



## Branded Chips & Snacks Stay within Munching limits!

Brand	Rank	Weight (in gm.)	Price (in ₹)
<b>Potato Chips</b>			
Bingo	1	66	20
Parle	2	84	20
Lays	3	63	20
Haldirams	4	66	15
Pringles	5	182	122
Uncle Chips	6	72	20
Bikano	7	200	42
Balaji	8	60	10
Diamond	9	18	5
<b>Snack Food</b>			
Kurkure	1	130	20
Haldiram'sTakatak	2	110	15
Bikano Chatex	3	120	20
Parle Fulltoss	4	150	20

Branded chips and snacks have become part of the daily diet for rural and urban kids in India. Working parents prefer to buy the branded chips and snacks as they believe that these are prepared hygienically and will provide some amount of energy and nourishment that the children are deprived of because of their parents' busy schedules. Parents tend to forget that chips and snacks are fillers and not a whole meal that provides nutrition in some proportion. *Consumer VOICE* did comparative testing of well-known chips and snacks brands to find out how well these products perform on health and hygiene parameters. Fortunately, all the tested products were endorsed as hygienic and as far as being healthy, the manufacturer was playing with words – 'no added msg', 'edible oil', 'iodized salt'. So many different names confusing even educated consumers searching for definition of these words in dictionaries rather than being able to make a quick decision as to which product is most suited for them. Read our report to help you make a better choice next time!

From being a poor man's staple diet ensuring sufficient nutrition to a style statement of the 21st Century, potato has come a long way, blemishing its name in the process, with the lazy bums being named after it as 'couch potatoes'. Potato chip is estimated to constitute nearly 85% of India's total market of salty snack food market of about Rs 2500 crore. No exotic product has been as successful in clinching the Indian market as the humble potato chips, being liked both by the young and the old alike. Branded Chips are seemingly less oily, and it tastes irresistible.

Kids and Youngsters have taken branded potato chips as a way of life, as a tasty easy substitute to bite over hunger pangs. But the question arises as to how chips affect the health of avid eaters, some have even vouched their loyalty to a particular brand. According to a study, potato chips were the biggest dietary offenders in preventing weight loss.

Taking the cue from the market, various companies are coming up with a variation of packaging and shapes and crispiness, but basically all of them are fried potato chips which when

once dipped in oil and mixed with salt transforms from a nutrition-rich, no-fat staple food to a high cholesterol snack increasing chances of obesity and other diseases. *Consumer VOICE* has tested some of the well-known brands of potato chips, and the findings are quite revealing.

### Preparing Potato Chips & Snack Food

Fried Potato Chips, also known as potato wafers, are prepared by peeling and slicing or shredding potatoes and deep fat frying the slices/shreds in suitable edible oil or fat, or

## Key Findings

- Bingo scored top among all the brands followed by Parle and Lays. In Snack Food category Kurkure scored top followed by Haldiram's Takatak and Bikano Chatex.
- Bingo performed the best in the sensory test followed by Pringles and Haldiram's in potato chips category. In snack food Haldiram Takatak performed better followed by Kurkure and Bikano Chatex.
- Parle potato chips (22.58%) was found with lowest fat among the brands tested followed by Bingo and Uncle Chips however brand Pringles (34.09%) was found with highest fat. In snack food category brand Parle Fulltoss (31.07%) was found with lower fat content followed by Haldiram's Takatak (32.45%) and Kurkure (33.55%).
- Potato chips and snack food were found within the permissible limit of fat content.
- All brands of potato chips were free from Trans Fat, however in snack food category brands Bikano Chatex and Parle Fulltoss were found with slight percentage of trans fat.
- All the brands were free from microbial contamination, rancidity and adulteration of mineral oil and carcinogens like Acrylamide.
- All the brands were properly labeled and suitably packed.



combinations thereof. The Slices/Shreds chips are generally washed and fried in fat/oil or combinations thereof, held at proper temperature and given time to render them crisp. Edible salt and other seasoning are added after frying depends upon the flavour as desired. When groundnut or other unsaturated oils are used, permitted antioxidants in the frying medium are sufficient to give protection to the Potato Chips.

Snack food are also generally fried in edible oils/fats. The snack food consists of variety of one cereal flour namely grams or a mixture of cereals flours namely grams, wheat, rice, ragi, pulses etc. Kurkure or similar snacks are regular selling snacks that are made from a mixture of flours of cereals extruded and sprayed with hot edible oil and mixed with edible salt/spices to add taste.

## Brands Tested

*Consumer VOICE* tested 13 popular brands of most selling Potato Chips (Plain Salted) as well as snack food brands, where 9 brands were of potato chips and 4 were of snack food.

## Packaging As Important As the Food Inside

Fried potato chips and snack food should be packed in flexible thermoplastic films of multi layer or monolayer construction, or their laminates with paper and/or aluminium foil so as to provide a high resistance to the passage of oxygen, light and water vapour and to produce an effective heat seal. The air tight sealing can be done with or without nitrogen flushing to retain the contents in a fresh condition.

➔ All the brands of potato chips and snack food except Pringles were

packed in multilayer or monolayer aluminium foil. Brand Pringles was packed in paperboard box which prevent chips from breakage. Brand Diamond was packed in aluminium foil of lower quality in comparison to other brands we tested.

## Labeling on the Packets

Each pack of the potato chips and snack food are required to be marked with the following information:

- a. Name of the product and trademark if any
- b. Name and address of the manufacturer
- c. Batch or code number
- d. Net quantity
- e. Date of manufacture
- f. List of ingredients
- g. Nutritional Claim
- h. Permitted Additives
- i. MRP
- j. Best before date
- k. Green dot marking for vegetarian

➔ There is good news for consumers that all the brands of potato chips and snack food were observed with proper labeling and they have all the necessary information on their pack. Hence all the brands we tested got full marks (4 out of 4) in marking requirements.

Pringles an international brand has given the measurements in ounce, which leaves the Indian consumers groping for information. Consumers will have an easier understanding if all companies give measurements in grams and milligrams.

## All pass!

In a number of tests for shelf life, rancidity and impurities found the Chips and Snacks, all the product easily sailed through the test and were found to be abiding to the rules.

The test in which the products were given all pass are as follows:

- Moisture test:** Moisture generally refers to the presence of water, often in trace amounts contained in a material. If it is found to be beyond permissible limit, it will cause to deteriorate the quality of chips or snack food. As per Indian Standard, it should not be more than 2 % by mass.
- Acid insoluble ash test:** The test indicates the presence of impurities such as sand, dirt and dust in food product, which is expected to be the lowest in potato chips and snack food. As per Indian Standards (IS), it should not be more than 0.15% by mass. Bingo and Diamond go the highest marking of 4 out of 4.
- Peroxide Value:** It is a very important parameter where the Peroxide value is used as a measurement of the extent to which rancidity (deterioration of end product is judged) reactions have occurred during storage. As per the Indian Standard, it should not be more than 10. Peroxide value was found NIL in all the brands of potato chips and snack food we tested, hence all the brands passed the test and hence got 4 out of 4 marks.
- Mineral Oil in Extracted Fat/Oil:** A mineral oil is any of various colorless, odorless, light mixtures of alkanes from a non-vegetable (mineral) source, particularly a distillate of petroleum. The entire brands we tested were free from presence of mineral oil in extracted fat/oil.
- Rancidity Test:** Rancidity is the chemical decomposition of fats, oils and other lipids. When these processes occur in food, undesirable odors and flavors can result. All the brands were free

## Fat and Calories within limits, but still a problem

A deep fried food product inherently contains certain amount of fat in it. The fat component adds richness of flavour and contributes to a smooth texture. As per the Indian Standards, fat content of potato chips and snack food should not be more than 35% by mass and as low as possible so as to regulate the intake of fat. The Fat content in all the chips and snacks is less than 35 percent with the lowest percentage of fat Bingo and Parle. The highest fat snack is Pringles which manages to pass the test with a 34.9% which is the maximum limit to which fat can be added to a snack. A 100g packet of chips has the stipulated fat content that is required for a day

*Consumer VOICE* discovered that On an average a 100g packet of potato chips or other snack provides 532 kcal of energy. One should take around 2000 calories per day, which mean quarter of the energy value for a day is got from a 100g packet of Potato chips. Potato chips and

from rancidity in product and in extracted fat and pass the test.

- Trans Fat:** Trans Fatty acids are unsaturated fatty acids produced when unsaturated oils are converted to semi solid by a process called hydrogenation. These are unsaturated Fats, but resemble saturated fats in many ways. Just like saturated fats, they also raise the level of 'bad' cholesterol in our blood. It should be as low as possible in potato chips and snack food. In snack food brand Kurkure and Haldiram's Takatak were found free from trans fat while other brands were found with some quantity of trans fat.

snack food are widely used for instant energy, it is expected to be higher in energy value.

Test Results conducted by  
*Consumer VOICE*

Brand	Fat	Calorie Intake In K cal/100g
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### Potato Chips

Bingo	29.55	529.97
Parle	22.58	501.72
Lays	32.36	540.58
Haldirams	31.55	474.25
Pringles	34.09	550.34
Uncle Chips	30.33	530.24
Bikano	32.4	543.56
Balaji	31.77	536.28
Diamond	31.83	538.16

### Snack Food

Kurkure	33.55	547.63
Haldiram's Takatak	32.45	542.79
Bikano Chatex	34.63	551.76
Parle Fulltoss	31.07	535.10

## Acid Value of extracted fat extends shelf life

Acid value of a packaged product is related to the shelf life of the product. If acid value does not meet the requirement, it allows contamination and reduces the shelf life of the product. As per Indian Standard, ph value should not be more than 2.

→ Except brand Diamond (4.45), rest all the brands met the requirement of acid value specified in the Indian Standard. Brand Diamond was found with acid value more than the maximum limit hence did not meet the laid down requirements in this test and got lower weightage in this test.

# Comparative Test

Test Results conducted by <i>Consumer VOICE</i>	
Brand	Protein (in %)
<b>Potato Chips</b>	
Bingo	9.85
Parle	11.68
Lays	8.63
Haldirams	7.48
Pringles	5.67
Uncle Chips	6.26
Bikano	6.25
Balaji	6.35
Diamond	14.5
<b>Snack Food</b>	
Kurkure	5.86
Haldiram's Takatak	6.15
Bikano Chatex	7.5
Parle Fulltoss	7.48



of proteins is natural. Protein is an essential nutrient in diet, playing an important role in cellular maintenance, growth, and functioning of the human body. Indian Standard has not specified any requirement for protein content in potato chips and snack food. It is expected to be present in potato chips as well snack food as derived from fresh potatoes (containing protein) and cereals that also contain protein respectively. What is important is that the protein should not be destroyed while processing.

➔ Brand Diamond had the highest content of protein, and Pringles the least in the potato chips section. While in the snacks section Bikano and Parle Fulltoss had the highest protein content and Kurkure the least.

necessary for proper peristaltic action in the intestinal tract. Dietary fiber/crude fiber acts to lower the concentration of low density lipoprotein cholesterol in the blood, possibly by binding with bile acids. There is no requirement specified for crude fiber in Indian Standard. It is expected to be as high as possible in product like potato chips and snack food.

➔ In potato chips brand Bikano (0.31%) was found with higher crude fiber followed by Haldiram's (0.30%) and Lays (0.26%), however brand

## User Review

6 In these times of fast food and colas, one can't avoid nor restrict the consumption of chips, burgers etc. As a mother, I have come to terms with the fact that these kinds of food products are going to stay with us. Kids love to have such food always, in fact we elders like it too. I allow my children to eat a packet of chips once in a week and also when we are on a holiday or at a party. Over the years my children have been repeatedly told about the ill effects of such food, that they will put on weight and the chemicals found in this food which are harmful for the body and cause loss of appetite. Of late they also realized the truth and have reduced their consumption. 🍌

*Tessy Thomas, a mother of two.*

## Brand

Balaji (0.26) was found with lower acid value followed by Haldiram's (0.65) and Pringles (0.71). Brand Lays (1.59) was found with higher acid value but within the maximum limit. In snack food category brand Haldiram's Takatak (0.90) was found with lower acid value followed by Bikano (1.24), Parle Fulltoss (1.51) and Kurkure (1.59). Balaji Potato chips got 4 out of 4 in our marking system.

## Crude Fiber found in the snacks and chips

Crude fiber is a measure if the quantity of indigestible cellulose, pentosans, lignin, and other components of this type in present foods. These components have little food value but provide the bulk

Pringles (0.15%) was found with lower crude fiber content followed by Parle (0.16%) and Uncle chips (0.21%). In snack food brand Kurkure (0.35%) was found with higher crude fiber, however brand Haldiram's Takatak (0.14%) was found with lower crud fiber. Hence Bikano got the highest marking of 4.41 out of 5 in the Potato chips section and Kurkure got 4.75 out of 5 in the snack food section.

## Chips and Snacks in safe mode of Microbiological Test

Microbiological contamination is a very serious issue for all food products. Microorganisms are responsible for many foods borne disease. There is no limit prescribed in National Standards for microbial contamination in potato chips and snack food. However, the brands of potato chips and snack food were under the safe mode of microbiological content hence are safe for human consumption.

## The proteins in the Snacks and Chips

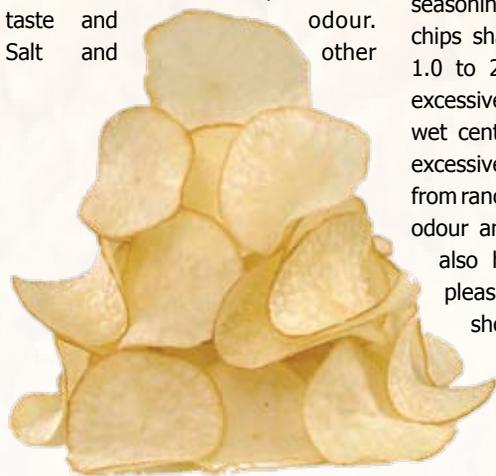
Since Potatoes are the basic raw ingredient of potato chips, the presence

## Brands in Sensory Evaluation

This is very important parameter where subjective Panel tests were conducted based on their critical examination and opinion. Consumers are very choosy on selection of product from retail stores making some brands more acceptable/least acceptable in respect of price, appearance and various other parameters. During this test, we determine the overall organoleptic (sensory) quality of the product in term of consumptions. We conducted the sensory tests against Colour, Appearance, Texture, Flavour, Crispness, Taste, Saltiness, Crispiness, Oiliness and then overall acceptability. These tests were conducted in the lab involving panel members under the supervision of trained experts.

## Parameters for Sensory test

Potato chips shall have an attractive light to golden yellow colour without brown spots, crisp texture, and pleasant taste and odour. Salt and other



## Salt

Potato chips packets mention sodium and salt alternatively or together, thus confusing consumers about the exact quantity of salt intake per day. *Consumer VOICE* has referred to the high level of salt in the chips during earlier surveys in 2006 and 2008, the salt level still remain a worrying issue. Previously National Institute of Nutrition (NIN) had laid down 8gm. as mandatory intake of salt which has now been reduced to 6gm per day adding all sources.

In potato chips and snack food salt is added to give taste to the product. As per Indian Standard, salt should not be more than 2.5% by mass. All brands have managed to stay within limits. Manufacturing companies have used various names for salt that leave the consumers confused. While Haldiram and Bikano use the word edible common salt, Bingo and Balaji claim to use iodized salt.

Sodium is just another name for salt which if taken in excess can cause serious health problems. Sodium content, found both in

seasoning shall be added to taste. The chips shall be of thickness between 1.0 to 2.5 mm, free from blisters, excessive brown pigmentation and wet centers. The chips shall not be excessively greasy and shall be free from rancidity, and other objectionable odour and taste. Snack food should also have attractive texture and pleasant flavour and taste. These should be free from insects, insect residues, rodent hair and excreta, and fungal infestation.

Sensory

salt and other ingredients is expected to be low in potato chips and snack food.

### Test Results conducted by Consumer VOICE

Brand	Salt (In %)
<b>Potato Chips</b>	
Bingo	1.31
Parle	1.04
Lays	1.03
Haldiram's	1.13
Pringles	0.97
Uncle Chips	1.18
Bikano	1.04
Balaji	1.26
Diamond	0.93
<b>Snack Food</b>	
Kurkure	1.08
Haldiram's Takatak	1.15
Bikano Chatex	1.11
Parle Fulltoss	1.36

\* Remember: Salt = 2.5 X Sodium

tests involved seven expert panelists of different age group.

**Overall ratings:** Brand Bingo was rated very well and scored highest among the brands we tested followed by Pringles and Haldiram's in potato chips category. In snack food brand Haldiram's Takatak scored higher followed by Kurkure and Bikano Chatex. The highest in the sensory tests was given to Bingo with a score of 11.01 out of 15.

**Colour of the food item:** Pringles was found with good colour,

## User Review

Teachers have a major role in the lives of students. Their word would be law especially amongst the young students. As a concerned citizen, I am against the idea of eating chips, fast food and colas. Students of my class have been told not to bring such food and if they bring it, they would be taken to task. So it is ensured that at least in the school premises the students don't eat junk food. At the same time the message is also sent across to the children that eating such snacks is unhealthy and should be avoided.

*Shilpa Trivedi, teacher in a South Delhi School.*

## Comparative Test



appearance & texture followed by Bingo and Lays. In snack food brand Haldiram's Takatak was found with good colour, appearance & texture followed by Kurkure and Bikano Chatex.

**Crispiness:** Lays was found most crispy followed by Pringles and Haldiram's. In snack food brand Kurkure was most crispy followed by Haldiram's Takatak and Bikano Chatex

**Taste:** Pringles was found with very good taste followed by Bingo and Uncle Chips. In snack food brand Haldiram's Takatak was found with very good taste followed by Kurkure and Bikano Chatex. It must be noted that chips are made of mashed potatoes, and added with cornflour, wheat starch, rice flour, wheat and other ingredients.

**Saltiness:** Brand Diamond was found most salty in chips category and brand Haldiram's Takatak was found most salty.

### Conclusion & Recommendation

The testing was mainly based on the requirements of Indian Standard. Out of overall parameters the key parameters for which potato chips and snack food brands tested were Fat content, Protein Content, Organoleptic qualities, Trans Fat, Quality of extracted oil and rancidity. Potato chips and other snack food are meant to give a pleasant

taste and instant energy to the consumer therefore these are expected to be rich in flavor and taste. Based on the analysis and evaluation of all test parameters and observations, brand Bingo scored

top among all the brands we tested, followed by Parle & Lays. In snack food brand Kurkure scored top followed by Haldiram Takatak and Bikano Chatex.

To conclude, a 100gm pack contains nearly a quarter of the calorie and fat that is required in a day, consumers should follow a strict regimen in the regular consumption of potato chips and snack food.

### Potato converts faster to sugar

Nutritionist thought they were doing the right thing by telling everyone to remove all fat from your diet. But it's not fat that makes you fat. It's excess carbohydrates.

Potatoes are an all-starch food. There's almost zero fat or protein in a potato. It's almost pure carbohydrate. And it's a kind of starch that breaks down into sugar exceptionally fast. As soon as a potato hits your saliva it starts turning into blood sugar. All that blood sugar means you have to produce more and more insulin to process it. Eventually, your body gets tired and stops responding.

Blood sugar that your body can't or won't process gets stored as fat. So it's foods with excess carbohydrates that can make you fat. Not fat itself. So the idea is to eat foods that don't spike your blood sugar. Also, you want to let your blood sugar come back down after eating so that your insulin doesn't stay elevated for too long. This means eating foods with a low Glycemic Load (GL). The GL is simply a number you get when you multiply a food's Glycemic Index (GI) rating by the total amount of carbohydrate in each serving you eat.

That makes it much more practical for your everyday life because the GL tells you how fattening a food is. A potato has a sky-high GI of 104. So it's worse for your blood sugar than actual sugar. But that's not the whole story. A medium potato has an enormous 216 grams of carbs per serving. This gives it an incredibly high GL of 36. On the hand the carbohydrates in fruits do not convert so fast.



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COMPARATIVE PERFORMANCE SCORE OF POTATO CHIPS AND SNACKS FOODS

Brand Parameter	Potato Chips							Snacks Foods						
	Wt. %	Bingo	Parle	Lays	Haldiram's	Pringles	Uncle Chips	Bikano	Balaji	Diamond	Kurkure	Haldiram's Takatak	Bikano Chatex	Parle Fulltoss
Pack Size, gms		66	84	63	66	182	72	200	60	18	130	110	120	150
MRP, Rs.		20	20	20	15	122	20	42	10	5	20	15	20	20
Unit price per 50 gms, Rs.		15.15	11.9	15.87	11.36	33.51	13.88	10.5	8.33	13.88	7.69	6.81	8.33	6.66
<b>Physico-chemical Tests 74%</b>														
Fat	14	11.14	12.86	10.45	10.64	10.02	10.95	10.44	10.59	10.58	10.15	10.42	9.88	10.76
Protein	7	5.91	6.3	5.66	5.42	5.04	5.17	5.16	5.18	6.89	5.08	5.14	5.42	5.42
Moisture	5	4.07	4.75	4.11	4.4	4.46	3.96	3.8	3.86	4.25	4.3	4.59	4.26	4.57
Salt as Sodium	4	2.56	3.44	3.47	3.14	3.66	2.98	3.44	2.72	3.8	3.31	3.08	3.21	2.4
Crude Fiber	5	3.91	3.16	3.99	4.33	3.08	3.58	4.41	4.16	3.66	4.75	3.0	3.74	4.49
Trans Fat	4	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	1.2	1.2
Mineral Oil	4	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Rancidity (in product and in extracted oil)	7	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Acid Insoluble Ash	4	4.0	3.81	3.8	3.92	3.72	3.6	3.85	3.84	4.0	3.81	3.73	3.68	3.6
Acid Value of Extracted Fat	4	3.51	2.97	3.1	3.8	3.75	3.68	3.36	4.0	1.2	3.1	3.61	3.34	3.16
Peroxide Value	4	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Quality of Extracted Oil	3	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Energy Value	6	5.3	4.75	5.51	4.22	5.7	5.31	5.57	5.45	5.46	5.65	5.55	5.73	5.4
Net Weight	3	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
<b>Microbiological Test 4%</b>	4	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
<b>Sensory Tests 15%</b>														
Colour, Appearance, Texture, Odour, Crispness, Taste, Saltiness & Oiliness	15	11.01	8.95	10.68	10.69	10.83	10.48	8.91	8.92	7.9	10.77	10.86	10.11	9.4
<b>General Parameters 7%</b>														
Packing	3	2.95	2.95	2.95	2.95	3.0	2.95	2.95	2.95	2.9	2.95	2.95	2.95	2.95
Marking	4	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
<b>Overall Score</b>	100	87.36	86.94	86.72	86.51	86.26	85.66	84.89	84.67	83.64	86.87	85.93	82.52	82.35

• Rating: >90 – Excellent \*\*\*\*\*, 71-90- Very Good \*\*\*\*\*, 51-70- Good \*\*\*, 31-50- Average \*\*, upto 30 – Poor \*

• Brand Pringles claims to contain cornflour, wheat starch, rice flour, wheat ingredients, etc but still had low quantity of crude fibre

• Plain salted potato chips were only tested as it is consumed in majority as compared to the other variants/category laced with mint, tomato, spices and other ingredients.