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# INSIGHT®



# CHIPS

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Assert Your Right To Information



7 Brands Tested. Many High In Fat & Sodium

CONSUMER EDUCATION AND RESEARCH SOCIETY, AHMEDABAB, INDIA

hey're crisp, crunchy, deliciously salty, and "you can't eat just one". You're right — we are talking about chips. Chips are certainly not a health food but that doesn't stop them from being extremely popular, especially with the younger generation. Of course, we too have tasted them. But this time we decided to test them.

Camy and Induben Khakhrawala, (C.G. Road, Ahmedabad). The banana chips were — Samrat, Sushma, Sree Ram, Jalsa Foods, A-1 Kairali, Balaji and Induben Kela Wafer (Mithakhali, Ahmedabad).

They represented nationally, regionally or locally popular brands. We carried out all the tests in duplicate and well within the products' shelf-life.

# **Brands Tested**

We tested 10 brands of fried potato chips (plain, salted) and seven brands of fried banana chips.

The potato chips were —

Balaji, Haldiram's Halke
Fulke, Sushma,
Samrat, Lays, Uncle
Chipps, Kailash
Parbat, O.K.,

How Unhealthy Are Chips?

Chips are high in fat and salt.
Worse, as our tests
revealed, the fat content
in most brands was
above the range
recommended by
the Standards.

Porcific Section 17 Brands Tested

Many High in Fat and Sodium

Misight-The Consumer Magazine (ANY FEE 2006)

People know that chips are fattening but a higher than stipulated fat content, which reflects on the method of preparation, is an even bigger cause for concern. The sodium content was also quite high as per guidelines of the *Food Standards Agency*, UK. Both these factors have adverse implications for health.

Excess fat can lead to obesity which triggers many health problems — from heart disease to diabetes and cancer. Excess salt means excess sodium and excess sodium is

harmful; it can cause high blood pressure which triples the risk of heart disease and stroke.

#### **Packets Underweight**

Thirteen brands had packets weighing less than the labelled weight. No consumer should have to pay for a quantity he does not receive. Inadequate labelling information in some brands was another finding.

# **Ingredients**

The essential ingredients of potato and banana chips as per the Bureau of Indian Standards (BIS) are potatoes and mature unripe bananas,

#### Standards

There are no Standards in the Prevention of Food Adulteration Act, 1954 (PFA) for chips as it is a proprietary product. We tested them against the voluntary BIS standards — IS 12575: 1989 for fried potato chips and IS 12574: 1989 for fried banana chips. Sensory characteristics are also covered in the Standards. Packets of none of the brands carried the ISI mark.

respectively, besides edible oil or fat (refined edible oil, edible hydrogenated vegetable oil or ghee, singly or in combination and

# **Key Findings**

\* We tested a total of 17 brands — 10 brands of potato chips and seven brands of banana chips — as per the specifications of the BIS.

#### Best Buys

\* We recommend *Lays* as the 'best buy' among the national brands of potato chips and *Sushma* among the regional brands. Among the regional brands of banana chips, *A-1* and *Balaji* were equally good, though *A-1* was lower in price by Rs 1.50 per 100 gm.

#### Chemical

- \* The fat content was substantially above the specified range of 15-35 per cent in all brands of potato chips except one (*Lays*). Four out of seven brands of banana chips *Sree Ram, Jalsa, A-1* and *Balaji* conformed to this parameter.
- \* The sodium content was also very high in most brands of potato chips and some brands of banana chips. Only *Sushma* and *Samrat* potato chips and *Sree Ram, Jalsa, A-1* and *Balaji* banana chips contained

- sodium less than 550 mg per 100 gm.
- \* The moisture content was found to be higher than the limit in *Induben* (C.G. Road) potato chips (4.5 per cent) against the Standard maximum of 3 per cent.
- \* The acid value of extracted fat was higher than the stipulated limit of 2 in one brand of banana chips *Induben* (Mithakhali) at 4.

#### Sensory

\* In the sensory analysis, among the potato chips *Uncle Chipps* topped the list with a score of 76.8 per cent. Among the banana chips *Sree Ram* was liked the most with a score of 68.2 per cent.

#### Nutrition

\* Balaji and Lays potato chips contained the maximum amount of protein (7 per cent), Lays the most carbohydrate content (55 per cent) and Samrat and Sushma the maximum amount of energy (590 Kcal per 100 gm). Samrat, Balaji

and *Induben* banana chips had the maximum protein content (3 per cent), *Sree Ram* the most carbohydrate content (63 per cent) and *Sushma* the maximum amount of energy (570 Kcal per 100 gm).

### Weight

\* Five brands were found not complying with the Standards of Weights and Measures (Packaged Commodities) Rules, 1977, with the net weight lower than the maximum permissible error limit. These were *Sushma*, *Samrat* and *O.K.* potato chips, and *Jalsa* and *Induben* banana chips.

#### Labelling

- \* Four brands of potato chips (Induben, Camy, O.K. and Kailash) and four brands of banana chips (A-1, Sree Ram, Jalsa and Induben) did not comply with the PFA Act's labelling requirements.
- \* The maximum retail prices (MRPs) and packing sizes of different brands varied widely.







	Brands/Standards	Rank		Price# 100 gm. (Rs.)	Chemical		GHTED SO		Weight	Moisture % by mass	CHEMICAL Acid value (indicating staleness)	Sodium mg/ 100 gm	<b>NUT</b> Fat % by mass	% by	Carbohy- drate % by mass	Kcal/	SENSORY 100-point Score
	Weightage IS-12575-1989				40%	20%	20%	10%	10%	3 max.	2 max.	2	15-35	8	8	8	
	POTATO National	CH	IIPS													7	
	LAYS	1	60	17.40	5.6	19.6	14.6	10	10	1.1	0.5	737	33	7	55	537	73.0
	UNCLE CHIPPS	2 <b>]</b>	47	16.00	1.0	10.4	15.4	10	10	1.6	0.4	775	40	5	50	573	76.8
	HALDIRAM'S	2 }	47	25.00+	6.0	11.0	12.5	10	7.5	1.4	0.6	709	37	6	52	559	62.4
	Regional																
	SUSHMA 🧋	1	63	12.50	31.7	10.2	9.1	10	2.5	2.8	0.6	289	44	5	46	590	45.6
	SAMRAT	2	61	12.50	26.0	10.2	9.7	10	5.0	2.5	0.6	362	44	5	46	590	48.4
	BALAJI	3	53	11.10	19.5	11.5	11.6	10	0	0.8	0.4	576	38	7	50	566	58.2
	Local																
	CAMY	1	40	15.00	8.0	10.8	11.4	2.5	7.1	2.7	1.1	586	40	6	48	570	57.0
_	KAILASH PARBAT	2	32	13.85	7.6	10.9	9.5	0	4.3	3.0	1.2	584	39	6	50	559	47.4
	O.K.	3	22	13.85	-0.4	10.7	11.5	0	0	2.9	1.8	680	38	6	49	551	57.4
	INDUBEN ◆(C.G. Road)	-	43	11.10	2.9	10.2	12.2	7.5	10	4.5	0.3	559	39	5	50	553	60.8
	IS-12574-1989									5 max.	2 max.		15-35				

BANANA	A CH	HPS														
Regional																
A-1 KAIRALI	1 \	67	11.00	18.5	18.2	13.0	8.8	8.8	4.0	0.5	278	32	2	61	522	65.2
BALAJI 🍍	1 ]	67	12.50	14.4	19.5	12.7	10	10	2.4	2	471	34	3	59	537	63.6
SREE RAM	2	65	10.00	21.8	18.3	13.6	7.5	3.8	2.9	0.4	289	30	2	63	517	68.2
JALSA FOODS	3	57	11.10	18.9	18.2	11.4	2.5	5.6	3.9	0.4	281	31	2	62	516	57.0
SAMRAT	4	55	12.50	12.0	11.4	13.3	10	8.1	1.4	2	668	38	3	54	564	66.6
SUSHMA	5	46	12.50	5.3	10.0	11.2	10	9.4	2.5	2	790	40	2	53	570	56.2
Local																
INDUBEN (Mithakhali)		26	10.00	0.4	11.2	11.6	2.5	0	3.5	4	665	39	3	52	555	58.0

As per UK Food Standards Agency, more than 550 mg per 100 gm is high.

Non-conforming brand

+ Price taken as Rs. 10 for 40 gm as 10 gm is given extra.



### Rating and Ranking

we assigned the following peroxide value (4.8). In banana chips weightages — 40 per cent to the weightages were as follows chemical parameters, 20 to mutrition, 20 to sensory scores, 10 to value of extracted fat (4.8) and weight and 10 to labelling.

potato chips the following banana chips the weightages given weightages in percentages were in percentages were: fat (8), protein given — moisture (12.8), sodium (4), carbohydrate (4) and energy (4).

(12.8), acid insoluble ash (4.8), acid For rating and ranking the brands, value of extracted fat (4.8) and peroxide value (4.8).

Among the chemical parameters, in As for nutrition in both potato and

The other chemical parameters tested as per the Standards were acid insoluble ash (only for potato chips) and peroxide value. All brands conformed to these.

We tested sodium, protein, carbohydrates and energy as additional parameters. Price at the time of purchase converted into price per 100 gm for comparison.



		L	ABE	LLIN	G				
Brands*	Brand Name		Net Weight	Batch No.	Date of Packing	'Best Before' Date	Ingre- dients	Veg. Logo	MRP
POTATO CHIPS									
Local INDUBEN (C.G. Road) CAMY KAILASH PARBAT O.K.	✓ ✓ X X	✓ ✓ X X	✓ X X X	x x x	× x x x	✓ X X X	X X X	✓ ✓ X X	× x x x
BANANA CHIPS									
Regional A-1 KAIRALI SREE RAM JALSA FOODS	✓ ✓ ✓	✓ ✓ X	✓ ✓ ✓	X ✓ X	✓ ✓ X	✓ ✓ X	× X X	× X X	✓ ✓ ✓
Local INDUBEN (Mithakhali)	Х	X	<b>✓</b>	Х	X	X	X	X	<b>✓</b>

\*All the other brands conformed to the labelling requirements. Key ✓ mentioned on label X Not mentioned on label

containing permitted antioxidants) and salt. Optional ingredients are spices (chillies or peppers), permitted flavourings and citric acid/tartaric acid. Monosodium glutamate may be added to potato chips. The frying medium has to be regularly replaced and its temperature should not exceed the smoke point.

Chips are prepared by peeling and slicing and deep-frying potatoes or bananas at the proper temperature which would render them crisp. Salt is added after frying.

As per the Standards, potato and banana chips should be tested for moisture, fat, acid value of extracted fat and peroxide value. Potato chips have also to be tested for acid insoluble ash.

#### **Fat Content**

While fat gives crispness and taste to chips, increases their shelf-life and energy value, excess fat makes them greasy besides adding extra calories.

The fat content was substantially

above the specified range of 15-35 per cent of mass in nine brands of potato chips and three brands of banana chips. Only one brand of potato chips, *Lays*, and four brands of banana chips, *Sree Ram*, *Jalsa*, *A-1* and *Balaji*, were within the limits.

Among the potato chips brands, *Sushma* and *Samrat* recorded the highest fat content of 44 per cent. Among the banana chips, again *Sushma* contained the highest amount of fat at 40 per cent.

# **High Sodium**

Another major finding of our tests was that eight brands of potato chips and three brands of banana chips had high sodium content. As per a UK *Food Standards Agency* guideline, the model value for sodium in chips is 550 mg per 100 gm.

Among the potato chips brands, *Uncle Chipps* revealed the highest sodium content of 775 mg per 100 gm, followed by *Lays* with 737 mg. Among the banana chips, *Sushma* recorded the highest sodium content

at 790 mg, followed by *Samrat* at 668 mg.

#### **Moisture**

Moisture as a percentage of weight should not be more than 3 per cent. One local brand, *Induben* potato chips, did not conform and showed moisture of 4.5 per cent. An excess moisture may lead to spoilage.

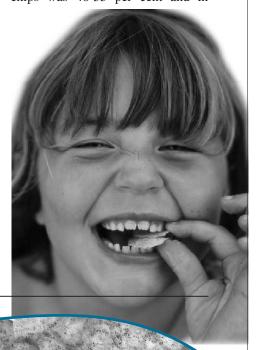
#### **Acid Value**

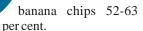
The acid value of extracted fat was higher

than the stipulated limit in *Induben* banana chips. The value was 4 against the limit of 2. This is undesirable, indicating staleness and inferior quality.

#### **Nutrition**

Chips also contain protein and carbohydrates. The protein content in the potato chips was found to be 5-7 per cent and in banana chips 2-3 per cent. The carbohydrate content in potato chips was 46-55 per cent and in





The calorific value of potato chips was found between 537 and 590 Kcal/100 gm. In the case of banana chips, it was 516 to 570 Kcal/100 gm.

# **Inadequate Labelling**

As per PFA Rule 32, packets should carry certain information on the label. (See table on page 10 for details).

Four brands of potato chips, *Induben*, *Camy*, *O.K.* and *Kailash*, and four brands of banana chips, *Induben*, *A-1*, *Sree Ram* and *Jalsa*, did not conform to the labelling requirements.

Interestingly, only one out of 17 brands, i.e. *Haldiram's* gave additional nutritional information on the label at the time of purchase of samples. Now, however, some brands have started giving this information.

# **Sensory Testing**

As per IS 12575 (1989) and IS 12574 (1989), both potato and banana chips should have an attractive yellow to golden yellow colour; crisp texture; pleasant odour and taste; uniform surface; be free from blisters, excessive brown pigmentation and wet centres; should not be excessively greasy; be free from rancidity and other objectionable odours and tastes, and be free from insects, insect residues, rodent hair and excreta, and fungal infestation.

The chips were tested for the following parameters — appearance, texture, flavour, mouthfeel and taste, and after-taste.

# **Sensory Results**

Among the potato chips, *Uncle Chipps* ranked first with a score of 76.8 per cent followed by *Lays* with 73 per cent, and *Haldiram's* with

62.4 per cent. *Sushma* obtained the lowest score of 45.6 per cent.

Among the banana chips, *Sree Ram* scored the maximum with 68.2 per cent. *Samrat* came next with 66.6 per cent and *A-1* obtained 65.2 per cent. *Sushma* obtained the lowest sensory score of 56.2 per cent.

While studying the correlationship between chemical and sensory scores, we found that although *Sushma* and *Samrat* had high chemical scores, *Uncle Chipps* topped in sensory followed by *Lays*. A preference for a brand of chips is largely a matter of taste.

# **Unjust Enrichment**

Five brands were found not complying with the Standards of Weights and Measures (Packaged Commodities) Rules, 1977.

Sushma, Samrat and O.K. potato chips and Jalsa and Induben banana

#### UNJUST ENRICHMENT TO MANUFACTURERS

Brand	Labelled Weight (gm)	MRP (Rs.)	No. of packets checked	No. of packets found underweight	Minimum weight (gm)	Maximum weight (gm)	Your loss per pack* (Rs.)
POTATO CH	IIPS						
BALAJI	180	20.00	8	8	177.04	179.29	0.08 to 0.33
HALDIRAM'S	40	10.00	20	5	39.12	39.42	0.15 to 0.22
SAMRAT	80	10.00	16	8	68.09	79.09	0.11 to <b>1.49</b>
SUSHMA	80	10.00	16	12	74.08	79.38	0.08 to 0.74
O.K.	200	27.75	7	7	188.15	194.70	0.74 to <b>1.64</b>
KAILASH	200	27.75	7	4	196.47	198.17	0.25 to 0.49
CAMY	200	30.00	7	2	195.28	198.23	0.27 to 0.71
BANANA CHI	PS						
SAMRAT	80	10.00	16	4	77.13	78.43	0.20 to 0.36
SUSHMA	80	10.00	16	1	79.34	**	0.08
SREE RAM	200	20.00	8	5	199.05	199.20	0.08 to 0.10
JALSA	90	10.00	9	4	83.17	89.17	0.09 to 0.76
A-1 KAIRALI	200	22.00	8	1	197.77	**	0.25
INDUBEN (Mitt	hakhali) 100	10.00	16	16	94.10	97.65	0.24 to 0.59

<sup>\*</sup>A few paise on an individual pack may look insignificant. However, taking into account the large number of chips packets being sold throughout the country, the consumers' loss may run into lakhs of rupees.

\*\* Only one packet was less than the labelled weight.

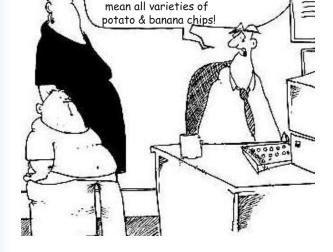


chips revealed packets with net weights less than the maximum permissible error limits.

In addition to these five, the packets of eight brands weighed less than the labelled net weights. (See table on page 11 for details.)

In contrast, the net weight of all the packets of two brands of potato chips — Lavs and Induben — was more than the labelled weight.

A lot of variation was found in the MRP (price) and packing size of different brands. For instance, Lays potato chips (net weight 115 gm) was priced at Rs. 20. Balaji and Induben



I recommended you give him a more varied diet.... I didn't

potato chips (net weight 180 gm) were also priced at Rs 20.

#### Price vs Performance

Though the packing sizes varied widely, we calculated what 100 gm of each brand would cost. We compared these prices with the overall weighted scores the brands obtained.

The results came up with a few surprises. The national favourite among the potato chips, Lays, was less

expensive than Haldiram's which obtained a much lower score. Among the banana chips, one of the top two regional brands, A-1, was also reasonably priced. However. Sree Ram which obtained a score that was only two points lower was considerably less expensive.

Brand	Price per 100 gm (Rs.)	Overall weighted score (100%)
POTATO CHIPS		
LAYS UNCLE CHIPPS HALDIRAM'S SUSHMA SAMRAT BALAJI INDUBEN CAMY KAILASH PARBAT O.K.	17.40 16.00 25.00 12.50 12.50 11.10 11.10 15.00 13.85 13.85	60 47 47 63 61 53 43 40 32
BANANA CHIPS A-1 KAIRALI	11.00	67
BALAJI SREE RAM JALSA FOODS	12.50 10.00 11.10	67 65 57
SAMRAT SUSHMA	12.50 12.50	55 46 26

#### **Shelf-life**

The Standards do not specify any shelf-life. Most brands of potato chips which mention a 'best before' date give it as four months from the date of manufacture or packing. Among the banana chips, the shelf-life given varied from 15 days to three months. Some brands advised storage away from direct sunlight.

# **Home-made** Chips

Some people prefer to purchase (or make at home) dried chips which can be fried whenever they want. We tested two samples of home-made chips for fat and sodium contents. The fat content was 27.2 per cent and 25.8 per cent — much lower than that of ready-to-eat chips. Similarly, the sodium content was only

240.7 mg and 298.8 mg per 100 gm. The results indicate that home-made chips are better for health.

# **Manufacturers**' Response

As a policy, we convey the test results to all the manufacturers, irrespective of whether their brands have passed or failed. The results are posted to their registered offices by Registered A.D./courier. All manufacturers receive the results of their own product only and are

# Areas of Action

- 1. The PFA Act should make Standards mandatory for potato and banana chips as this would lead to a better quality control, especially as children are major consumers of chips.
- 2. Manufacturers should mention on the labels the types of oil used — saturated. unsaturated or hydrogenated.
- 3. The BIS should take note of salt minimisation efforts recommended by the Food Standards Agency (UK). It should suggest limits for salt and sodium, taking into account our country's tropical climate.
- 4. Nutritional information should be given on the labels, as in other countries.
- 5. The Third Schedule of the Standards of Weights and Measures (Packaged Commodities) Rules, 1977, needs to include chips so that they are available only in standard quantity and consumers can easily compare the prices of different brands

#### Addresses of Manufacturers

Balaji Wafers Pvt. Ltd. — Survey No. 19, Vajdi (Vad), Kalawad Road, Dist. Rajkot - 360003 Haldiram's Kasana Foods Pvt. Ltd., Bhandara Road, Nagpur - 440008

**Samrat** — Samrat Namkeen Ltd., 178-1-B, Phase-1, G.I.D.C. Naroda, Ahmedabad

Sushma-- Sushma Namkeen Pvt. Ltd., Tajpur Road, Sarkhej-Bavla Highway, Changodar, Dist. Ahmedabad - 382210

Lays — Frito-lay India, C-5, MIDC, Ranjangaon, Taluka - Shirur, Pune - 412220 **Uncle Chipps** — Pepsi Foods (P) Ltd., Village Channo, Patiala, Sangrur Road, P.O. Bhawanigarh, Dist. Sangrur

Camy - Camy Wafers (India) Pvt. Ltd., 4B, Old Anzeerwadi, Dr. Mascarehns Road, Mazgaon, Mumbai - 400010 **O.K.** — Aga Bros, 16/A, Cusrou Baug, Colaba, Mumbai - 400001

Kailash Parbat - Kailash Parbat Sweets & Salties, 5, Sheela Mahal, 1st Pasta Lane, Colaba, Mumbai - 400005

Induben Khakhrawala Khakhrawala, Behind Shilp Building, Opp. Sardar Patel Seva Samaj Hall, Off C.G. Road, Navrangpura, Ahmedabad - 380009

Smita Induben Kela Wafer (Hirenbhai Zaveri), Opp. Municipal School, Nr. Mithakhali Bus Stop, Mithakhali, Ahmedabad -

Sree Ram - Sree Ram Chips, 225, Mundi, Amman Koil St., Redhills, Chennai - 62 Jalsa — Jalsa Products, Mysore - 21

A-1 Kairali — Thomsun Enterprises, Nr. Octroi Naka, Vastrapur, Ahmedabad - 380015

#### Claims vs Facts

Brand: Lavs potato chips

Claim: The world's No. 1 potato chips Fact: The manufacturer did not substantiate the claim with

supporting data.

Brand: Haldiram's

Claim: The chips are crispier and lighter

with lower fat content

Fact: The chips had a higher fat content (37 per cent) than the 15-35 per

cent range stipulated in the

Standards.

Brand: Balaji potato chips

Least oil for your healthy heart Claim: The fat content was 38 per cent Fact: which was more than the limit.

given two weeks from the date of receipt to respond.

Pepsi Foods said the salt content in Lays and Uncle Chipps is optimised based on extensive consumer testing and the level is based on consumer preferences. Still, keeping in mind its commitment to consumers, the company is developing a low-sodium variant.

As for the fat content, it is dependent on the total solids in potatoes and in the off season this is on the lower side, leading to an increase in the fat content. The company said it uses palmolein oil for frying which has zero trans fats. Nutritional information is now being given on Lays packets. While Lays is a global brand, Uncle Chipps is a brand acquired in India. Lays offers only

ridged chips while *Uncle Chipps* also has flat chips. Both the brands are available in different flavours.

Insight: Despite the company's explanation on fat content the level found by our tests is more than the

Balaji Wafers Pvt. Ltd. said that the higher than the Standard fat content was because it is maintaining low moisture content to improve the keeping quality. The moisture content in potato chips was 0.8 per cent of mass against the Standard maximum of 3 per cent. Because of the low moisture, oil/fat absorption may be higher.

As regards the slightly high sodium content in the potato chips, it said that application of salt may have been more during the chip-making process and promised to take care to reduce it in the future.

The company said it had a fully automatic frying system where fresh oil is added continuously and that refined palmolein oil and refined cottonseed oil are used for frying.

Insight: Maintaining low moisture content should reduce the oil absorption, leading to lower fat content. Besides, we have tested the fat content on a dry basis as is required by the IS. The company did not comment on the fact that all eight samples checked were underweight.

Haldiram's said the fat content in the chips varied depending on the quality of potatoes. As regards sodium, the company said it would check the chip making process. It said packets were checked randomly for weight and it would ensure that the problem of underweight packets does not recur. It added that fresh palmolein oil is used for frying.

Insight: We welcome the assurance.

**Kailash Parbat** said it was not the manufacturer but only a trader but assured us it would change the weighing instruments to ensure that packets are not underweight.

Insight: It did not comment on the complete absence of labelling information.

A-1 Kairali, again a marketer and not the manufacturer, said that from now on it will add the batch number to the packets. As regards underweight packets, the company said it would ensure that this does not recur.

Insight: We welcome the assurance.

Sushma just acknowledged the receipt of the results with thanks.

The manufacturers of Samrat, Induben Khakhrawala (C.G. Road), Camy and O.K. potato chips and Samrat, Sree Ram, Jalsa and Induben (Mithakhali) banana chips did not respond till the time of going to press.

#### Thanks

Our thanks to Dr. V.S. Krishna, National Centre for Human Settlements Environment, Bhopal; Cdr J.E. Gomes, Goa; Consumer Forum, Chandigarh; Dr. Shakuntala Narasimhan, Bangalore; Tamil Nadu Rural Urban Consumer Protection Society, Cuddalore; Dr. T. Balachandran, Cochin; Consumer Protection and Research Society, Delhi, and Federation of Consumer Organisations, Orissa, for market share information on chips.