

## Nutrient Contents of Commercial Snack Food Products

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### ABSTRACT

Analytical study of chemical composition in snack food was investigated. Six types of snack foods as potatoes, seasoning-flour, corn, squid, fishsnacks and crispy peas and beans, including 63 brands, from local retail markets were analysed for chemical composition, sodium and monosodium glutamate (MSG) contents. There were 2.44-11.06 g/100 g of protein and 7.06-36.65 g/100 g of fat in products of potatoes, seasoning-flour and corn. Roasted squid and fish products had higher protein and lesser fat contents than crispy peas and beans (21.18-64.78 versus 14.48-20.36 g/100 g and 0.26-2.92 versus 7.89-39.41 g/100 g). Most of the snack foods contained energy ranged from 399.10-555.89 Kcal., whereas squid and fish products had less than 355 Kcal. The sodium contents in potatoes, seasoning flour, corn and crispy peas and beans products ranging from 195.9-1,126.8 mg/100 g and MSG were less than 1.58 percent. Squid and fish products had the highest contents of sodium (1,658.4-2,797.5 mg/100 g) and contained MSG less than 3.24 g/100 g.

**Key words :** snack, sodium, monosodium glutamate

### INTRODUCTION

At present, snack consumption has increased its popularity in Thailand shown by their widespread presence in supermarkets. Snack foods comprised a very large variety of items including potato chips, popcorn, crackers, nuts and extruded snacks. For many years, nutritionists have been concerned about snack eating behavior of teenagers. They frequently consume between meal snacks thus, their diets were nutritionally unsound (Thomas and Call, 1973; Huenemann *et al*, 1968; Leverton, 1968). Snacks based on cereals and grains were the most widely consumed snack food items, and many of these were low in nutrient density and high in calories and/or fat content (Tettweiler, 1991) More attention

was focused on sodium contents in snacks and its relationship to hypertension than on any other nutrients such as protein and fat. (White and Crocco, 1981). Data indicated that a lot of foods eaten as snacks made a significant contribution to the sodium intake of teenagers (Morgan and Bundy, 1981; Khan and Martin, 1983). Therefore, this study conducted a survey of commercial snacks to determine their chemical composition, sodium and monosodiumglutamate contents for use in nutritional studies and for public information

### MATERIALS AND METHOD

Sixty three different brands of snack food were purchased from local retail markets. All these

snacks were manufactured by nationally known industries. The samples were pooled from 10-15 retail markets for each brand, then ground with electric blender and stored in glass bottle until analysis.

Proximate analysis :- moisture, ash, protein, fat and crude fiber were determined by AOAC 1995 and carbohydrate calculated by difference 100-(moisture + protein + fat + ash + crude - fiber). Sodium contents analysed by Atomic Absorption Spectrometer (AOAC, 1995). Monosodium glutamate was determined by Atomic acid analysers (Bechman instruction manual, 1985. The system 6300 series high performance amino acid analysers)

## RESULTS AND DISCUSSION

Chemical compositions of snack food are presented in Table 1. It was found that protein contents ranged from 2.81-8.50 g/100 g for potato base, 2.44-11.06 g/100 g for rice base and 4.74-8.45 g/100 g for corn base. Comparison to the earlier report (Boonyasirikool et al, 1986) indicated that protein contents of all those snacks ranged from 4.6-7.6 g/100 g. Whereas, the fat contents of these snacks were rather high according to the process of deep fat frying or flavored coating with some methods, oil was used 24-30 percent of total weight (Boonyasirikool, 1997). Therefore, they provided high total energy ranging from 399.22-555.89 Kcal per 100 g. This finding confirmed those from earlier studies that snack foods contributed high starch and fat contents (Leverton, 1968; Sparks, 1975 and Mc Coy *et al*, 1986). However, squid, fish snack, peas and beans were high protein contents snack foods which were greater than 14.48 g/100 g (the lowest contents in crispy green peas-seafood).

Sodium and monosodium glutamate contents of the snack food are presented in Table 1. Products of potato, seasoning flour (puffed rice –

cuttle fish, puffed rice – seaweed, puffed rice-paprika, etc.) and corn contained sodium contents ranging from 195.9-1,126.8 mg/100 g. or 58.77 – 338.04 mg/serving (serving size = 30 g). In particular, puffed rice-seaweed and cuttlefish crackers contained over 1,000 mg/100 g. (300 mg/serving).

Furthermore, the data illustrated that squidy, fish snack contained the highest amount of sodium and monosodium glutamate comparing to the other snacks analyzed in this study. Most of them contained sodium above 2,000 mg/100 g. High contents of sodium distributed from NaCl and chemical substances used in manufacturing products (Lee, 1984)

Ratio of kilocalories from protein, fat and carbohydrate are shown in Table 2. The fat intake should not be more than 30 per cent of dietary energy. In Table 2, most of snack foods were found (> 60 %) not to meet the lower level of fat whereas, all fish snacks gave less than 30% of the kilocalories in the form of fat

## CONCLUSION

Mostly, snacks were fun to eat but the nutritional contribution was minimal because they were wholly starch based. More attention has been focused on sodium contents with some types of snacks, squid and fish snack, containing high amount of sodium (more than 2,000 mg/100g). According to the Food and Nutrition Board (1980), the estimated safe and adequate daily dietary intake of sodium was 1,100-3,300 mg (2.8-8.4 g sodium chloride) for healthy adults. Data obtained in this study were more useful from the point of the sodium contents in snack foods, which was alarmingly high in certain snack foods.

Energy and protein contents of snack food products ranged from 296.12 – 555.81 Kcal/100 g (88.84 – 166.74 Kcal/serving) and 2.44 – 64.78 g/

**Table 1** Proximate composition sodium and monosodium glutamate (MSG) content of snack foods (per 100 g).

Snack name	Company	Mois- ture (g)	Protein (g)	Fat (g)	CHO (g)	Ash (g)	Crude fiber (g)	Energy (Kcal)	Sodium (mg)	MSG (g)
<b>I) Potato</b>										
Potato crisps	Siam Snack	2.10	7.22	32.39	53.01	3.88	1.40	532.43	676.3	1.15
Potato crisps-Bar-B-Q	Siam Snack	1.91	6.78	34.11	52.55	3.19	1.46	544.31	286.2	0.12
Potato twist	Yokkun	3.68	3.33	21.74	66.85	3.59	0.81	476.38	962.7	0.18
Potato crisps-Paprika	Yokkun	2.20	2.81	29.47	61.17	3.44	0.91	521.15	943.9	N.D*
Potato crisps-Original	Peggy Foods	4.07	5.37	11.09	74.73	3.44	1.30	420.21	770.3	0.97
Potato chips-Original	Food Processing	3.30	7.15	35.29	48.81	3.35	2.10	541.45	221.7	N.D
Potato chips-Butter & onion	Food Processing	3.92	8.10	33.67	48.75	4.17	1.39	530.43	633.7	0.29
Stick french fries- Sour cream'N-Onion	Pacific Snacks	4.37	7.60	19.57	64.30	3.10	1.06	463.73	696.1	0.99
Potato crisps-Original	United Foods	3.97	6.54	31.44	53.59	2.85	1.61	523.48	195.9	N.D.
Potato crisps	Calbee Thanawat	4.21	5.60	21.49	65.45	2.11	1.14	477.61	496.5	0.35
Potato chips-Bar-B-Q	Pepsi Co Foods	3.43	8.48	29.82	53.79	3.62	0.86	517.46	416.5	0.91
Potato chips-Original	Hanami Tohato	2.98	4.77	31.40	57.13	2.81	0.91	530.20	676.4	0.10
Potato crisps	Siam General Foods	4.54	8.50	21.93	60.41	3.13	1.49	473.01	747.4	0.33
Potato crisps-Original	United Foods Public	4.02	7.67	31.70	52.94	2.66	1.01	527.74	373.0	N.D.
Potato crisps-Original	Procter & Gamble (USA)	3.55	5.36	36.25	49.65	2.96	2.23	546.29	482.2	N.D.
<b>II) Seasoning-flour</b>										
Puffed rice-Cuttlefish	S.P.R.Food Industry	3.88	11.06	7.83	73.01	2.73	1.49	406.75	792.5	0.08
Puffed rice-Seaweed	J.C.Lianchai & Son	5.16	7.11	7.06	76.78	3.24	0.65	399.10	1,052.2	0.23
Puffed rice-Paprika	Food Processing	3.52	5.99	24.33	62.96	2.28	0.92	494.77	742.2	0.33
Puffed rice-Chicken	Food Processing	2.48	6.43	24.88	63.72	2.20	0.29	504.52	743.2	0.89
Puffed rice-Butter	Food Processing	2.74	6.82	26.22	61.35	2.16	0.71	508.66	618.5	0.14
Puffed rice & corn-Paprika	Food Processing	2.99	5.48	28.61	59.28	2.56	1.08	516.53	848.3	0.33
Puffed rice	Namchow	4.04	4.31	36.70	51.19	2.01	1.75	552.30	728.1	0.56
Glutinous rice cracker	Kanom Sakol	3.95	4.13	30.94	59.51	0.69	0.78	533.02	224.0	0.08
Wheat crisp-squid	Hanami Tohato	2.86	8.72	29.35	56.43	2.37	0.27	524.75	857.0	0.43
Prawn crackers	Calbee Thanawat	2.69	7.07	22.99	64.17	2.38	0.70	491.87	669.1	0.26
Prawn crackers	Friendship	1.94	6.97	23.54	64.12	2.64	0.79	496.22	886.9	1.19
Prawn crackers	Fashion Food	2.95	4.45	29.51	60.11	2.13	0.85	523.85	643.8	0.92
Cuttlefish crackers	Laem Thong- Food Industries	6.27	7.92	10.22	70.73	3.46	1.40	406.58	1,126.8	1.10
Fried Shrimp chips	Songkhla industry	2.08	8.37	34.52	51.82	2.38	0.83	551.44	754.9	1.40
Fried Taro chips	Songkhla industry	3.83	2.44	31.12	60.46	1.36	0.79	531.68	414.6	N.D.
Yam crisp	Siam Snack	2.83	3.56	15.57	74.64	2.64	0.76	452.93	909.6	N.D.
Yam chips-Chocolate	Siam Snack	3.54	4.41	13.90	75.27	2.05	0.83	443.82	480.4	N.D.
<b>III) Corn</b>										
Corn puffs-Butter	J.C.Lianchai & Son	4.47	6.99	7.69	77.89	1.94	1.02	408.73	487.4	N.D.
Corn puffs-Chilli paste	Siam Snack	1.63	5.80	34.21	56.20	1.46	0.70	555.89	450.2	0.51
Corn puffs-Toasted corn	Siam Snack	1.47	5.27	35.95	54.55	1.62	1.14	562.83	522.0	0.51

**Table 1** Cont.

Snack name	Company	Mois- ture (g)	Protein (g)	Fat (g)	CHO (g)	Ash (g)	Crude fiber (g)	Energy (Kcal)	Sodium (mg)	MSG (g)
Corn puffs	Friendship	3.53	6.80	22.64	62.93	2.07	2.03	482.68	655.8	1.58
Corn puffs	Yokkun	2.15	4.82	32.83	57.05	1.70	1.45	542.95	611.8	0.06
Corn crisp-Roasted corn	Mahanakornchai-Food	5.59	4.20	13.67	72.35	2.54	1.65	429.23	907.1	0.25
Popcorn	United Foods Public	3.23	8.45	10.70	75.17	1.94	0.51	430.78	603.0	N.D.
Popcorn Chocolate	United Foods Public	3.72	5.11	12.79	72.50	2.07	3.81	425.55	545.3	N.D.
Popcorn	Alet	2.35	4.74	14.07	75.41	1.25	2.18	447.23	275.6	N.D.
<b>IV) Squid</b>										
Crispy squid	T. Thaiwattana	8.69	44.96	1.94	37.84	6.02	0.55	348.66	1,658.4	2.25
Seasoned cuttlefish	Laem Thong Food Industries	5.69	24.76	1.22	60.72	6.58	1.03	352.90	2,491.6	0.64
Prepared cuttlefish	Sun Yang Food	18.79	64.78	2.92	2.68	9.21	1.62	296.12	2,601.9	3.40
<b>V Fishsnack</b>										
Fish snack-Spicy	PM Food	12.47	26.28	0.35	52.14	7.44	1.32	316.83	2,787.6	0.78
Fish snack-Original	PM Food	12.50	31.00	0.49	48.29	6.94	0.78	321.57	2,622.6	0.87
Fish snack-Vasabi	Siam Daily Food	12.54	33.64	0.73	46.20	6.18	0.71	325.93	2,414.4	3.18
Fish snack-Surimi	Siam Daily Food	12.42	28.97	0.79	50.87	6.30	0.65	326.47	2,392.7	3.24
Fish snack-Pizza	Sun Yang Food	13.74	21.11	0.32	55.96	7.32	1.55	311.16	2,711.4	2.47
Fish snack-Seaweed	Sun Yang Food	12.54	21.18	0.26	57.68	7.41	0.93	317.78	2,731.1	2.18
Fish snack-Seafood	Sun Yang Food	12.84	21.87	0.46	57.02	7.08	0.73	319.70	2,582.7	2.13
Fish snack-Original	Leam Thong Food	14.90	30.29	0.53	44.50	7.63	2.15	303.93	2,797.4	0.50
Fish snack	Leam Thong Food	14.05	27.05	2.35	48.00	7.36	1.19	321.35	2,645.4	0.76
<b>VI) Crispy peas and Beans</b>										
Peanuts-coconut cream	Mae-Ruay snack Food Factory	1.95	20.36	34.80	39.73	2.05	1.11	553.56	394.7	N.D.
Peanuts-Coffee	Mae-Ruay snack Food Factory	5.51	19.91	34.55	36.16	2.39	1.48	535.23	414.2	N.D.
Peanuts-Coffee	Coffee Sales	2.18	18.52	25.85	48.68	2.79	1.98	501.45	520.3	0.03
Peanuts-Chicken	MPS Enterprise	2.39	19.63	25.66	48.34	2.86	1.12	502.82	609.7	0.02
Peanuts	Eastern food	1.73	17.12	32.46	45.51	2.26	0.92	542.66	492.3	0.17
Crispy Green Peas	Hanami Tohato	2.76	18.93	29.28	43.48	3.40	2.15	513.16	515.3	0.13
Crispy Green Peas	BB Snack	3.79	17.70	39.41	32.58	2.90	3.62	555.81	491.4	0.18
Crispy Green Peas-Cuttlefish	BB Snack	3.77	18.61	11.19	58.71	3.12	4.60	409.99	520.3	0.20
Crispy Green Peas-Bar-B-G	PM Food	3.58	16.56	7.89	66.28	2.86	2.83	402.37	701.6	0.08
Crispy Green Peas-Seafood	PM Food	3.75	14.48	8.23	66.83	3.48	3.23	399.31	783.6	0.05

\*N.D. = Not Detectable

**Table 2** Caloric value of snack foods and percent contributed by protein, fat and carbohydrate.

Snack name	Company	Energy (Kcal)	Protein ← % of Total energy →	Fat	CHO
<b>I) Potato</b>					
Potato crisps	Siam Snack	532.4	5.4	54.8	39.8
Potato crisps-Bar-B-Q	Siam Snack	544.3	5.0	56.4	38.6
Potato twist	Yokkun	476.4	2.8	41.1	56.1
Potato crisps-Paprika	Yokkun	521.2	2.2	50.9	46.9
Potato crisps-Original	Peggy Foods	420.2	5.1	23.8	71.1
Potato chips- Original	Food Processing	541.4	5.3	58.7	36.1
Potato chips-Butter & onion	Food Processing	530.4	6.1	57.1	36.8
Stick french fries-	Pacific Snacks	463.7	6.6	38.0	55.5
Sour cream'N-Onion					
Potato crisps-Original	United Foods	523.5	5.0	54.0	40.9
Potato crisps	Calbee Thanawat	477.6	4.7	40.5	54.8
Potato chips-Bar-B-Q	Pepsi Co Foods	517.5	6.6	51.9	41.6
Potato chips-Original	Hanami Tohato	530.2	3.6	53.3	43.1
Potato crisps	Siam General-Foods	473.0	7.2	41.7	51.1
Potato crisps-Original	United Foods	527.7	5.8	54.1	40.1
	Public				
Potato crisps-Original	Procter & Gamble (USA)	546.3	3.9	59.7	36.4
<b>II) Seasoning-flour</b>					
Puffed rice-Cuttlefish	S.P.R.Food Industry	406.8	10.9	17.3	71.8
Puffed rice-Seaweed	J.C.Lianchai&Son	399.1	7.1	15.9	77.0
Puffed rice-Paprika	Food Processing	494.8	4.8	44.2	50.9
Puffed rice-Chicken	Food Processing	504.5	5.1	44.4	50.5
Puffed rice-Butter	Food Processing	508.7	5.4	46.4	48.2
Puffed rice & corn - Paprika	Food Processing	516.5	4.2	49.8	45.9
Puffed rice	Namchow	552.3	3.1	59.8	37.1
Glutinous rice cracker	Kanom Sakol	533.0	3.1	52.2	44.7
Wheat crisp-squid	Hanami Tohato	524.8	6.6	50.3	43.0
Prawn crackers	Calbee Thanawat	491.9	5.7	42.1	52.2
Prawn crackers	Friendship	496.2	5.6	42.7	51.7
Prawn crackers	Fashion Food	523.8	3.4	50.7	45.9
Cuttlefish crackers	Laem Thong-Food Industries	406.6	7.8	22.6	69.6
Fried Shrimp chips	Songkhla industry	551.4	6.1	56.3	37.6
Fried Taro chips	Songkhla industry	531.7	1.8	52.7	45.5
Yam crisp	Siam Snack	452.9	3.1	30.9	65.9
Yam chips-Chocolate	Siam Snack	443.8	4.0	28.2	67.8
<b>III) Corn</b>					
Corn puffs-Butter	J.C.Lianchai & Son	408.7	6.8	16.9	76.2
Corn puffs-Chilli paste	Siam Snack	555.9	4.2	55.4	40.4

**Table 2** Cont.

Snack name	Company	Energy (Kcal)	Protein ← % of Total energy →	Fat	CHO
Corn puffs-Toasted corn	Siam Snack	562.8	3.7	57.5	38.8
Corn puffs	Friendship	482.7	5.6	42.2	52.1
Corn puffs	Yokkun	543.0	3.6	54.4	42.0
Corn crisp-Roasted corn	Mahanakornchai - Food	429.2	3.9	28.7	67.4
Popcorn	United Foods Public	430.8	7.8	22.4	69.8
Popcorn Chocolate	United Foods Public	425.6	4.8	27.0	68.1
Popcorn	Alet	447.2	4.2	28.3	67.4
<b>IV) Squid</b>					
Crispy squid	T.Thaiwattana	348.7	51.6	50.1	43.4
Seasoned cuttlefish	Laem Thong Food Industries	352.9	28.1	31.1	68.8
Prepared cuttlefish	Sun Yang Food	296.1	87.5	8.9	3.6
<b>V Fishsnack</b>					
Fish snack-Spicy	PM Food	316.8	33.2	1.0	65.8
Fish snack-Original	PM Food	321.6	38.6	1.4	60.1
Fish snack-Vasabi	Siam Daily Food	325.9	41.3	2.0	56.7
Fish snack-Surimi	Siam Daily Food	326.5	35.5	2.2	62.3
Fish snack-Pizza	Sun Yang Food	311.2	27.1	0.9	71.9
Fish snack-Seaweed	Sun Yang Food	317.8	26.6	0.7	72.6
Fish snack-Seafood	Sun Yang Food	319.7	27.4	1.3	71.3
Fish snack-Original	Leam Thong Food	303.9	39.9	0.7	58.6
Fish snack	Leam Thong Food	321.4	33.7	6.6	59.2
<b>VI) Crispy peas and Beans</b>					
Peanuts-coconut cream	Mae-Ruay snack	553.6	14.7	56.6	28.7
	Food Factory				
Peanuts-Coffee	Mae-Ruay snack	535.2	14.9	58.1	27.0
	Food Factory				
Peanuts-Coffee	Coffee Sales	501.4	14.8	46.4	38.8
Peanuts-Chicken	MPS Enterprise	502.8	15.6	45.9	38.4
Peanuts	Eastern food	542.7	12.6	53.8	33.5
Crispy Green Peas	Hanami Tohato	513.2	14.8	51.3	33.9
Crispy Green Peas	BB Snack	555.8	12.7	63.8	23.4
Crispy Green Peas - Cuttlefish	BB Snack	410.0	18.2	24.6	57.3
Crispy Green Peas - Bar-B-C	PM Food	402.4	16.5	17.6	65.9
Crispy Green Peas - Seafood	PM Food	399.3	14.5	18.5	66.9

100 g (0.73 – 19.43 g/serving), respectively.

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### LITERATURE CITED

- AOAC. 1995 Official methods of analysis. 16th ed. Association of Official Analytical Chemists. Arlington, Virginia. 32 : 1-43.
- Boonyasirikool, P. 1986. Research on the production of high protein snack foods. Asean-Thailand Food Technology Research and Development Project. Institute of Food Research and Product Development, Kasetsart University, Bangkok. 23 p.
- Boonyasirikool, P. 1997. Product development by extrusion cooking process. Food 27 : 79-99.
- Food and Nutrition Board. 1980. Recommended Dietary Allowances. 9th rev. ed., Washington, DC : National Academy of Sciences.
- Huenemann, R.L., L.R. Shapiro, M.C. Hampton, and B.W. Mitchell. 1968. Food and Eating practices of teenagers. J Am Diet Assoc 53 : 17.
- Khan, M.A. and J.A. Martin. 1983. Salt content of selected snack foods. J. Fd. Sc. 48 : 656-657.
- Lee, C.M. 1984. Surimi process technology. Fd. Tech. 38 : 69-80
- Leverton, R.M. 1968. The paradox of teen-age nutrition. J. Am. Diet. Assoc. 53 : 13-18.
- Mc Coy, H., S. Moak, M.A. Kenny, A. Kirby, L. Chopin, W. Billon, A. Clark, G. Disney F.G. Ercanli, E. Glover, M. Korslund, H. Lewis, S.J. Kitchey, P. Schilling, S. Shoffner, and T. Wakefield. 1986. Snacking patterns and nutrient density of snacks consumed by southern girls. J. Nutr. Ed. 18 : 61-66.
- Morgan, K.J. and K.T. Bundy. 1981. Food sources of sodium in teenagers' snacks. Cereal Foods World 26 : 61.
- Sparks, G. 1975. Teen-age snacking habits : A challenge for nutrition education. J. Am. Diet Assoc. 66 : 371-375.
- Tettweiler, P. 1991. Snack foods worldwide. Food Technol. 45 : 58-62.
- Thomas, J.A., D.L. Call. 1973. Eating between meals-a nutrition problem among teenagers ? Nutr Rev. 31 : 137-139.
- White, P.L. and S.C. Crocco. 1981. Hypertension : A Sodium related problem. Cereal Foods World 26 : 61-63.

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