



Packaged Whole-Wheat Flour (Atta)

Looking for the chaff in 10 popular brands

While the wheat flour (atta) market in India is still largely dominated by local chakki mills, branded and packaged wheat flour is gaining in popularity and market share. The introduction of new product variants such as multigrain atta and fortified atta bears testimony to this. What companies are capitalising on are nutrition, hygiene and convenience factors—increasingly important for more and more consumers, especially in urban locations. The wheat flour industry in India is worth more than Rs 15,000 crore, and is inundated with national, regional and private-label brands. So, how is one to differentiate one brand from another, and on what basis? Can we tell between brands on the basis of how much of the essential nutrients (protein, carbohydrate, dietary fibre, etc.) they provide? What do the national regulatory standards require of wheat flour brands? And do all brands conform to quality and acceptability parameters? What about microbiological contamination? The following report on 10 leading brands of wheat flour will clarify all these various aspects on the basis of the test findings. The presence of certain amounts of bacteria is a matter of concern but in the absence of national standards for microbiological parameters, we will have to await some steps in this direction for clarity and consensus.

A Consumer Voice Report

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As per our standard procedure, we undertook market research to identify the popular and regular-selling brands of packaged whole wheat flour (atta) across the country. All the 10 brands selected for testing were evaluated and graded as per their overall performance based on the comprehensive laboratory results. The grading has been done based on the international grading system.

The key parameters for which the samples were tested included protein, gluten, carbohydrates, calorific value, dietary fibre, crude fibre, total ash, moisture, and presence of lead, aflatoxins and pesticide residues. We also conducted tests for microbiological contamination (*E. coli*, coliform count, yeast and mould count).

The tests were conducted at an NABL-accredited laboratory and as per requirements specified in Indian Standard IS: 1155, Agmark and Food Safety and Standards (FSS) Regulations.



BRANDS

Rank	Total Score out of 100 (Rounded off)	Brand	MRP (Rs)	Unit Price (Rs) per kg
1	91	Nature Fresh	175	35
2	90	Kanak	165	33
2	90	Reliance	320	32
2	90	Ahaar	192	38.4
3	89	Pillsbury	195	39
3	89	Rajdhani	370	37
3	89	Shakti Bhog	180	36
3	89	Patanjali	165	33
4	88	Hathi	190 in Delhi (200 in rest of India)	38
4	88	Kendriya Bhandar	280	28

Score Rating: >90: very good*****, 71-90: good****, 51-70: fair***, 31-50: average**, up to 30: poor*

CV RECOMMENDATION | TOP PERFORMER

Nature Fresh

VALUE FOR MONEY

Reliance



Key Findings

- Based on the overall test findings, the top performer Nature Fresh. Next in ranking are Kanak, Reliance and Ahaar.
- The value-for-money brand is Reliance – its unit price per kg is Rs 32.
- All 10 brands passed in the physical and chemical tests.
- Aflatoxins and lead were not detected in any of the brands.
- All brands passed the tests for pesticide residues (150 pesticides).
- The bacterium E. coli was not detected in any of the brands.
- Coliform as well as yeast and mould were found in most of the brands and therefore these may not be safe for direct consumption. Note that the national standards have not set any requirement for these parameters.

TESTED

	Net Weight (kg)	Standard Mark	Best before	Manufactured/Marketed By
	5		3 months	Cargill India Pvt. Ltd, Delhi
	5		3 months	The Delhi Flour Mills Company Ltd, Delhi
	10		3 months	Reliance Retail Ltd, Maharashtra
	5		4 months	Ahaar Consumer Products (P) Ltd, Delhi
	5		3 months	General Mills India Pvt. Ltd, Mumbai
	10	Agmark (special grade)	3 months	Victoria Foods Pvt. Ltd, Delhi
	5		4 months	Shakti Bhog Foods Ltd, Delhi
	5		4 months	Patanjali Ayurved Ltd, Delhi
	5	Agmark (standard grade)	3 months	JJ Foods (P) Ltd, Delhi
	10	Agmark (standard grade)	30 days	Bakers Pride Wheat Flour Pvt. Ltd, Delhi





TEST RESULTS FOR PHYSICO-CHEMICAL PARAMETERS

**Protein | Gluten | Dietary Fibre | Carbohydrates |
Calorific Value | Acid-Insoluble Ash | Pesticide
Residues | Heavy Metal (Lead) | Aflatoxins | Uric Acid |
Crude Fibre | Moisture | Total Ash | Alcoholic Acidity**

◆ Protein

Protein is inherently found in wheat flour. However, the national standards have not specified any requirement for protein in wheat flour.

- Protein quantity was highest in Hathi (11.91 per cent) and lowest in Rajdhani (9.98 per cent).

Protein is an essential nutrient. It plays an important role in cellular maintenance, growth and functioning of the human body.

◆ Gluten

Gluten is the wheat's natural protein, and it's what gives the dough elasticity, strength and gas-retaining properties. As per FSS Regulations, gluten in wheat flour should not be less than 6.0 per cent by

weight; as per Agmark, it should be a minimum 7 per cent for standard grade and a minimum 9 per cent for special grade.

All brands adhered to the specified conditions.

◆ Dietary fibre

Wheat flour contains dietary fibres and pro-health vitamins in abundance. However, as yet no requirement has been specified in the national standards for dietary fibre in wheat flour.

- Dietary fibre was found highest in Reliance (10.28 per cent) and lowest in Shakti Bhog (8.13 per cent).

Dietary fibre has many health benefits. It can reduce one's risk for heart disease, diabetes and some cancers, and also help in weight control. High dietary fibre content helps in easy digestion and relieving.

◆ Carbohydrates

Carbohydrates are a major component of wheat flour. They are therefore expected to be high in wheat flour. As yet, no requirement for carbohydrates in wheat flour has been specified in the national standards.

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- Carbohydrate was highest in Reliance (76.03 per cent) and lowest in Kendriya Bhandar (72.90 per cent).

Carbohydrates are a source of energy. They are the sugars, starches and fibres found in fruits, grains and vegetables and milk products.

◆ Acid-Insoluble Ash

As per Indian Standard, acid-insoluble ash content in wheat flour shall not be more than 0.10 per cent; as per FSS Regulations, it shall not be more than 0.15 per cent (on dry-weight basis).

- All 10 brands conformed to the specified limit.

Acid-insoluble ash indicates the presence of sand, dirt and dust.

◆ Calorific (Energy) Value

Calorific value is the amount of calories that our body obtains from food. For calorific value of wheat flour, there is no requirement prescribed in the national standards. We have considered a higher quantity to be better.

Calorific value was highest in Kanak (369.33 kcal/100 gm) and lowest in Kendriya Bhandar (355.10 kcal/100 gm).

◆ Pesticide Residues

We tested the wheat flour brands for 150 pesticides. FSS Regulations have specified the maximum permissible limit for individual pesticides.

One pesticide, copper oxychloride, was detected in all the brands but it was within the specified limit (maximum 20 mg/kg). None of the other pesticides was found in any brand (up to the detection limit). Thus, all brands are safe for consumption.

◆ Heavy Metal (Lead)

The permissible limit for lead in wheat flour is 2.5 mg/kg.

- Lead was not detected in any of the brands.



Pesticide is a chemical or biological agent (such as a virus, bacterium, antimicrobial, or disinfectant) that deters, incapacitates, kills, or otherwise discourages pests. Pesticides may cause acute and delayed health effects in people who are exposed. Such adverse health effects range from simple irritation of the skin and eyes to more severe effects like affecting the nervous system, mimicking hormones causing reproductive problems, and causing cancer.

Lead is a heavy metal and a highly poisonous one at that (whether inhaled or swallowed), affecting almost every organ and system in the human body. Lead can cause severe damage to the brain and kidneys, and ultimately death too. By mimicking calcium, lead can cross the blood-brain barrier. It degrades the myelin sheaths of neurons, reduces their numbers, interferes with neurotransmission routes, and decreases neuronal growth.

Comparative Test

◆ Aflatoxins (B1, B2, G1, G2)

As per FSS Regulations, aflatoxins shall not exceed 15 µg/kg.

- Aflatoxins were not detected in any of the brands, making them safe for consumption.

Aflatoxins are a kind of toxin or poison produced by the mould *Aspergillus flavus*. When animals or humans consume these compounds, they may produce severe undesirable health effects.

◆ Uric Acid

Uric acid of wheat flour increases as infestations increase. As per Agmark, it should not be more than 100 mg/kg.

- Uric acid was below the detection limit in all brands.

Maintaining low uric acid levels may help guard against certain types of kidney stones, as well as gout – a painful form of arthritis.

◆ Crude fibre

As per the national standards, crude fibre content of wheat atta shall not be more than 2.5 per cent.

- Crude fibre in all brands fell within the specified limit.



Crude fibre is a measure of the quantity of indigestible cellulose, pentosans, lignin and other components of this type present in food. Crude fibre helps in the treatment and prevention of constipation, haemorrhoids and diverticulitis.

◆ Moisture

Moisture is an indicator of grain storability. Wheat or flour with high moisture content (greater than 14.5 per cent) attracts mould, bacteria and insects, all of which cause deterioration during storage. Wheat flour with low moisture content is more stable during storage.

As per FSS Regulations, moisture content in wheat flour shall not be more than 14 per cent by weight.

Moisture content in all brands was within the specified limit.

◆ Total ash

Total ash includes essential minerals and some unwanted materials in the flour. It is determined by burning a given quantity of flour under prescribed conditions and measuring the residue. As per the national standards, total ash in wheat flour shall not be more than 2.0 per cent by weight.

Total ash in all brands was within the specified limit.

◆ Alcoholic acidity

Higher alcoholic acidity is an indicator of higher acidity of the germ oil in the flour. As per FSS Regulations, alcoholic acidity in wheat flour shall not be more than 0.18 per cent by weight; as per Indian Standard, it shall not be more than 0.1 per cent.

- All brands were within the specified limits.

What Does Ash in Food Mean?

Ash refers to the inorganic material, such as minerals, present in food. It is the portion of the food or any organic material that remains after it is burned at very high temperatures. Some minerals are essential to a healthy diet (for example, calcium, phosphorus, potassium and sodium), whereas others can be toxic (lead, mercury, cadmium and aluminium). The quality of many foods depends on the concentration and type of minerals they contain, including their taste, appearance, texture and stability.

Physical Fitness

All the brands were an off-white colour and were a fine powder. They were all free from a) fermented, musty and other objectionable odour, b) foreign matter and extraneous matter, c) dead/living insects, and d) insect infestation and rancidity.

Sieves Test

This test was conducted to check for small/breakage pieces/coarse powder in the wheat flour. The product was put through a 600-micron IS sieve for two minutes. The residues left on the sieve were required to be not more than 0.2 per cent and this parameter was fulfilled by all 10 brands



PHYSICOCHEMICAL

Parameters ↓	Weightage (%)	Nature Fresh	Kanak	Reliance	
Protein	16	13.69	13.69	12.37	
Gluten	10	8.75	8.78	8.86	
Dietary fibre	8	6.52	6.8	7.42	
Carbohydrates	6	4.85	5.12	5.41	
Calorific value	6	5.8	5.91	5.63	
Acid-insoluble ash	5	4.4	4.4	4.4	
Pesticide residues	5	4.62	4.62	4.62	
Heavy metal (lead)	4	4	4	4	
Aflatoxins	4	4	4	4	
Uric acid	4	4	4	4	
Crude fibre	4	3.52	3.51	3.5	
Moisture	3	2.27	2.38	2.28	
Total ash	3	2.18	1.95	2.22	
Alcoholic acidity	3	2.7	2.55	2.4	

FOR MICROBIOLOGICAL ACTIVITY

For wheat flour, we conducted tests for E. coli, coliform count as well as yeast and mould count. Due to improper or poor hygienic condition during the manufacturing process, microorganisms may occur in the finished product.

The national standards have not specified any requirement for microbiological tests with regard to wheat flour.



- E. coli was absent in all brands.
 - Lowest coliform count (less than 10 cfu/gm) was found in Kanak and Nature Fresh. Coliform count ranged between 100 cfu/gm and 1,900 cfu/gm in the other brands.
 - Yeast and mould count ranged from 40 cfu/gm to 930 cfu/gm.
- Microbiological load was found lowest in Kanak and highest in Rajdhani.

FOR GENERAL QUALITIES

◆ Packing

The packing shall be such that it protects the product from contamination, deterioration and absorption of moisture. Also, it should not impart any objectionable taste and odour. Polymeric packages used should be of food-grade quality and should conform to the relevant national standards.

- All brands have been given equal scores on packing quality.
- Kendriya Bhandar had a poly-woven pack. The rest all had flexible polymer packaging.

SCORES

	Ahaar	Pillsbury	Rajdhani	Shakti Bhog	Patanjali	Hathi	Kendriya Bhandar
	13.75	13.49	12.14	13.89	12.37	13.99	13
	8.27	7.77	8.96	8.06	8.72	9.07	8.93
	6.5	7.29	7.15	5.7	7.32	5.76	6.82
	4.97	4.76	5.06	4.76	4.95	4.56	4.47
	5.78	4.87	4.88	5.62	4.83	4.98	4.21
	4.6	4.6	4.6	4.4	4.6	4.6	4.6
	4.55	4.69	4.64	4.64	4.64	4.53	4.66
	4	4	4	4	4	4	4
	4	4	4	4	4	4	4
	4	4	4	4	4	4	4
	3.58	3.63	3.57	3.62	3.62	3.04	3.68
	2.32	2.09	2.21	2.25	2.05	2.09	1.87
	2.03	2.22	2.18	2.07	2.18	2.25	2.31
	2.55	2.7	2.7	2.7	2.4	2.55	2.7

◆ Marking

The samples were verified against the marking requirements as per the relevant Indian Standard. The pack shall be legibly and clearly marked with the following particulars:

- Name and trade name
- Grade of the material
- Manufacturer's address
- Batch/Lot number/code number
- Date, month and year of manufacturing
- 'Best before' date
- Net weight
- Trademark, if any
- Standard mark, if any
- Green dot (for vegetarian status)
- MRP
- FSSAI license number
- Customer-care details

All brands provided the required information. It may be noted that storage information was missing in Ahaar and Kanak.

◆ Net Weight

Samples from all brands were verified for net weight as per the quantity claimed. The net weight should be within the tolerance limit permitted in Legal Metrology Rules.

- Except in the case of Kendriya Bhandar, the net weight of all brands was found to be above the declared quantity. The difference in net weight in Kendriya Bhandar's atta was within the tolerance limit.

