



Assessment of composition of different types of food in Barisal city area of Bangladesh

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ABSTRACT

Early food composition studies were carried out to identify and determine the chemical nature of the principles in foods that affect human health. The study was carried out to determine the composition of various types of food in Barisal city areas from 12 March 2014 to 12 July 2014 to observe whether the composition met the Bangladesh standard or not. In this study, a total of 36 samples, where the number of biscuit, chilli powder, black tea, cake and white bread were 8, 7, 5, 11 and 5, were collected and analyzed with proper methods in BSTI laboratory, Barisal. It was revealed that, average of moisture, acid insoluble ash, edible fat and acidity of extracted fat of biscuits were 2.698, 0.03, 18.078 and 0.466 and the average of moisture, acid insoluble ash and acidity of extracted fat of cake were 14.767, 0.019 and 0.462 respectively. In case of chilli powder, the averages of moisture, total ash, acid insoluble ash, crude fibre and nonvolatile were 4.621, 5.3, 0.607, 17 and 17 respectively and, the averages of total ash, P^H, acid insoluble ash and crude fibre of white bread were 65.652, 5.24, 0.03 and 0.16 17 respectively whereas, the average water extract, water soluble ash of total ash, alkaline of water soluble ash, acid insoluble ash and crude fibre were 34.566, 5.4, 66.02, 0.85, 0.228, and 14.232 respectively. It was observed that, all results were within the range of BD standard and dry hard biscuit contain less moisture that increases the keeping quality and these samples of the study are the low sources of ash but chilli powder were good sources of crude fiber and total ash. In case of white bread, the moisture contents were high that may make favorable condition to grow the different types of organism which reduce the self-life of the product. The samples of black tea contain higher water extract indicates its better quality.

INTRODUCTION

Early food composition studies were carried out to identify and determine the chemical nature of the principles in foods that affect human health. These studies were also concerned with the mechanisms whereby chemical constituents exert their influence and provided the basis for the early development of the science of nutrition and they continue to be central to the development of the nutritional sciences. Current knowledge of nutrition is still incomplete, and studies are still required, often at an ever-increasing level of sophistication, into the composition of foods and the role of these components and their interactions in health and disease. The recognition of the involvement of diet in the development of many diseases has led to an expansion in the number and

range of studies of the relationship between diet and health and disease (McGovern, 1977). This can impose differences in the same type of a food product placed on the market by different suppliers or in different countries. Some names of products are protected and can only be applied if the composition or the region of production is respected (McCance, 1994). Moreover, food taste, odour, visual quality, texture etc are important because food is associated with a nice feeling; consumers are judging food products severe when buying them. Discolorations, abnormal proportions, abnormal visual aspect etc have influence on consumer behavior (McCance, 1994). Base on the facts, organization, both national and international, were established for standardization, testing, metrology, quality control, grading and marking of goods. Within the

framework of this ordinance, the government has established the Bangladesh Standards and Testing Institution (BSTI). One import task of this organization is to certify the quality of commodities, materials, whether for local consumption or for export and import. It is the sole body to look after the quality of the products in Bangladesh. Different food producers produce the same types of food with different formula. But there is no standard data whether all the producers' products met the standard setting by the BSTI or not. Only few literature regarding the general composition of various types of food items are available. Considering the above facts, the study was undertaken to find out the composition of different types of available food items in the study area, and to compare the composition of the food items with the Bangladesh standard.

MATERIALS AND METHODS

Sample collection

All the samples of food of locally available brand were randomly collected from the different areas of Barisal city. A total of 36 samples were collected where biscuit, chilli powder, black tea, cake and white bread were 8, 7, 5, 11 and 5 respectively. Samples were taken aseptically so that not exposed to damp air dust. Loose biscuit samples of the representative small pack were placed in air-tight clean and dry glass, cake and bread containers of appropriate size. Each container containing the samples were sealed air-tight and marked with full details of sampling, such as date and time of sampling batch or code number, name of the manufacturer, and other relevant particulars. Chilli powder and tea sample were collected in packet form and carried to laboratory. All samples were analyzed immediately after collection.

Determination of acid insoluble ash

The dried materials in the dish with the flame of a Meker burner (camlab.co.uk) were ignited for about one hour. The ignition was completed by keeping in a muffle furnace at 600°C until gray ash results of the ash add 25 ml of hydrochloric acid cover with a watch glass and heat on a water bath

for 10 minutes. The sample was then allowed to cool and filter the contents of the dish through whatman filter paper No. 42 or its equivalent. The filter paper was washed with water until the washings are free from the acid and return it to the dish keep it in an electric air oven maintained at $135^{\circ} \pm 2^{\circ}\text{C}$ for about 3 hours. Ignition was done in muffle furnace at $600^{\circ} \pm 20^{\circ}\text{C}$ for one hour. The dish was cooled in desiccators and weighted. The process of igniting in the muffle furnace cooling and weighing at half hour intervals were repeated until the difference between two successive weightings is less than one milligram. The Acid insoluble ash, on dry basis, was calculated as percent by mass.

Determination of acidity of extracted fat

Approximately 100 g of the prepared sample was taken in a broad porcelain basin and dried the material in an electric air oven at $105^{\circ} \pm 1^{\circ}\text{C}$ for 4 hours, transferred the dried material to the thimble of the Soxhlet apparatus and fat was extracted with ether for 2 hours. The ether was evaporated slowly in a water oven. The acidity of the extracted fat was determined by titrimetry.

Organoleptic test sheet for biscuit

Organoleptic tests were done on the score of 24 with the reduction of 2 marks for each defect of foreign and objectionable, sour, harsh, weak, medicinal and metallic defects. Score for odor and flavor was evaluated within the score of 10 where 2 marks reduction were done for the defects of objectionable, foreign, burnt, musty and metallic defects. Score grading were calculated on very good, good, fair, average and poor for the score of 20-24, 15-19, 11-14, 7-10 and less than 7.

Determination of edible fat

About 5 g of the moisture-free sample was taken in a beaker and 10 ml distilled water was added. Then 2 to 3 drops of phenolphthalein solution was added in beaker and shaken. Two drops alcohol was added for neutralized. Then sample was taken in a crucible to incinerate in the electric muffle furnace at $600^{\circ} \pm 20^{\circ}\text{C}$ until all the carbonaceous matter is burnt. The sample was then cooled and fat was determined.

The moisture, fat, ash, crude fibre and total solid content by air-oven method were determined according to AOAC (2000). Alkalinity of water soluble ash, water extract and non volatile ether extract were determined as per method followed by BDS 1011:1982,C1-14 , BDS 808:1974,APP-B and BDS 808:1974, APP-E method respectively.

The proportion of different samples of biscuit indicated in table 1 where the moisture content of the biscuit ranged from 1.72 to 3.69, acid insoluble ash ranged from 0.02 to 0.04, edible fat 14.4 to 20.82 and acidity of extracted fat 0.43 to 0.48 but all samples maintain the same organoleptic score. The results demonstrated here did not cross BD standard limit.

RESULTS AND DISCUSSION

Table 1
Observed different test result of biscuit.

Tests	S1	S2	S3	S4	S5	S6	S7	S8	Mean±SD	Standard limits
Moisture	3.69	3.53	2.26	2.34	1.72	2.72	2.52	2.8	2.698±0.654	5.00 (Max)
Acid insoluble ash	0.02	0.03	0.03	0.03	0.03	0.04	0.03	0.03	0.03±0.005	0.05 (Max)
Edible fat	16.68	17.38	20.82	17.82	16.85	20.82	19.85	14.4	18.078±2.259	5.00(Min)
Acidity of extracted fat	0.46	0.47	0.48	0.47	0.46	0.48	0.48	0.43	0.466±0.017	1.00 (Max)
Organolapatic test	12	12	12	12	12	12	12	12	12±0	11~14

Table 2
Observed different test result of cake.

Tests	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	Mean±SD	BD St. Lm. Max
Moisture	19	23.8	14	16	12	12.2	12.18	14.3	13	12.84	13.5	14.767±3.65	25.0
Acid insoluble ash	0.02	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.03	0.04	0.019±0.009	0.10
Acidity of extracted fat	0.46	0.47	0.45	0.44	0.45	0.46	0.45	0.5	0.45	0.47	0.48	0.462±0.017	1.00

It was observed that the averages of moisture, total ash, acid insoluble ash, crude fibre and nonvolatile ether extract were 4.621, 5.3, 0.607, 17 and 17 respectively (Table 3). The observed the highest sample values of test results were under BD standard limits,

Examination of different composition of cake samples revealed 14.767% ±3.65 moisture, Acid insoluble ash 0.019%±0.009 and Acidity of extracted fat 0.462%±0.017 (Table 2). It is

observed that all samples of cake were under BD standard limit.

The average composition of the total solid, P^H, acid insoluble ash and crude fibre were 65.43, 5.24, 0.03, 0.16, 12 respectively of white bread .All sample shows the same fair organoleptic score of 12 (Table 4). It was observed that the highest sample values of test results were under BD standard limits.

Table 3
Observed sample test result of chilly powder.

Tests	S1	S 2	S 3	S 4	S 5	S 6	S7	Mean±SD	Standard limits
Moisture	4	4.5	4.6	4.65	5.3	5.3	4	4.621±0.534	10.00 (Max)
Total ash	5	5	5.3	5.4	5.4	5.4	5.6	5.3±0.224	8.00 (Max)
Acid insoluble ash	0.7	0.6	0.5	0.6	0.65	0.6	0.6	0.607±0.061	1.25 (Max)
Crude fiber	16	17	18	17	18	16	17	17±0.817	28.00 (Max)
Non Volatile ether extract	17	18	17	18	16	17	16	17±0.817	15.00 (Min)

Table 4
Observed different test result of white bread.

Test results	S 1	S2	S3	S4	S5	Mean±SD	Standard limits
Total solid	65.43	66.5	65.45	65.43	65.45	65.65±0.474	60.00(Min)
p ^H	5.1	5.4	5.3	5.1	5.3	5.24±0.134	5.3-6.0
Acid insoluble ash	0.03	0.03	0.03	0.03	0.03	0.03±0	0.1
Crude fiber	0.15	0.16	0.17	0.15	0.17	0.16±0.01	0.50 (Max)
Organolapatic test	12	12	12	12	12	12±0	11-14 Fair
a) Marks obtained (out of 24)	Fair	Fair	Fair	Fair	Fair		
b) Over all evaluation							

Table 5
Observed different test result of black tea.

Tests	S 1	S2	S3	S4	S5	Mean±SD	Standard limits
Water extract	34.3	34.3	35.3	34.51	34.42	34.566±0.420	32.0 (Min)
Total ash	5.6	4.8	5.3	5.5	5.8	5.4±0.381	4.0-8.0
Water soluble ash of total ash	66.3	65.3	66.3	65.6	66.6	66.02±0.545	45.0 (Min)
Alkaline of water soluble ash (as KOH)	1.06	1.05	1.06	1.03	0.05	0.85±0.447	1.0-3.0
Acid insoluble ash	0.22	0.23	0.22	0.23	0.24	0.228±0.008	1.0 (Max)
Crude fibre.	14.4	14.5	14.4	13.43	14.43	14.232±0.450	16.50 (Max)

Table 5 describe the information regarding average of different proposition of black tea were 34.566% water extract, 5.4% total ash, 66.02% water soluble ash of total ash, 0.85 alkaline of water soluble ash, 0.228% acid insoluble ash and 14.232% crude fibre (Table 5). It was observed that the highest sample values of test results were under BD standard limits.

In this study, it was revealed that moisture, ash and edible fat content of biscuits were 2.698, 0.03 and 18.078% respectively. Similar study was done by Kent (1984), where 1.7% water and 17% fat were

observed for hard sweet biscuits and 25% fat for soft sweet biscuits. Kabirullah et al. (1995) reported for sweet biscuits as moisture 4.06-4.97%, ash 0.74-1.01% and fat 8.90-19.33%. Masoodi and Bashir (2004) observed with 0-43% supplementation of wheat flour with flaxseed powder as fat content 11.07% and ash content 2.48%. The average moisture, acid insoluble ash and acidity of extracted fat of cake were 14.767, 0.019 and 0.462 respectively. Report related to moisture contents of different types of cake represents the average moisture contents in raw, dried and roasted beans were 28.80%, 18.14% and

7.11% respectively (Borchers et al, 2000; Afoakwa et al, 2007). All tests summary statistics for chilly powder revealed that the averages moisture, total ash and crude fibre were 4.621, 5.3, and 17% respectively. Similar study reported in FAO, dried peppers (*Capsicum annum*) contain 13.4% moisture, 5.7% ash and 22.5% fiber suggested that the products can be good sources of crude fiber and total ash (Esayas et. al., 2011). In case of white bread, it was observed that the averages value of total ash, P^H, acid insoluble ash and crude fibre were 65.652, 0.03 and 0.16 17 respectively. Rupa et. al.(2013) reported that potato bread contain 33%, moisture 0.5% ash, 0.2% fiber. The higher moisture contents of bread of this study may favorable to grow the different types of organism which reduce the self-life of the product. The samples of black tea contain water extract of 34.566 %, whereas Akande et al. (2012) reported that the moisture content of Lipton tea, Top tea, Green tea, Nescafe and Lemon grass tea were 11.20±0.29%, 10.00±0.49, 13.85±0.78, 13.08±1.15 and 10.12±0.11 respectively and also described tea with highest water extract as best quality tea.

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