Groundnut Oil
It's Got the Good Fat

Almost all commercial food suppliers – beginning from a roadside stall owner to restaurants as also a part of the food processing industry – use groundnut oil in some proportion. And, of course, there is a bottle, a tin, or a poly pack/Tetra Pak of groundnut oil in millions of households in India – a country that happens to be the world's largest importer and the third largest consumer of edible oils. However, are all groundnut oil types suitable for your consumption? Are all manufacturers keeping the promises that they make? Are you actually getting the quality and the quantity that you are (innocently) paying for?

To seek answers to these and more such questions, VOICE picked up samples of some of the regular selling groundnut oil brands based on a market survey, sent the samples to an established accredited laboratory, and made these go through multiple tests. In the text that follows are the results of various tests for you to ascertain if the groundnut oil in your home or at your favourite eatery is good enough for your consumption—or if you need to make a switch to a better brand.

Coincidentally, a couple of days before filing of this report, groundnut oil prices across India saw a whopping rise. A bad monsoon resulted in reduced production of groundnuts; hence, many oil solvents went dry. What would this mean to you consumers?

If the prices continue to soar, there is the possibility of a marginal increase in the prices of

your favourite fried namkeen, pakodas and samosas. Many foods that are delivered at your doorsteps or consumed at eateries and small restaurants may also become dearer.

The basis of the test

The test programme was based on IS: 544-1968, AGMARK, and Food Safety and Standards Rules, 2011, which covered the product requirements and methods of the test. While the Indian Standard (IS 544: 1968) prescribes five grades of the oil, only refined groundnut grade is recommended for direct edible purposes.

The Food Standards and Safety Rules, 2011, and rules made under IS 544: 1968 permit additions of antioxidants in groundnut oil for higher shelf life of the oil. However, under the scheme of labelling of environment-friendly products, the presence of antioxidants within a prescribed limit is a requirement as per notification of the Ministry of Environment and Forests.

How many types of groundnut oil?

Groundnut oil is available in the market in refined and filtered forms. Although filtered oils are nutritionally superior, they may contain toxic compounds if the filtration process is not of high quality. Hence, it is better to buy groundnut oils of reputed brands.

Groundnut oil is suitable for all types of cooking, particularly deep frying, grilling and seasoning. Raw groundnut oil is not suitable for direct human consumption for various safety reasons. Therefore, it is refined through various processes in which it is purified, refined, bleached and deodorized. The refined groundnut oil may also be available in packs marked under the standard AGMARK.

What brands were tested?

	Brand	Rank
Refined Grade	Fortune	1
	Ginni	2
	Dalda	3
	Postman	3
	RRO Primio	4
	Dhara	5
Filtered Grade	Tirupati	1
	Ankur	1
	Kanak	2
	Ekta	3

What is the oil's shelf life?

All the brands tested mention shelf life of oil between 6 months and 12 months. The consumer must keep this in mind while buying groundnut oil, particularly the large pack that is above five litres, so that the oil will be consumed within its shelf life.

Where did the samples come from?

The samples of most of the tested brands were bought from retailers in Delhi, while Ekta, Kanak and Ankur were picked up from Vadodara. Ginni was the only one bought from Chandigarh.

All these oils were in different forms of packaging. While some were in poly packs (HDPE), others were in Tetra Paks, plastic cans and pet bottles of 1 litre and 5 litres. Most of the brands have mentioned nutritional values of the groundnut oil on their packs.

Best Buy	**Value for Money**
Fortune	Ginni

KEY TESTING PARAMETERS

■ Polyunsaturated fatty acids (PUFA) and monounsaturated fatty acids (MUFA)

As per the Heart Association of America, one should daily consume PUFA up to 10 per cent and MUFA up to 15 per cent of the total calories consumed. MUFAs lower the level of bad cholesterol (LDL) in the blood and raise the good cholesterol (HDL). In contrast, PUFA reduces both good and bad cholesterol. Groundnut oils are rich in vital linoleic acid as well as MUFA and omega-6 acids, which are essential for cell formation and healthy growth.

Oleic acid, MUFA%, PUFA%, and omega-6 fatty acids are essential fatty acids and must be higher in edible groundnut oils. MUFA% has been found in good amount in all the samples.

It is to be noted that trans-fatty acids are unsaturated fatty acids produced when unsaturated oils are converted to semi solid by a process called hydrogenation. Just like saturated fats, these fats also raise the level of 'bad' cholesterol in our blood.

For evaluation purpose, key acids of the fatty acid profile test – namely oleic acid, linoleic acid, saturated fat, MUFA, PUFA, trans-fats and omega-6 – have been considered as they are important parameters for human consumption.

■ Vitamins A and D

Fat-soluble vitamin protects essential fatty acids from

		Ankur	Dalda	Dhara	Ekta	Fortune	Ginni	Kanak	Postman	RRO Primio	Tirupati
1.	Key fatty acids										
	Palmitic acid %	11.14	10.32	10.23	26.8	11.23	10.37	11.31	8.46	10.48	12.28
	Stearic acid %	3.96	4.13	4.78	3.8	4.37	4.28	4.48	3.51	5.44	3.5
	Oleic acid %	35.35	43.54	43.96	30.97	36.76	39.15	30.36	48.7	43.4	37.97
	Linoleic acid %	30.2	23.08	20.83	22.49	29.52*	22.89	29.86*	18.68	21.15	31.94*
2.	Saturated fat %	20.49	20.04	20.95	37.21#	22.08	21.3	20.36	15.43	18.12	18.41
3.	MUFA %	35.49	43.64*	44.06*	30.98	36.91	39.26	30.48	48.81*	43.46*	38.09
4.	PUFA %	30.29	23.28	20.88	22.67	29.65	23.12*	29.87*	18.7	21.24	31.94*
5.	Trans-fat %	Not detected	Not detected	Not detected	Not detected	Not detected	Not detected	Not detected	Not detected	Not detected	Not detected
6.	Omega-6 fatty acid	30.28*	23.27	20.92	22.66	29.94*	23.16	29.86*	18.74	21.23	31.96*

#Bad sign *Good Sign

Some Fats That Are Good and Others That Are Bad For Human Consumption

Monounsaturated	Polyunsaturated	Saturated	Trans
Good Fat	Good Fat	Bad Fat	Bad Fat
Reduces bad cholesterol (LDL) levels and increases good cholesterol (HDL) levels	Reduces bad cholesterol (LDL) levels	Increases overall cholesterol levels, especially bad cholesterol	Increases the bad cholesterol (LDL) level and decreases good cholesterol (HDL) levels
Found in nuts and seeds, avocados, olive oil and canola oil	Found in fatty fish such as salmon, mackerel, trout and sardines, and also in corn, safflower, sunflower and soybean oils	Found in animal-based foods such as meat, poultry and eggs, and also in butter, cream and other dairy products Also found in plant-based products such as coconut, coconut oil, palm oil and palm kernel oil, and cocoa butter	Found in hydrogenated fat products such as margarines and vegetable shortenings Used in packaged snack foods such as cookies, crackers and chips, and in fried foods

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oxidation and prevents the breakdown of body tissues. Groundnut oil is also a good source of Vitamin D. Vitamins A and D were found in all the tested brands, and were higher in Ginni, Fortune and Ekta for vitamin A, and in Ginni and Ekta for vitamin D.

■ Energy (kcal/100gm)

Energy is the basic need of the human body for daily workouts. Edible oils contribute a good amount of energy in our daily requirement – so groundnut oils should be high in energy. The minimum requirement must be around 900kcal/100gm.

■ Moisture: Should be 0.1 per cent maximum

Moisture is the amount of unwanted water present in edible oils. The amount of water should be as low as possible, and FSSAI and AGMARK have defined its maximum permissible limit as only 0.1 per cent of net weight/volume.

All the brands were found above the maximum limit of 0.1% (though not very significant), except for Fortune (0.09%), which was found under the maximum permissible limit.

■ Toxic/heavy metals as lead, cadmium, arsenic and cadmium

Heavy metals including lead, cadmium, arsenic and cadmium were tested for all the brands based on the Ecomark requirements because these toxic metals have to be checked in the end-product.

All the brands passed in this test and all the results were under the limit set by Ecomark.

■ Antioxidants (TBHQ/BHT/BHA)*

Antioxidants are the permitted food additives that when added to food products retard or prevent oxidative deterioration of food for better nutritional stability and quality of processed foods. The brands were tested for presence of TBHQ, BHA and BHT. FSS rules recommend that the above antioxidants should not exceed 0.02 per cent or 200ppm in concentration. Most of the brands of groundnut oils did not mention the presence of antioxidants. Only Fortune, RRO Primio, Ginni and Dalda stated that they added permitted antioxidants.

Most of the brands had antioxidant presence within permissible limit; Kanak (from filtered

category) was not found with any of the antioxidant. RRO Primio had mentioned the presence of permissible antioxidant, but did not contain any of the (BHA, TBHQ, and BHT) three permitted antioxidants.

Aflatoxin

Aflatoxin is a kind of toxin or poison produced by the mould Aspergillus flavus. When animals or humans consume these compounds, they suffer from severe health effects.

All the brands passed the test for aflatoxin limit (30ppb). However, AGMARK is more stringent, requiring an absence of this carcinogen. Aflatoxin generally develops due to poor oil seed storage conditions and presence of undesirable moisture in the groundnuts. All the aflatoxins (B1, B2, G1, G2) were tested for.

No brands had presence of any aflatoxins (B1, B2, G1, G2).

Foreign matter or impurities should be absent in groundnut oil, as these reduce the acceptability of oil to consumers and may also result in bad odour, and can even be harmful.

Specific gravity, saponification value, iodine value, acid value, flash point, insoluble impurities

All the brands were tested for specific gravity, saponification value, iodine value, acid value, flash point and insoluble impurities as per requirements of IS: 544 and FSSR 2011, and were found meeting the requirements in terms of quality of oils.

Pesticides

All chemical pesticides are poisons and pose long-term danger to the environment and humans through their persistence in nature and body tissue. These can be added during farming stage but must be low as possible or absent in the final product. The test was conducted for Oxyfluorfen Imazethapyr pesticides as per FSSR 2011 and no pesticides were detected in any of the tested brands.

Suspended and foreign matter

This test is for detection of any foreign matter or impurities, which may come during improper processing. It should be absent in groundnut oil, as foreign matter in oil reduces the acceptability of oil to consumers and may also result in bad odour, and can even be harmful. Brand Ekta was found with white suspended particles deposited at the bottom.

Rancidity

Rancidity is the development of off flavour and taste during the storage of product or also due to presence of impurities and moisture in the end product. Rancid oils are not likely to affect one's health adversely, but are unfit for consumption due to their off flavour. No brand was found to be rancid.

Net volume

According to Legal Metrology (Packaged Commodities) Rules, 2011, for edible oils in packing of 1,000ml to 10,000ml, only 1.5 per cent of net weight/volume error is permissible, and for those above 4kg/litre, only 0.6 per cent error is permissible.

Most of the brands tested were found within the maximum tolerance limit, except for Ginni and Ekta – both brands had lesser volume than the permissible 1.5 per cent error margin. Three brands – Fortune, Dhara and Kanak – were found with no error.

Conclusion

Cooking oils play a vital role in cooking systems across the world. All the meals we prepare or consume always have cooking oil

Key Findings

- Restricted materials like lead, arsenic cadmium and aflatoxins are found in permissible limits in all brands.
- Oleic acid, MUFA%, PUFA% and omega-6 fatty acids are essential fatty acids and must be higher in edible groundnut oils. MUFA% has been found in good amount in all the samples.
- Trans-fat, which is not EFA and harmful for human consumption, is absent in all the samples.
- Groundnut and mustard oils are very good. It is suggested that a combination of these oils be used, either by blending or by rotation.
- The moisture contents in 8 out of 10 brands are found to be in higher quantity, which can result in lowering the shelf life and make the oil vulnerable to rancidity.
- Net weight of Ginni and Ekta is lesser than what the brands claim (970ml and 980 ml, respectively, against 1,000ml).
- Solidification is observed in Ekta brand and, hence, it may not be fit for human consumption and thus not recommended.

How To Best Match Your Oils To Foods

While the to-and-fro on the healthiest oil continues through various studies and findings, most of them clearly conclude against sticking to one type of oil for cooking. It is beneficial to consume a mix of oils to maintain a balance between the three fatty acids. The only way to ensure that you consume healthy oil is by switching between two-three of them – for instance, by using groundnut oil one month and then using sunflower oil in another. Even better, rotate the oil types for breakfast, lunch and dinner.

Blending oils is another option, whereby you take equal proportions of different oils in one container and then use it. This way you do not get prolonged exposure to the side effects of one type of oil and also get the benefits of different oils.

You could also have two or more different kinds of oils in your kitchen which you could use for different purposes. For example, you could use olive oil for salads, groundnut oil for frying, and soyabean oil for other cooking purposes. This will let you avail of the health benefits offered by each oil brand.

However, refrain from reusing of oil as this has been linked with cancer.

in one form or the other. It is a rich source of energy, MUFA, PUFA, omega-6 fatty acid and linoleic acid (the last mentioned being particularly available from groundnut oils). However, the consumption of the groundnut oil is not very widespread – except in parts of western, southern and central states of India, where groundnuts are traditionally grown by farmers and thus also consumed more.

Consumer VOICE tested the regular selling 10 brands of groundnut oils and based on the key test parameters, particularly related to nutritional properties, brands Fortune and Ginni have emerged as the top performers followed by Dalda. The remaining brands are on the lower side, with Dhara on the bottom ranks among all the brands. In terms of value for money, it is Ginni from Punjab that is the strongest contender – it is cheaper among all the brands at Rs 136 per litre. However, all the brands are safe for human consumption.

Keeping in view the evaluation of test results and overall grading, all the brands qualify to be in very good category. All brands meet the requirement of quantity of edible oil as marked on the containers/ packaging. All brands also conform to the Ecomark (product-specific) requirements for toxic metals – namely lead (5ppm), arsenic (0.5ppm) and cadmium (1.0 ppm). Also, all samples are found to be meeting the restriction regarding safe limit for aflatoxin content (30 ppb [parts per billion]), which is another toxic substance found in this category of edible oils.

Comparative Performance Ratings of Groundnut Oils

		Refined Grade						Filtered Grade			
	% weightage	Fortune	Ginni	Dalda	Postman	RRO Primio	Dhara	Tirupati	Ankur	Kanak	Ekta
MRP per litre (Rs)		185	165	185	250	170	162	170	200	150	150
Actual price (retail price), Rs		160	136	185	192	170	162	155	140	140	120
Packing & labelling	5	4.5	4.5	4.75	5	4.75	4.75	4.5	4.5	4.75	4.25
Net volume & spec. gravity	5	4.1	4.25	4	4.1	4	4.1	4.05	4	4.1	3.6
Moisture	4	3.04	1.60	1.92	3.04	2.56	1.12	1.60	1.56	1.28	1.60
Colour	3	2.74	2.60	2.78	2.89	2.67	1.41	1.31	1.31	1.23	1.43
Fatty acid profile	22	19.39	17.72	18.35	17.83	17.79	17.67	20.34	19.44	18.71	15.89
Toxic metals such as As,Pb, Cd	5	5	5	5	5	5	5	5	5	5	5
Antioxidants (TBHQ/ BHT/BHA)	3	2.4	2.4	2.4	2.4	1	3	2.4	3	1	3
Aflatoxin	2	2	2	2	2	2	2	2	2	2	2
Saponification value	5	4.03	3.43	3.28	3.65	3.40	4.01	3.46	2.88	3.61	4.28
Iodine value	4	3.96	3.76	3.15	2.40	2.44	3.43	4	3.88	3.73	2.01
Acid value	4	3.24	3.92	4	3.96	3.92	1	3.16	2.8	2.56	3.40
Unsaponifiable matter	5	4.25	4.5	4.5	3	3	2.75	3	3	4.5	4.25
Flash point	4	3.92	3.71	3.76	3.71	3.71	3.63	3.89	3.55	3.82	3.89
Argemone oils	2	2	2	2	2	2	2	2	2	2	2
Energy	3	3	3	3	3	3	3	3	3	3	3
Vitamins A & D	5	3.37	3.89	2.84	2.71	2.6	3.58	3.23	3.55	3.04	4.83
Insoluble & suspended impurities	2	2	2	2	2	2	2	2	2	2	1.0
Pesticides	3	3	3	3	3	3	3	3	3	3	3
Rancidity	2	2	2	2	2	2	2	2	2	2	2
Organoleptic test	12	7.17	6.62	6.69	7.07	7.79	7.99	5.73	7.08	5.09	4.37
Overall Score (Rounded)	100	85	82	81	81	79	77	80	80	76	75

Rating: Up to 30: Very Poor *, 31–50: Poor **, 51-70- Average ***, 71-90- Good ****, >91 – Very good *****

Note: 1) The data presented is score obtained w.r.t. assigned weightage based on the actual performance of tested brands.

2) Refined oil is purified to remove any suspended particles, toxic substances, flavour components, colour and odour. Filtered oil is obtained by the traditional cold pressing method, filtered once or twice to remove suspended particles without further processing.