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A Comparison of Nutritive Value of Traditional and Modern Snacks

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Abstract

The study was conducted to compare the nutrient content of traditional homemade, traditional market purchased and modern snacks/dishes. The traditional market purchased snacks such as *jalebi, mathee* and *samosa* had significantly low protein. Traditional homemade snacks/dishes i.e. rice *kheer,* vegetable *pakora, besan ladoo* had appreciable values for protein. Modern snacks i.e. pizza, sandwich and burger had protein content at par with the traditional homemade snacks/dishes. Although all snacks had low fiber content, modern snacks had lesser fiber when compared to traditional snacks/dishes. High fat snacks were *mathee, besan ladoo* and *khoa pinni* (> 20%). All modern snacks had moderate level of fat content (6 to 13%). On an average, modern snacks provided lesser calories when compared to most of the market purchased traditional snacks. Modern snacks like pizza (215 mg) and sandwich (104 mg) and traditional snacks/dishes like rice *kheer* (210 mg), sweet *dalia* (134 mg) and *khoa pinni* (199 mg) were good sources of calcium. Most of the snacks were poor or fair source of iron, the range being 0.3 to 7.0 mg/100 g DM. The results concluded that high consumption frequency snacks may play a significant role in determining the nutritional status of consumers. So, wise choices should be made while including these snacks in the daily diets. The low fat, low carbohydrate and low protein snacks should be chosen for frequent consumption from the wide range of traditional and modern snacks.

Key words : Traditional snacks, Modern snacks, Proximate composition, Minerals.

Snacking is a way of life for many people, and not necessarily a bad habit especially for children. Snacks can be an important part of a healthful diet. Well prepared snacks can help in managing weight, hunger, health and energy. If the meals are not perfectly balanced, snacks can help to meet nutritional requirements of the body. Snack is a small meal or amount of food usually taken between the meals. A nutritious snack is from the food groups given in food guide pyramid that includes fruits, vegetables, meats, beans or nuts, milk and grains and are low in fat and salt (1). Nutrition plays an important role in physical, mental and emotional development of human beings, therefore the snacks chosen by the families should provide adequate and balanced nutrients (2). Rapid pace of economic and demographic changes in India has ushered marked lifestyle changes. Last two decades have witnessed tremendous change in the food habits of Indian population in urban and semi-urban areas. Modern snacks like pizzas, noodles and burgers are fast replacing traditional snacks not only in resturants and eating joints but in households as well (3). Deleterious effects of change in dietary pattern is witnessed in the form of increasing evidence of obesity, hypertension, metabolic disorders such as cardio vascular diseases, diabetes especially in younger generations.

Indian diets use to include a number of traditional snacks/dishes being prepared in the households since long time, which are assumed nutritious and hygienic. The enormous nutritional needs of the children are being met by consuming these products. Simultaneously, the families also purchase sweet and savoury snacks from the local markets, which are relished by all family members but their nutritional contribution and hygienic preparation are always doubtful. The invasion of some western snacks in the urban Indian diets has altered the traditional snack pattern, resulting in the difference in preferences of snacks among different generations living in the same household. More working mother and break down of joint family system are also the contributors of shift in snacking pattern i.e. more consumption of modern and market purchased snacks which are usually referred as junk foods or fast food compared to traditional home made snacks. Education about demerits of junk/fast food consumption and healthy eating habits in the family starting since childbirth and pub-

lic policies about healthy life styles should be strengthened. The nutritional impact of snacking among teenagers needs to be assessed carefully. Poor diets during this stage of life can result in serious consequences that can further be aggravated by physical stress and emotional problems. If fast food combinations replace traditional snacks, their nutrient content should be equivalent to that the meals being replaced (4).

In the modern day context, the traditional homemade snacks are vanishing away with the breakup of joint family system and there is more and more influence of modern snacks/fast food due to increasing urbanization and industrialization. Keeping in mind, the changing snack pattern of the people, the present study was designed to evaluate the nutritive value of traditional and modern snacks so as to draw guidelines for the masses so that they can make healthy choices from a wide array of traditional and modern snacks.

Methods

Based on a previous survey, five traditional homemade snacks/dishes with high consumption frequency namely rice *kheer,* vegetable *pakora, khoa pinni, suji halwa, sweet dalia* were chosen for nutritional analysis. Similarly five most frequently consumed snacks from the maket purchased category viz. jalebi, *mathee,* bread *pakora, besan ladoo* and *samosa* and five most frequently consumed modern snacks viz. pizza, burger, sandwich, manchurian and noodles were selected. The samples of traditional home made snacks/dishes were collected from the six urban households from Ludhiana city. The samples of traditional market purchased were collected from six food outlets from different locations of the city. A large number of families used to purchase modern snacks from the market instead of preparing them at home, so they were also collected from six food outlets of the city.

The procured samples were brought to the food analysis laboratory of the Department of Food and Nutrition, Punjab Agricultural University, Ludhiana. The samples were homogenized in a mixer. A portion of fresh sample was used to determine moisture in the fresh samples while the remaining part was dried in hot air oven at 60 ± 2 C and was grinded finely. Proximate principles namely crude protein, ash, crude fat and crude fiber were estimated using AOAC method (5). Available carbohydrates were calculated by adding proximate principles and subtracting from 100. Crude protein and carbohydrates assessed by difference were multiplied by factor 4 and crude fat by factor 9 and finally added to calculate total energy.

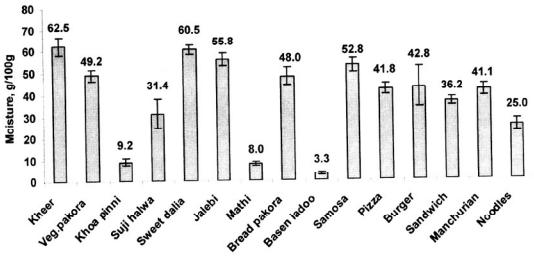

Figure 1. Moisture content of snacks/dishes.

Analysis of variance was used to determine the variation between five samples of snacks from the three categories i.e. traditional homemade snacks/ desserts, traditional market purchased snacks and modern snacks using Microsoft Excel Statistical tool pak. Critical difference (CD) at 5 and 1% was calculated where *F*-ratio was significant.

Results and Discussion

There was a wide variation in the moisture content of different snacks/dishes. Among the traditional homemade snacks/dishes, the minimum moisture was in *khoa pinni* i.e. 9.2 g %. Among five traditional market purchased snacks, three of them namely *jalebi* (55.8 g %), *samosa* (52.8 g %) and bread *pakora* (48.0 g %) were high in moisture, whereas, *mathee* and *besan ladoo* were low moisture snacks, the values being 8.0 and 3.3 g %, respectively. There was a lesser variation for moisture observed between various modern snacks except noodles (25.0 g %). The moisture values for pizza, burger, sandwich and manchurian ranged between 36.2—42.8 g % (Fig. 1).

The data of proximate composition of traditional and modern snacks on dry weight basis have been presented in Tables 1 and 2. The mean protein content of traditional homemade snacks/dishes varied between 7.4 to 12 g % respectively, the highest value being for rice *kheer* followed by sweet *dalia.* Rice *kheer* had significantly ($P \leq 0.01$) higher protein con-

Table 1. Protein, total ash and crude fiber content of traditional and modern snacks/dishes (g/100 g DM). Values are mean ± SD. CD : Critical difference. Values in parentheses are ranges from samples collected from six households/food outlets

Snacks	Protein	Total ash	Fiber
Traditional Homemade Snacks/Dishes			
Vegetable *pakora*	7.4 ± 0.8 (6.5—8.2)	4.5 ± 0.8 (3.8—5.7)	2.6 ± 0.3 (2.2—3.1)
Khoa Pinni	9.3 ± 1.9 (7.5—12.5)	2.4 ± 0.2 (2.2—2.7)	2.0 ± 0.3 (1.7—2.5)
Suji Halwa	9.5 ± 1.8 (8.2—12)	2.5 ± 0.3 (2.1—2.9)	3.3 ± 0.4 (2.9—3.9)
Rice *Kheer*	12.0 ± 2.1 (10.2—15.1)	5.0 ± 0.6 (4.2—5.8)	3.5 ± 0.7 (2.5—4.1)
Sweet *Dalia*	10.0 ± 1.3 (9.2 ± 12)	3.2 ± 0.7 (2.5—3.9)	2.5 ± 0.5 (2.0—3.1)
CD at 5%	1.21	0.37	0.32
CD at 1%	1.41	0.44	0.37
Traditional Market Purchased Snacks			
Jalebi	3.5 ± 0.7 (3.0—4.7)	4.1 ± 0.6 (3.5—5.1)	0.7 ± 0.2 (0.5—1.1)
Mathee	6.4 ± 1.1 (5.2—7.9)	1.9 ± 0.5 (1.2—2.5)	1.9 ± 0.2 (1.5—2.2)
Bread *pakora*	7.5 ± 0.9 (6.2—8.5)	4.1 ± 1.3 (2.4—5.5)	1.7 ± 0.1 (1.5—1.9)
Besan Ladoo	9.8 ± 1.0 8.5—10	1.8 ± 0.5 (1.1—2.3)	0.6 ± .08 (0.5—0.7)
Samosa	4.3 ± 1.1 3.0 —5.5	2.8 ± 0.3 (2.5—3.2)	1.4 ± 0.5 (0.7—1.7)
CD at 5%	0.68	0.51	0.20
CD at 1%	0.79	0.59	0.24
Modern Snacks			
Pizza	12.0 ± 0.7 (11.1—13.4)	3.8 ± 0.2 (3.7—4.2)	1.0 ± 0.2 (0.8—1.3)
Burger	9.2 ± 0.7 (8.5—10.1)	3.1 ± 0.3 (2.8—3.6)	0.2 ± 0.1 (0.1—0.5)
Sandwich	1.0 ± 0.8 (9.7—11.2)	3.7 ± 0.3 (3.3—4.1)	0.9 ± 0.3 (0.5—1.3)
Manchurian	6.2 ± 0.6 (5.4—6.9)	2.1 ± 0.3 (1.7—2.5)	0.3 ± 0.09 (0.2—0.4)
Noodles	9.2 ± 1.6 (7.5—11.0)	3.3 ± 0.4 (2.8—3.7)	0.3 ± 0.1 (0.1—0.4)
CD at 5%	0.68	0.08	0.13
CD at 1%	0.79	0.11	0.16

Table 2. Fat, carbohydrate and energy content of traditional and modern snacks/dishes (per 100 g dry matter) on dry weight basis. Values are mean ± SD. CD : Critical difference. Values in parentheses are ranges from samples collected from six households/food outlets.

Snacks	Fat (g)	Carbohydrates (g)	Energy (kcal)
Traditional Homemade Snacks			
Vegetable *pakora*	20.9 ± 1.9 (18—23.2)	63 ± 1.4 (62—65)	468 ± 13.9 (452—483)
Khoa Pinni	21.9 ± 2.3 (19—24)	63 ± 2.2 (61—66)	487 ± 8.8 (478—496)
Suji Halwa	10.2 ± 1.0 (9.4—12)	73 ± 1.2 (71—74)	417 ± 17.6 (392—432)
Rice *Kheer*	6.9 ± 1.3 (5.6—8.2)	69 ± 1.6 (68—70)	390 ± 10.8 (380—402)
Sweet Dalia	3.2 ± 0.8 (2.2—4.1)	79 ± 1.2 (78—81)	389 ± 5.7 (381—395)
CD at 5%	0.98	1.1	7.8
CD at 1%	1.1	1.2	9.1
Traditional Market Purchased Snacks			
Jalebi	26.5 ± 2.6 (24.3—30)	6.2 ± 1.8 (60—64)	502 ± 15.8 (486—523)
Mathee	28.6 ± 3.1 (25.3—32)	58 ± 5.0 (51—63)	516 ± 23.9 (491—547)
Bread *pakora*	21.7 ± 2.1 (20.3—25)	63 ± 2.5 (60—66)	484 ± 10.1 (474—498)
Besan Ladoo	23.8 ± 3.5 (19.7—27)	63 ± 2.3 (61—66)	507 ± 14.5 (487—513)
Samosa	25.0 ± 1.7 (23.1—27)	66 ± 2.3 (66—69)	505 ± 9.0 (495—517)
CD at 5%	1.8	2.2	10.3
CD at 1%	2.1	2.5	12.0
Modern Snacks			
Pizza	10.2 ± 1.7 (8.7—13)	68—71 (71 ± 2.1)	419—435 (426 ± 7.9)
Burger	15.8 ± 2.8 (12.3—19)	70 ± 2.6 (66—72)	457 ± 12.6 (442—473)
Sandwich	9.9 ± 0.9 (9.2 —11)	74 ± 0.9 (73—75)	428 ± 6.07 (423—437)
Manchurian	22.4 ± 1.8 (20.3—24)	64 ± 1.4 (63—66)	482 ± 8.1 (472—49)
Noodles	8.5—11 (9.6 ± 0.9)	72—76 (74 ± 1.7)	415—422 419 ± 2.9
CD at 5%	1.2	1.2	5.6
CD at 1%	1.4	1.4	6.5

tent as compared to vegetable *pakora, khoa pinni, suji halwa* and sweet *dalia.* The significantly higher protein of rice *kheer* was mainly because of milk, which was the major ingredient in this snack. A significantly lower ($P \leq 0.01$) protein content was observed in vegetable *pakora* when compared to *khoa pinni, suji halwa,* rice *kheer* and *sweet dalia.* Hassan and Dosari (6) reported that the protein content of traditional snacks of Kuwait ranged between 4 to 14 g/100 g. Muthapa et al. (7) reported the protein content of *suji halwa* as 7.7%. The protein content of

traditional market purchased varied between 3.5 to 9.8 g %, the highest value was for *besan ladoo* and the lowest was in *jalebi* followed by *samosa* (4.3 g %). *Besan ladoo* and bread *pakora* were legume based products, so they had high protein content. Overall, the traditional market purchased snacks had lower values of protein when compared to traditional homemade snacks except for bread *pakora* and *besan ladoo.* Among traditional market purchased snacks a significant ($P \leq 0.01$) difference in protein content was observed. Kaur (8) found the crude protein in some commonly used deep fried fat products in the range of 9.1 to 15.1%.

Among five modern snacks that were analyzed, the highest protein value was for pizza (12.4 g %), followed by sandwich, burger and noodles. The higher content of protein was attributed to use of cheese in the preparation of these snacks. There was a significant ($P \leq 0.01$) difference in protein content between all the modern snacks. All the modern snacks except manchurian were found to be at par in protein content when compared against traditional homemade snacks/dishes. They also had higher values of protein when compared to most of the traditional market purchased snacks. The protein content of commonly consumed modern snacks by Punjabi adolescents ranged between 9.2 to 17.1 g/100 g dry matter (9).

The highest ash value was for rice *kheer* followed by vegetable *pakora* (4.5 g %). The lowest value of ash was for *khoa pinni* closely followed by *suji halwa* (2.5 g %). There was a significant ($P \leq 0.01$) difference in ash content of different snacks except for *khoa pinni* and *suji halwa.* Muthapa et al. (7) reported the ash value in *suji halwa* as 1.81%. Ash content of three Punjabi snacks i.e. *khoa pinni, dal pinni,* and *panjiri* in the range of 1.1 to 3.7 % was reported (10). The traditional market purchased snacks had ash content varied between 1.8 to 4.1 g %, the highest values being for *jalebi* and bread *pakora* while the lowest was for *besan ladoo. Jalebi,* and bread *pakora* had significantly ($P \leq 0.01$) higher ash content as compared to *mathee, besan ladoo* and *samosa.* The ash content in the range of 1.2 to 2.4 g/100 g in various traditional snacks of Kuwait (6). Kaur (8) reported that the ash content of bread *pakora* was 1.76. The ash content of modern snacks ranged between 2.4 to 3.8 g %. The highest value was for pizza and the lowest for manchurian.

Rice *kheer* and *suji halwa* had significantly ($P \leq 0.01$) high crude fiber content as compared to other three snacks in homemade snack category. Kaur and Kawatra (10) reported the crude fiber content of Punjabi snacks namely *khoa pinni, dal pinni* and *panjiri* ranged between 2.1 to 3.5 %. All the traditional market purchased snacks had comparatively low crude fiber content when compared to traditional homemade snacks/dishes. Kaur (8) reported the crude fiber content in the range of 0.2 to 1.5% in commonly used deep fat fried snacks. All the five modern snacks had lower fiber content when compared with homemade and market purchased snacks. Pizza and sandwich had significantly ($P \leq 0.01$) higher values for fiber when compared to burger, manchurian and noodles, the variation were attributed to different ingredients used in their preparation.

There was a wide variation in the fat content of traditional homemade snacks/dishes, the range being 3.2—21.9 g % with the highest value in *khoa pinni* closely followed by vegetable *pakora* (20.9 g %). The lowest value of fat was observed in sweet *dalia* i.e. 3.2 g % followed by *rice kheer* (6.9 g %). Muthapa et al. (7) reported a much higher fat content i.e. 53.7 % in *suji halwa.* Hassan and Dosari (6) found the fat content of traditional snacks of Kuwait in the range of 1.2 to 20.7 g %. All the traditional market purchased snacks had high values for fat, the range being 20.1 to 28.6 g %. *Besan ladoo* had significantly ($P \leq 0.01$) lower values of fat when compared to other snacks like *jalebi* (26.5 g %), *mathee* (28.6 g%), bread *pakora* (22.5 g %), and *samosa* (25.0 g %). Kaur (8) reported that fat in some deep fat fried snacks in the range of 8.1 to 15.6 g %. There was a wide range in fat content of modern snacks, the range being 9.6 to 22.0 g%. The highest value was for manchurian followed by burger (15.6 g %). Pizza, sandwich and noodles had significantly ($P \leq 0.01$) lower fat values when compared with manchurian and burger. The results revealed that all the traditional market purchased snacks, the traditional homemade snacks/dishes namely *khoa pinni* and vegetable *pakora* and modern snacks namely manchurian and burger were having higher fat content as compared to other snacks. Khanna (9) observed the fat content in various modern snacks/fast food varied between 12.7 and 39.0 g/100 g DM and was higher than the values observed in the present study.

The range of carbohydrates in traditional homemade snacks/dishes ranged between 63 to 79 g %, the highest value was for sweet *dalia* followed by *suji halwa* and rice *kheer.* Higher carbohydrate content in these three snacks was due to use of cereals i.e. wheat and rice as major ingredient in these dishes. Muthapa et al. (7) found the carbohydrate content of 53.7 % in *suji halwa.* In comparison to traditional home made snacks/dishes, the market purchased snacks had lower carbohydrate contents, the range varied between 58 to 66 g %. The maximum values of carbohydrates were in *samosa* and the lowest value was for *mathee.* There was a significantly ($P \leq 0.01$) higher values of carbohydrates in *samosa* as compared to other four products. *Mathee* had significantly ($P \leq 0.01$) lower carbohydrate content when compared with other snacks of this category. The low carbohydrate values were attributed to high level of fat in these snacks. All the modern snacks were high in carbohydrates, the range being 64 to 74 g/100 g DM. The highest value for carbohydrates was for sandwich and noodles (74 g %), both had significantly ($P \leq 0.01$) higher values when compared to pizza, burger and manchurian. All the modern snacks that were analyzed had refined wheat flour as a major ingredient except for manchurian, which was the main cause of high carbohydrate content of these snacks.

The traditional homemade snacks/dishes had energy content in the range of 389 to 487 kcal/100 g DM. Rice *kheer* and sweet *dalia* had significantly ($P \leq 0.01$) lower energy content when compared to *suji halwa,* vegetable *pakora* and *khoa pinni,* the reason was high fat content of these snacks. The energy in the range of 167 to 380 kcal/100 g was reported in different traditional snacks of Kuwait (6). All the market purchased snacks were rich in energy, the highest value was for *mathee* (516 kcal/100 g DM) followed by *besan ladoo* (507 kcal), *samosa* (505 kcal) and *jalebi* (502 kcal). Bread *pakora* had significantly ($P \leq 0.01$) lower energy content when compared to other market purchased snacks. The modern snacks had comparatively lesser variation in energy content, the highest value was for manchurian (482 kcal) and the lowest was for noodles (419 kcal). There was a significant ($P \leq 0.01$) variation in the energy content of all the analyzed modern snacks. On comparing the three categories of snacks, the traditional market purchased snacks were found to have maximum energy density whereas traditional homemade dishes namely sweet *dalia* and rice *kheer* had lesser energy density. Khanna (9) observed higher values of energy for some fast food/modern snacks i.e. 466 to 650 kcal/100 g dry matter.

The study concluded that the traditional market purchased snacks such as *jalebi, mathee* and *samosa* were low protein snacks. Traditional homemade snacks/dishes i.e. rice *kheer,* vegetable *pakora*, *besan ladoo* had appreciable values for protein. Modern snacks i.e. pizza, sandwich and burger had protein content at par with the traditional homemade snacks/ dishes. Although all snacks had low fiber content, modern snacks had lesser fiber when compared to traditional snacks/dishes. High fat snacks were *mathee, besan ladoo* and *khoa pinni* (> 20%). All modern snacks had moderate level of fat content (6 to 13%). Traditional snacks/dishes like rice *kheer* and sweet *dalia* were particularly low in fat (1.3 to 2.5%). On an average, modern snacks provided lesser calories when compared to most of the market purchased traditional snacks.

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