

Bangladesh Standard  
SPECIFICATION FOR  
FORTIFIED WHEAT ATTA

1793:2008  
BDS / : 2008

Cereals, pulses and their products Sectional Committee, AFDC - 1,

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**BANGLADESH STANDARDS AND TESTING INSTITUTION**

**MAAN BHABAN**

**116/A, TEJGAON INDUSTRIAL AREA**

**DHAKA-1208, BANGLADESH**

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0. FOREWORD

- 0.1 This Bangladesh Standard was adopted by the Bangladesh Standards and Testing Institution on 19 March 2008 after the draft finalized by the Cereals, Pulses and their Products Sectional Committee had been approved by the Agricultural and Food Products Divisional Committee.
- 0.2 Wheat atta is known as whole wheat flour. Wheat atta is prepared in Bangladesh by grinding whole wheat in larger mills using mechanical power or in large roller flour mills.
- 0.3 In an effort at nutritional upgrading, fortified wheat atta to which vitamins and minerals are to be added. This standard is expected to help in exercising proper quality control in the manufacture of fortified wheat atta of good quality under hygienic conditions.
- 0.4 Bangladesh Standard for wheat atta (BDS 380:1980, Amendment-1, 2001) has already been published. Separate standards on fortified wheat atta and fortified maida are also being brought out.
- 0.5 The Sectional Committee responsible for the preparation of this standard has taken into consideration the views of producers, consumers, and technologists and has related the standard to the manufacturing and trade practices followed in the country in this field.
- 0.6 In the formulation of this standard, assistance has been derived from the following publications:

IS 10898:1984, Reaffirmed-2001. Fortified Wheat Atta  
Bureau of Indian Standards

1. SCOPE

- 1.1 This standard prescribes the requirements and the methods of sampling and test for fortified wheat atta, hereafter termed FW atta.

2. REQUIREMENTS

- 2.1 The FW atta shall be prepared by thoroughly and uniformly blending suitable proportions of premix containing necessary amount of fortificants with wheat atta of good quality (see BDS 380:1980, amendment-1, 2001\*). It shall be in the form of powder having a characteristic taste and flavour. The product shall be free from rancidity and insect, rodent or fungus infestation. It shall also be free from fermented, musty or other objectionable odour. It shall neither have any ingredients other than those specified nor any extraneous matter.

Note: The appearance, taste and odour shall be determined by sensory evaluation taste.

- 2.2 The vitamins and the minerals in the premix shall be of pharmaceutical or food grade.
- 2.3 Hygienic Conditions – The FW atta shall be manufactured, packed, stored and distributed under hygienic conditions to BDS CAC RCPI : 2002 \*

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\* Code of practice general principles of Food Hygiene.

- 2.4 Handling, Storage and Transportation -These should be as per Codex Food Hygiene Basic Text, 3<sup>rd</sup> Edition, 2003.
- 2.5 The product shall also conform to the requirements given in Table 1.
3. PACKING AND MARKING
- 3.1 Packing - The packages may preferably be of 500g , 1 kg , 2kg , 5 kg and thereafter, in multiples of 5 kg as desired by the purchaser.
- 3.1.1 For packages above 65 kg , unless otherwise agreed between the purchaser and the supplier, the material for packing shall be single sound A- twill or B- twill jute bag conforming to BDS 930:1980<sup>1</sup> or BDS 906:1979<sup>2</sup>

TABLE 1 REQUIREMENTS FOR FORTIFIED WHEAT ATTA

| Sl. No. | CHARACTERISTIC                                                                                        | REQUIREMENT         | METHOD OF TEST REF. TO APPENDIX | METHOD TEST REF. TO BDS        |
|---------|-------------------------------------------------------------------------------------------------------|---------------------|---------------------------------|--------------------------------|
| 1.      | Moisture, percent by mass, Max                                                                        | 13.0                | A                               | -                              |
| 2.      | Total ash (on dry basis) percent by mass, Max                                                         | 2.0                 | B                               | -                              |
| 3.      | Acid insoluble ash (on dry basis), percent by mass, Max                                               | 0.1                 | C                               | -                              |
| 4.      | Gluten (on dry basis), percent by mass, Min                                                           | 8.0                 | D                               | -                              |
| 5.      | Total protein (N x 6.25) (on dry basis), percent by mass, Min                                         | 10.0                | -                               | Appendix A of BDS 1168:2002 *  |
| 6.      | Crude fiber (on dry basis) percent by mass, Max                                                       | 2.0                 | E                               | -                              |
| 7.      | Alcoholic acidity (as H <sub>2</sub> SO <sub>4</sub> ), with 90 percent alcohol, percent by mass, Max | 0.16                | F                               | -                              |
| 8.      | Granularity                                                                                           | To satisfy the test | G                               | -                              |
| 9.      | Calcium , mg/ kg. Min                                                                                 | 53                  | -                               | Cl.12 of BDS 1010:1982 **      |
| 10.     | Iron, mg /kg, Min                                                                                     | 55                  | -                               | Appendix A of BDS 1769 :2006 + |
| 11.     | Thiamine (as hydrochloride) mg/kg, Min                                                                | 6                   | -                               | -                              |
| 12.     | Riboflavin, mg /kg, Min                                                                               | 4                   | -                               | -                              |
| 13.     | Niacin mg/kg, Min                                                                                     | 15                  | -                               | -                              |
| 14.     | Pyridoxine mg/kg, Min.                                                                                | 5                   | -                               | -                              |
| 15.     | Vit B <sub>12</sub> , mg/kg, Min.                                                                     | 0.01                | -                               | -                              |
| 17.     | Zinc, mg/kg, Min.                                                                                     | 27                  | -                               | Cl.17 of BDS 1010 :1982 **     |
| 18.     | Vitamin-A, IU/kg, Min.                                                                                | 10,000 (3mg)        | -                               | Appendix B of BDS 1770 :2006++ |
| 19.     | Folic Acid, mg/kg, Min.                                                                               | 2                   | -                               | -                              |

<sup>1</sup> A twill jute bags

<sup>2</sup> B. twill jute bags.

\* Wheat flour for use in priscuit industry

+ Method of sampling and test for processed fruits and Vegetables

++ Fortified Soyabean Oil

\*\* Fortified Edible palm Oil.

3.1.2 The smaller packages should be multilayered food grade impermeable to moisture and opaque. The thickness of the packages should not be below 40 micron.

3.1.3 All packages should be air tight and sealed properly.

3.1.4 Storage condition of premix-I<sub>t</sub> should be stored in a cool, clean and dry place with a shelf life of one year.

3.2 Marking – Each packet or bag shall be suitably marked so as to give the following information:

- a) Name of the product ;
- b) Name and full address of the manufacturer;
- c) Batch or code number;
- d) Net content
- e) Date of manufacture
- f) Date of expiry
- g) Maximum retail price(MRP)
- h) Fortificants added.

3.2.1 All markings shall be applied on the packages/bags in such a manner that the dye or ink does not penetrate into the material .

3.2.2 Each packet or bag shall also be marked with the BSTI Certification Mark :

NOTE: The use of the BSTI Certification mark is governed by the provisions of the Bangladesh Standards and Testing Institution Ordinance, 1985 and BSTI (amendment) Act 2003 and the Rules and Regulation made thereunder. Details of conditions under which a license for the use of BSTI Certification marks may be granted to the manufacturer or processors may be obtained from the Bangladesh Standards and Testing Institution.

#### 4. SAMPLING

4.1 The method of drawing representatives samples of the material and the criteria for conformity shall be as prescribed in Appendix H.

#### 5. TESTS

5.1 Tests shall be carried out as prescribed under 2.1 and in the appropriate BDS Specified in col 4 of table I

5.2 Quality of Reagents : - Unless specified otherwise pure chemicals shall be employed in tests and distilled water shall be used where the use of water as a reagents is intended.

NOTE : Pure chemicals shall mean chemical that do not contain impurities which affect the results of analysis.

## APPENDIX — A

[ Table 1, Item (i) ]

### DETERMINATION OF MOISTURE

#### A 1 PROCEDURE

A-1.1 Weigh accurately about 5 g of the material in a dish made of porcelain, silica or platinum, previously dried in an electric oven and weighed. Place the dish in an electric oven maintained at  $105^{\circ} \pm 1^{\circ}\text{C}$ , for five hours. Cool the dish in a desiccator and weigh with the lid on. Repeat the process of heating, cooling and weighing at half-hour intervals until the loss in mass (weight) between two successive weighings is less than one milligram. Record the lowest mass (weight) obtained.

NOTE—Preserve the dish containing this dried material for the determination of total ash (see B-1.1) and crude fibre (see E-2.1).

#### A-2. CALCULATION

A-2.1 Moisture, percent by mass (weight) =  $\frac{100 (W_1 - W_2)}{W_1 - W}$

where

$W_1$  = mass (weight) in g of the dish with the material before drying,

$W_2$  = mass (weight) in g of the dish with the material after drying, and

$W$  = mass (weight) in g of the empty dish.

## APPENDIX — B

[ Table 1, Item (ii) ]

### DETERMINATION OF TOTAL ASH

#### B-1. PROCEDURE

B-1.1 Ignite the dried material in the dish (A-1.1) with the flame of a suitable burner for about one hour. Complete the ignition by keeping in a muffle furnace at  $550^{\circ}$  to  $600^{\circ}\text{C}$  until gray ash results. Cool in a desiccator and weigh. Repeat the process of igniting cooling and weighing at half-hour intervals until the difference in mass (weight) between two successive weighings is less than one milligram. Note the lowest mass (weight).

NOTE—Preserve the dish containing this ash for the determination of acid insoluble ash (see C-2.1).

\* Specification for water for laboratory use.

## B-2. CALCULATION

B-2.1 Total ash (on dry basis), percent  
by mass (weight)

$$= \frac{100 (W_2 - W)}{W_1 - W}$$

where

$W_2$  = mass (weight) in g of the dish with the ash.

$W$  = mass (weight) in g of the empty dish, and

$W_1$  = mass (weight) in g of the dish with the dried material taken for the test ( $W_2$  under A - 2.1).

## APPENDIX - C

[ Table 1, Item (iii) ]

### DETERMINATION OF ACID INSOLUBLE ASH

#### C-1. REAGENT

C-1.1 Dilute Hydrochloric Acid — approximately 5 N, prepared from concentrated hydrochloric acid (see BDS 37 : 1961\*).

#### C-2. PROCEDURE

C-2.1 To the ash contained in the dish (B-1.1) add 25 ml of dilute hydrochloric acid, cover with a watch-glass and heat on a water-bath for 10 minutes. Allow to cool and filter the contents of the dish through a Whatman filter paper No. 42 or its equivalent. Wash the filter paper with water until the washings are free from the acid and return it to the dish. Keep it in an electric air-over maintained at  $135^\circ \pm 2^\circ\text{C}$  for about 3 hours ignite in a muffle furnace at  $550^\circ$  to  $600^\circ\text{C}$  for one hour. Cool the dish in a desiccator and weigh. Repeat the process of igniting in the muffle furnace, cooling and weighing at half-hour intervals until the difference in mass (weight) between two successive weighings is less than one milligram. Note the lowest mass (weight).

#### C-3. CALCULATION

C-3.1 Acid insoluble ash (on dry basis), percent  
by mass (weight)

$$= \frac{100 (W_2 - W)}{W_1 - W}$$

where,

$W_2$  = mass (weight) in g of the dish with the acid insoluble ash,

$W$  = mass (weight) in g of the empty dish, and

$W_1$  = mass (weight) in g of the dish with the dried material ( $W_2$  under A - 2.1).

\* Specification for hydrochloric acid.

## APPENDIX - D

[ Table 1, Item (iv) ]

## DETERMINATION OF GLUTEN

## D-1 PROCEDURE

D-1.1 Weigh accurately into a dish about 25 g of the material. Add about 15 ml of water to the material and make it into a dough, taking care to see that all the material is taken into the dough. Keep the dough gently in a beaker filled with water and let it stand for one hour. Remove the dough and place it in a piece of bolting silk cloth with an aperture of 0.16 mm size (No 10 XXX) and wash it with a gentle stream of tap water till water passing through the silk does not turn blue when a drop of iodine solution is added to it. Spread the silk tight on a porcelain plate for facilitating scraping. Transfer the residue from the silk by means of a spatula to a tared porcelain dish. Spread the wet gluten into a thin layer and cut into small pieces. Transfer any residue sticking to the spatula into the porcelain dish. Place the porcelain dish in an air-oven maintained at  $133^{\circ} \pm 2^{\circ}\text{C}$ . Dry for two hours. Cool in a desiccator and weigh.

## D-2. CALCULATION

$$\text{D-2.1 Gluten (on dry basis), percent by mass (weight)} = \frac{100000 (W_2 - W_1)}{W (100 - M)}$$

where

$W_2$  = mass (weight) in g of porcelain dish with dry gluten,

$W_1$  = mass (weight) in g of the empty porcelain dish,

$W$  = mass (weight) in g of the material taken for the test, and

$M$  = moisture, percent by mass (weight) (A - 2.1).

## APPENDIX - E

[ Table 1, Item (v) ]

## DETERMINATION OF CRUDE FIBRE

## E-1 REAGENTS

E-1.1 Dilute Sulphuric Acid — 1.25 percent (w/v), accurately prepared.

E-1.2 Sodium Hydroxide Solution — 1.25 percent (w/v), accurately prepared.

E-1.3 Ethyl Alcohol — 95 percent by volume.

## E-2 PROCEDURE

E-2.1 Weigh accurately about 25 g of the material preserved under A-1.1 and transfer it to a litre flask. Take 200 ml of dilute sulphuric acid in a beaker and bring to the boil. Transfer the whole of the boiling acid to the flask containing the fat-free material and immediately connect the flask with a water-cooled reflux condenser and heat, so that the contents of the flask begin to boil within one minute. Rotate the flask frequently, taking care to keep the material from remaining on the sides of the flask and out of contact with the acid. Continue boiling

for exactly 30 minutes. Remove the flask and filter through fine linen (about 18 threads to the centimetre) held in a funnel, and wash with boiling water until the washings are no longer acid to litmus. Bring to the boil some quantity of sodium hydroxide solution under a reflux condenser. Wash the residue on the linen into the flask with 200 ml of the boiling sodium hydroxide solution. Immediately connect the flask with the reflux condenser and boil for exactly 30 minutes. Remove the flask and immediately filter through the filtering cloth. Thoroughly wash the residue with boiling water and transfer to a Gooch crucible prepared with a thin but compact layer of ignited asbestos. Wash the residue thoroughly first with hot water and then with about 15 ml of ethyl alcohol, 95 percent by volume. Dry the Gooch crucible and contents at  $105^{\circ} \pm 2^{\circ}\text{C}$  in an air-oven to constant mass (weight). Cool and weigh incinerate the contents of the Gooch crucible in an electric muffle furnace at  $600^{\circ} \pm 20^{\circ}\text{C}$  until all the carbonaceous matter is burnt. Cool the Gooch crucible containing the ash in a desiccator and weigh.

### E-3 CALCULATION

E-3.1 Crude fibre (on dry basis), percent by mass (weight) =  $\frac{100 (W_1 - W_2)}{W}$

where

$W_1$  = mass (weight) in g of Gooch crucible and contents before ashing.

$W_2$  = mass (weight) in g of Gooch crucible containing asbestos and ash. and

$W$  = mass (weight) in g of the dried material taken for the test.

## APPENDIX - F

[Table 1, Item (vi)]

### DETERMINATION OF ALCOHOLIC ACIDITY

#### F-1 REAGENTS

F-1.1 Neutral Ethyl Alcohol — 90 percent by volume.

F-1.2 Standard Sodium Hydroxide Solution — approximately 0.05 N.

F-1.3 Phenolphthalein Indicator Solution — Dissolve 0.1 g of phenolphthalein in 100 of 60 percent (v/v) rectified spirit.

#### F-2 PROCEDURE

F-2.1 Weigh 5 g of sample into a conical stoppered flask and add 50 ml of neutral ethyl alcohol. Stopper, shake and allow to stand for 24 hours, with occasional shaking. Filter the alcoholic extract, through a dry filter paper. Titrate 10 ml of the combined alcoholic extract against standard sodium hydroxide solution using phenolphthalein as indicator. Calculate the percentage of alcoholic acidity as sulphuric acid.

#### F-3 CALCULATION

F-3.1 Alcoholic acidity (as  $\text{H}_2\text{SO}_4$ ), with 90 percent  
alcohol, percent by mass (weight) =  $\frac{24.52 AN}{W}$

BDS :

where

A = volume in ml of standard sodium hydroxide solution used in titration,  
N = normality of standard sodium hydroxide solution, and  
W = mass (weight) in g of the material taken for the test.

**APPENDIX - G**  
[ Table 1, Item (viii) ]  
**DETERMINATION OF GRANULARITY**

**G-1 PROCEDURE**

G-1.1 Transfer about 10 g of the material to 600-micron and sieve for 2 minutes. Brush the upper surface of the sieve and sieve again for one minute.

G-1.2 The material shall be considered to satisfy the test if the residue left on the sieve does not exceed 0.2 percent by mass (weight).

**APPENDIX - H**  
( Clause 4.1 )  
**SAMPLING OF WHEAT ATTA**

**H-1 GENERAL REQUIREMENTS OF SAMPLING**

H-1.1 In drawing, preparing, storing and handling samples, the following precautions and directions shall be observed

H-1.2 Samples shall be taken in a protected place not exposed to damp air, dust or soot.

H-1.3 The sampling instrument shall be clean and dry when used.

H-1.4 Precautions shall be taken to protect the samples, the material being sampled, the sampling instrument and containers for samples from adventitious contamination.

H-1.5 The samples shall be placed in clean and dry glass containers. The sample containers shall be of such a size that they are almost completely filled by the sample.

H-1.6 Each container shall be sealed air tight after filling and marked with full details of sampling, date of sampling, batch or code number, name of manufacturer and other important particulars of the consignment

H-1.7 Samples shall be stored in such a manner that the temperature of the material does not vary unduly from the normal temperature.

H-1.8 Sampling shall be done by a person agreed between the purchaser and the vendor and in the presence of the purchaser (or his representative) and the vendor (or his representative).

**H-2 SCALE OF SAMPLING**

H-2.1 Lot - All the bags in a single consignment of the material drawn from a single batch of manufacture shall constitute a lot. If the consignment is declared to consist of different batches of manufacture, the batches shall be marked separately and the groups of bags in each batch shall constitute separate lots.

**H-2.2 Gross Sample** — For the purpose of drawing samples for test a number of bags shall be selected at random from a lot. This number of bags in relation to the size of the agreement between the purchaser and the vendor. As a guide to such an agreement scale of the sample in suggested in Table 2.

**TABLE 2. MINIMUM NUMBER OF BAGS TO BE SELECTED FOR SAMPLING FROM VARIOUS SIZES OF LOTS**

| LOT SIZE |    |      | SAMPLE SIZE |
|----------|----|------|-------------|
| 2        | to | 8    | 2           |
| 9        | to | 27   | 3           |
| 28       | to | 64   | 4           |
| 65       | to | 125  | 5           |
| 126      | to | 216  | 6           |
| 217      | to | 343  | 7           |
| 344      | to | 512  | 8           |
| 513      | to | 729  | 9           |
| 730      | to | 1000 | 10          |
| 1001     | to | 1331 | 11          |

### **H-3 TEST SAMPLES AND REFEREE SAMPLES**

**H-3.1 Preparation** — To prepare a set of test samples, draw with an appropriate sampling instrument, from the top, middle and bottom parts of each bags in the gross sample about 0.75 kg of the material and mix thoroughly to form a composite sample of that bag. Divide the composite sample of each bag into three equal parts, each being a reduced sample for that bag. A set of such reduced samples, consisting of one reduced sample from each bag shall constitute the test sample.

**H-3.2** Three sets of test samples, each sample being not less than 0.25 kg shall be transferred immediately to thoroughly clean and dry containers and sealed air-tight. This shall be labelled test samples shall be sent to the purchaser and with particulars given under H-1.6. One set of test samples shall be sent to the purchaser and one to the vendor.

**H-3.3 Referee Samples** — The third set of test samples, bearing seals of the purchaser and the vendor, shall constitute the referee sample, to be used in case of dispute between the purchaser and vendor. It shall be kept at a place agreed between the purchaser and the vendor.

### **H-4 TEST FOR ACCEPTANCE**

**H-4.1 Examination and Tests** — The purchaser may examine and test each of the reduced samples constituting a test sample separately for compliance with the requirements of this standard or the any prepare, for the purpose of such examination and at any stage of the progress of the examination, a composite sample representative of the whole lot, by mixing all the reduced samples constituting the test sample.

**H-4.2 Criterion for Judgement** — When the individual reduced samples in a test sample are separately examined and the results vary from one reduced sample to another, the criterion for judging the quality of the lot for the purpose of acceptance on the basis of the results obtained shall be at the discretion of the purchaser, under other wise previously agreed between the purchaser and the vendor.