

Nutritive Values of Some New Wheat Varieties Developed by Bangladesh Agriculture Research Institute

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Abstract

The present study was designed to investigate the nutritive values of different locally developed improved varieties of wheat collected from Bangladesh Agriculture Research Institute (BARI), Ishurdi, Pabna. The nutritive values of the released/registered varieties were analyzed for moisture, ash, protein, total lipid, crude fibre, carbohydrate, and calorie content. Nutrient contents of eleven newly developed wheat varieties have been analyzed by standard methods. From the study it is revealed that among the 11 varieties GAM-20, Kanchan, BDW-08, and BAW-923 and GAM-19 are the top five varieties wheat that contain highest energy among the samples studied. BAW-944 contents lowest amount of energy. Fat content varies from 2.96% to 3.85% of the samples studied. On the other hand except Protiva, Kanchan, BAT-01 and BDW-08 all varieties contain protein more than 12%. BAW-936 contains highest (13.23%) amount of protein. In general carbohydrate content was high in wheat varieties and the highest amount was found in Kanchan variety (73.36%). The results suggest that, more attention should be given the those varieties for yield and production of wheat in large scale, which contain highest percentage of nutritive values especially GAM-20, GAM-19, BAW-923, Kanchan, BAW-936 and BDW-08.

Key Words: Wheat, BARI, Improved Varieties, Nutritive Values

Introduction

Bangladesh in one of the poor countries of the world. Eighty percent of the population lives below poverty line¹. Malnutrition is widespread and apparently increasing problem in Bangladesh. Various nutrition surveys carried out in this country have documented clearly that inadequate calorie intake is the principal impediment to better nutrition. About 75% of 0-11 years old children of rural area suffer from second and third degree of malnutrition. About 72% of families are lack of necessary protein and 76% have short of energy requirements². According to survey carried out by Bangladesh Bureau of Statistics (BBS) in 1989-90 national crude death

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rate per 1000 population was 11.4 in 1989 and 11.3 in 1990, whereas infant mortality per 1000 live birth was 98% in 1989 and 94% in 1990. Since the present nutritional status of most developing countries is not satisfactory, the need of nutrients rich food is given greater emphasis in these parts of this world³. The findings of national nutrition survey indicated that the total per capita food consumption declined from 886 gm in 1962-64 through 807 gm in 1975-76 to 765 gm per person per day in 1981-82^{4,6}. Calorie intakes decreased from 2301 kcal in 1962-64 to 2094 kcal in 1975-76 and further to 1943 kcal in 1981-82^{4,6}. Protein intake dropped from about 58 gm to 48 gm demonstrating a reduction of intake by 17 percent since 1962-64. Fat and niacin consumption also decreased sharply over same period⁶. Increased attention to agricultural production is often pointed as the key to better nutrition. Clearly agriculture has a strong influence on a nation's nutritional status. Cereals contribute more than 70 to 80% of the calories in the diets of a majority of population in our country as because large amounts of this category foodstuff are included in the daily diet here. Rice and wheat are the main cereal grains consumed in Bangladesh. They are the cheapest sources of calories⁷. Of them wheat is second most important cereal crop providing 9% of the daily calorie intake in Bangladesh. Both whole wheat and wheat flour are excellent sources of digestible carbohydrates, and therefore of energy. Wheat is a cheap source, not only of carbohydrate but also of protein. The fats of the wheat grain are obviously not present in sufficient quantities to play an important role as sources of energy. They are, however, important as carries of vitamin E⁸. Wheat is good to rice. Rather it is better from energy, protein and fat point of view. Among cereals and legumes wheat is best in term of fat content. In Bangladesh there has been very few studies carried out to determine the nutritive values of different foodstuffs and informing mass people about the values of foods. "Deshiyo khaddya drobber pushtiman"-a booklet of INFS, Dhaka University is an example of such study⁹.

The present study as undertaken to determine the proximate composition namely moisture, ash, protein, fat, crude fibre, carbohydrate and calorie content of some newly developed wheat varieties to observe which one is best for which nutrient.

Materials and Methods

Eleven varieties of whole wheat namely Protiva, Kanchan, Bat-01, BAW-923, GAM-19, BAW-944, BAW-917, BAW-936, BAW-966, BDW-08 and GAM-20 were collected from Bangladesh Agriculture Research Institute (BARI), Ishurdi, Pabna for nutritive values analysis. All the chemicals and solvents

used in this study were analytical grade and were purchased from local market.

Samples of each variety mentioned above were chemically analyzed to find their proximate values (namely moisture, ash, fat, fibre, protein, carbohydrate and energy). From each variety, triplicate samples were taken and analyzed. Results are shown as mean \pm SD in gram per 100 gm edible portion. Moisture content was determined through Direct Heating Method (100^o-105^oc) described by Pearson¹⁰, ash content was determined through Straight Combustion Method (550^o-600^oc) described by Triebold-Aurand¹¹; protein content was determined by Kjeldahl Method as mentioned in AOAC¹²; total lipid (fat) content was determined through Evaporating Method described by Bligh-Dyer¹³; crude fibre content was determined by ICMR¹⁴, carbohydrate content was determined by subtracting the sum of the total value (per 100g) for moisture, ash, protein, fat, and crude fibre from 100 according to ICMR¹⁴; calorie content was determined by multiplying the total value (per 100g) of carbohydrate, protein and lipid by Atwater factors i.e. 4, 4 and 9 respectively described by Osborne and Voogt¹⁵. Mean values of these varieties were calculated from the triplicate results.

Results and Discussion

The proximate composition (moisture, ash, fat, fibre, protein, carbohydrate) and energy content of the analyzed samples are presented in Tables 1 and 2.

The moisture content of the wheat varieties studied was found to range between 8.81% to 12.52%, where the lowest value (8.81%) was in GAM-19 and the highest value (12.52%) was in BAW-944. Table 1 also shows that the ash content of wheat varieties studied ranges between 1.31%, to 1.67%. The fibre content in the samples analyzed was found to range from 1.22% to 2.94%. The fat content of the studied wheat was found to range between 2.96% to 3.85%.

The content of protein of the samples analyzed ranges from 10.88% to 13.23%. (Table-2). The carbohydrate content of the samples was found to range from 67.56% to 73.36%. The energy content of the samples ranges from 356 kcal to 369 kcal per 100g edible portion. (Table 2).

Table 1. Moisture, ash, fat and fibre content of different varieties of wheat (values are per 100g edible portion)

Name/code of variety	Moisture (g)	Ash (g)	Fibre (g)
Protiva	10.12 ±0.04	1.36±0.23	1.93±0.07
Kanchan	9.64 ±0.03	1.46±0.01	1.22±0.03
BAT-01 (Triticale)	10.08 ±0.07	1.48±0.01	2.94±0.43
BAW-923	10.18 ±0.03	1.52±0.05	1.28±0.08
GAM-19 (Saurav)	8.81± 0.06	1.45±0.07	1.89±0.08
BAW-944	12.52 ±0.08	1.37±0.09	1.97±0.10
BAW-917	9.75 ±0.02	1.53±0.01	1.23±0.11
BAW-936	10.03 ±0.11	1.31±0.01	1.47±0.30
BAW-966	9.96 ±0.11	1.33±0.01	1.72±0.08
BDW-08 (Durum)	9.58 ±0.06	1.67±0.02	1.33±0.05
GAM-20 (Gaurav)	9.16 ±0.06	1.51±0.02	1.60±0.08

Values are Mean ± SD of triplicate analysis.

Table 2. Fat, protein, carbohydrate and energy content of different varieties of wheat (values are per 100g edible portion)

Name/code of variety	Fat (g)	Protein (g)	Carbohydrate (g)	Energy (Kcal)
Protiva	2.96±0.31	11.51±0.28	72.12	361
Kanchan	3.44±0.36	10.88±0.98	73.36	368
BAT-01 (Triticale)	3.50±0.65	11.79±1.26	70.21	360
BAW-923	3.56±0.22	12.93±0.25	70.53	366
GAM-19 (Saurav)	2.96±0.91	12.53±0.57	72.36	366
BAW-944	3.85±0.00	12.73±0.79	67.56	356
BAW-917	2.98±0.79	12.39±0.00	72.12	365
BAW-936	3.12±0.69	13.23±0.07	70.84	364
BAW-966	3.00±0.14	12.13±0.07	71.86	363
BDW-08 (Durum)	3.38±0.48	11.75±0.08	72.29	367
GAM-20 (Gaurav)	3.58±0.56	12.57±0.39	71.58	369

Values are Mean ± SD of triplicate analysis except carbohydrate and energy.

The results presented above are more or less consistent with that of previous studies. For comparison of the results of present study nutritive values of similar samples are quoted from Gopalan et. al.⁷ and furnished below in tabular form:

Food item name	Moisture (g)	Fibre (g)	Fat (g)	Protein (g)	Carbohydrate (g)	Energy (Kcal)
Wheat (Triticum aestivum)	12.8	1.2	1.5	11.8	71.2	346

Minor difference may, however, occur because of different varieties, climate, soil condition etc.

The overall results suggest that GAM-20, GAM-19, BAW-923, BAW-936, Kanchan and varieties should be given more attention for the yield and production of wheat BDW-08.

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