, weighed and transferred to aluminum trays and preserved in a deep freezer at -16°C .

Freeze Drying of Samples: As the analysis was to be carried out on long term basis, the samples were dried. The freeze drying facility was provided by the Veterinary Research institute, Hureeke Road, Lahore. About 100 grams of the sample was processed for freeze-drying.

Determination of Fat: The fat was determined after John (1973) and Bittenbender (1970). The estimation of fat is based upon its extraction with an organic solvent. The extracted fat is heated to recover the solvent and determine the weight in known weight of sample. The % of fat is calculated by comparison. For this purpose, took 2 gram of dry ground sample. Added about 25 ml of chloroform methanol mixture (2:1) and shaken well. Filtered and washed the residue 2-3 times with 10-20 ml of mixture, added these washings to the filtrate. Took the filtrate into separating funnel and added water equal to the volume of methanol in the mixture. Shaked well and let it to stand. Two layers were separated. Took the lower layer into a pre-weighed beaker or flask and evaporated on water bath till whole of the chloroform was removed. Dried the beaker in an oven at $50-60^{\circ}\text{C}$ for 1-2 hrs and weight it again. Calculated % of fat from difference of weights.

Determination of Caloric Value: The % of fat was multiplied by 9 and values were subsequently added to determine the caloric values of sample. (Voit, 1975).

Results and Discussion

The recommended dietary requirements of fat per day for a normal human individual are 50 to 80 g per day. The values of daily intake of fat recorded in the Tables 1-3 when compared with the daily requirements indicate that with the exception of a few all the combinations of meals taken by rich and middle class families are quite satisfactory from the nutritional point of view. Some combinations seem to be below average. Here the meals were prepared using less fat and other ingredients such as rice, pulses etc., which were poor in fat contents. Most of the meals of poor family qualify on the margin or are slightly below average in adequacy. This is perhaps due to the fact that poor families in Pakistan take less fat and usually survive on the foods such as cereals, pulses etc. which are poor sources of fat (Khan, 1981 and Kummerov, 1975). Thus we strongly feel that to maintain the standard of poor families at the present level a careful planning is required. Similar kinds of findings have also been reported by Jacobs (1944) and Deng (1976). It is suggested that these families should supplement their foods with the use of cheaply available fats and oils.

Table 1: Fat content of full meals

(a) Rich family Meals	Days	Break fast g(%)	Lunch g(%)	Dinner g(%)	Total g(%)
1	Sat	4.3	4.5	3.0	11.8
2	Sun	5.2	5.1	4.5	14.8
3	Mon	5.2	3.5	3.8	12.5
4	Tue	2.8	7.2	4.5	14.5
5	Wed	5.2	2.8	Not available	?
6	Thr	3.85	7.2	4.2	15.2
7	Fri	4.3	4.5	2.5	11.3
b) Middle class family					
1	Sat	5.2	4.5	3.1	12.8
2	Sun	3.2	3.8	2.8	9.8
3	Mon	2.5	4.5	3.5	10.5
4	Tue	4.3	3.1	2.5	9.9
5	Wed	5.2	7.2	3.2	15.6
6	Thr	2.8	3.5	3.8	10.1
7	Fri	4.3	3.3	4.2	11.8
c) Poor family					
1	Sat	2.7	3.2	3.2	9.9
2	Sun	3.5	3.2	3.2	9.9
3	Mon	6.5	1.8	1.8	9.1
4	Tue	2.7	3.5	1.5	7.7
5	Wed	Not available	3.1	3.1	?
6	Thr	1.8	3.3	3.3	8.4
7	Fri	3.5	2.8	2.8	9.1

Table 2: Total fat in full meals and their total daily intake

(a) Rich family Meals	Days	Break fast g(%)	Lunch g(%)	Dinner g(%)	Total g(%)
1	Sat	19.35	22.08	12.03	54.45
2	Sun	14.56	25.05	18.00	58.06
3	Mon	14.56	26.25	15.39	56.20
4	Tue	10.64	36.00	18.00	64.64
5	Wed	14.06	12.06	Not available	?
6	Thr	21.17	25.02	25.02	71.57
7	Fri	21.05	18.00	11.25	50.75
b) Middle class family					
1	Sat	14.56	22.08	16.43	53.79
2	Sun	9.92	24.07	14.22	48.44
3	Mon	7.05	22.08	16.08	47.10

Mariam et al.: Determination of fats in Pakistani meals

4	Tue	19.35	17.36	10.00	46.71
5	Wed	14.56	36.00	13.12	63.68
6	Thr	8.68	21.35	19.38	49.41
7	Fri	21.05	19.08	27.03	69.85

c) Poor family

1	Sat	10.08	Not available	Not available	?
2	Sun	10.85	19.52	19.52	49.89
3	Mon	32.05	9.00	9.00	50.50
4	Tue	10.08	19.25	9.00	39.05
5	Wed	Not available	18.06	18.06	?
6	Thr	9.00	19.96	19.96	48.92
7	Fri	10.85	18.02	18.02	47.25

Table 3: Calorific intake of fats

(a) Rich family Meals	Days	Break fast g(%)	Lunch g(%)	Dinner g(%)	Total g(%)
1	Sat	174.15	205.20	110.09	490.05
2	Sun	131.04	229.05	162.00	522.54
3	Mon	131.04	236.25	138.51	505.08
4	Tue	95.76	324.00	162.00	581.76
5	Wed	131.04	113.40	Not available	?
6	Thr	190.53	226.80	226.80	644.13
7	Fri	193.35	162.00	101.25	456.75
b) Middle class family					
1	Sat	131.04	205.20	147.87	484.11
2	Sun	89.28	222.30	127.98	435.96
3	Mon	67.05	205.20	151.02	423.90
4	Tue	174.15	156.24	90.00	420.39
5	Wed	131.04	324.00	118.08	573.12
6	Thr	78.12	192.15	174.42	444.69
7	Fri	193.05	178.20	245.70	628.65
c) Poor family					
1	Sat	97.20	Not available	Not available	?
2	Sun	97.65	175.68	175.68	449.01
3	Mon	292.50	81.00	81.00	454.50
4	Tue	97.20	173.25	81.00	351.45
5	Wed	Not available	167.40	167.40	?
6	Thr	81.00	179.64	179.64	440.28
7	Fri	97.65	163.80	163.80	425.25

Caloric Requirements: The caloric requirements depend upon a lot upon the individual activity (McGraw Hill Enc., 1960). An average of the recommendations ranges from 1700 to 3000 calories. Here in Pakistan usually those who are poor have to do more active work, thus the caloric requirements of the poor families usually greater than rich families. A general view of the data indicates that the caloric intake of the rich and middle class families is quite adequate. In these classes the ratio of calories supplied by fat seems to be quite adequate. Most of the combinations for the poor families seem to be quite from the point of view of their caloric requirements.

The data reveals that the Pakistani meals with exception of a few seem to be quite satisfactory and thus qualify the nutritional standards laid down by the National and International agencies. There is also an index to the changing habits of the upper strata of our society for example the rich people of Pakistan use to take abnormally large quantities of fat in the form of Desi Ghee. Our analysis reveals that with the exception of few combinations, most of the meals taken by the rich families contained average amount of fat which is due to the nutritional awakening in the country particularly in the educated classes. Our work is just a single step forward on the road which leads to the final goal i.e. the over all survey of the National meals as the dietary habits of the people change from place to place and from season to season.

Conclusion

The data suggested that the daily intake of almost all the nutrients present in most of the combinations collected from different classes of the people of Pakistan (Scheduled for investigation) were in the range of the recommended requirements and thus were satisfactory. Suggestions have been given for the improvement of the combinations, which were below average. This work may be extended by preparing a schedule for nutritional analysis on broad-spectrum basis.

References

- Barriost, B., 2001. Feeds. Dairy Sci., 16: 64.
- Bittenbender, C. D., 1970. Fat determination - A new physical method. J. Food Sci., 35: 460.
- Deng, J. C., 1976. Lipids and fatty acids in Mullet. J. Food Sci., 41: 1479.
- Etsukokozukue, E. F., 1981. Lipid content and fatty acid composition in bamboo shoots. J. Food. Sci., 46: 751.
- Jacobs, M. B., 1944. The Chemistry and Technology of Food and Food Products. Inter-science Publication, New York, USA.
- John, M. W., 1973. Quantitative determination of fat, protein and carbohydrates of soy products. J. Food. Sci., 38: 14.
- Kerry, F. and P. Bodwell, 1998. Food stuff examination. Food Sci Dic., 34: 23-24.
- Khan, M. R., 1981. Biochem., 1: 99.
- Kummerov, F.A., 1975. Lipids in atherosclerosis. J. Food Sci., 40: 12.
- Margery, A. E., 1970. Food preferences of college students and nutritional implications. J. Food Sci., 35: 429.
- McGraw Hill, 1960. Encyclopedia of Sci. Tech., 9: 235.
- Voit, C., 1975. Physiologisches chemis, Che untersuchungen, Augsburg. Renin Publications, New Dehli, India.