



Rice Bran Oils

Cooking up a healthy platter

As 'healthy' edible oil, rice bran oil fits in well enough with our 'healthy lifestyle choices'. It has vitamins, antioxidants, nutrients—the works, if you may. It is trans-fat-free too. It is also delicate and flavourful. While all these aspects may hold good, are all brands of rice bran oils made equal – in other words, are they all as good as another and do they meet the basic requirements? What do we know about their 'fatty acid profile'? And are they free of pesticides, heavy metals and toxins—the scourge of our times? This report is a first-hand study of 11 brands available with various retailers in India and the good news is that in the overall score a mere four points separate the brands at the top and the bottom.

A Consumer Voice Report

All the 11 brands were purchased from retailers in Delhi, Mumbai, Chennai and Kolkata. These were in polypacks of one litre capacity. Most mentioned the nutritional values of the oil on the packaging. Based on the evaluation of test results and overall grading, it can be concluded that all the

Rice bran oil (also known as rice bran extract) is the oil extracted from the germ and inner husk of rice. It is notable for its high smoke point. Its mild flavour makes it suitable for high-temperature cooking methods such as stir frying and deep frying.

brands are safe for consumption. All also conform to the Ecomark (product-specific) requirements for toxic metals. All samples meet the requirement of safe limit for aflatoxins. Pesticides were not detected in any brand. The test programme, carried out in an NABL-accredited laboratory, was mainly based on IS: 3448-1984 (Specification for Rice Bran Oil), FSS Rules 2011 and AGMARK (Schedule X). The study covered both chemically refined and physically processed oils used for edible purposes.



Grades of Rice Bran Oil (as per Indian Standard)

- i) **Refined Grade:** The material of refined grade is suitable for edible purposes.
- ii) **Raw Grade 1:** The material here is suitable for making vanaspati and refined oil and not for direct human consumption.
- iii) **Raw Grade 2:** The material here is suitable for industrial purposes.

The refined rice bran oil shall be obtained from solvent extracted oil, neutralized with alkali, bleached with earth or activated carbon or both, and deodorized with steam or by other approved refining method. Alternatively, de-acidification, bleaching and deodorization may be done by physical means. The materials shall be clear and free from rancidity, adulterants, sediment, suspended and other foreign matter, separated water and added colouring and flavouring substances.

Refined and Filtered Oils

Refined oil: This type of oil has been purified with chemicals to remove suspended particles, toxic substances, flavour components, colour and odour, thereby leaving behind clear and pure oil.

Filtered oil: Obtained by the traditional cold-pressing method, this is filtered once or twice to remove suspended particles. They are simply filtered and bottled with no further processing. Unrefined or filtered oils retain the savoury flavour of the seed, nut or fruit from which they are derived.



Comparative Test

CV Recommendation | Top Performer

Healthy Heart

Value for Money

Healthy Heart | Sathi | Priya

Most Liked in Sensory Test

Sathi



BRANDS TESTED

Rank	Total Score out of 100 (Rounded off)	Brand	MRP (Rs)/Litre	Retail Price (Rs)	Best Before (Months)	Manufactured by
1	91	Healthy Heart	169	159 (buy one, get one free*)	6	Healthy Heart Foods Mahbubnagar, Andhra Pradesh
2	90	Dhara	115	99	6	Mother Dairy Fruit & Vegetable Pvt. Ltd Mother Dairy, Patparganj, Delhi
3	89	Ricela	135	98	9 (physically refined)	AP Organics Ltd Ludhiana, Punjab
3	89	Nature Pure	110	89	9	Kalyani Solvex Pvt. Ltd Uttar Dinapur, West Bengal
3	89	Sathi	102	82	9	Vinayak Oil & Fats Pvt. Ltd Howrah, West Bengal
3	89	Riso	120	105	9 (physically refined)	Kamani Oil Industries Pvt. Ltd Mumbai
3	89	Priya Rice Rich	98 (AP) 115 (rest of India)	82	6	Ushodaya Enterprises Pvt. Ltd Hyderabad, Andhra Pradesh
4	88	Fortune	115	104	9 (physically refined)	Adani Wilmar Ltd Ahmedabad, Gujarat
4	88	Tandul	100	80	6	Foods Fats & Fertilisers Ltd West Godavari, Andhra Pradesh
4	88	Porna	104	104	6	SKM Foods SKM Animal Feeds and Foods (India) Ltd Erode, Tamil Nadu
5	87	Orysa	92	92	6	Kaleesuwari Refinery Pvt. Ltd Dindigul, Tamil Nadu

*The 'buy one, get one free' scheme is temporary.

KEY FINDINGS

- Based on the overall test findings, Healthy Heart is the top performer followed by Dhara.
- All the brands have performed very well on quality parameters and meet the requirements of standards, making them safe for consumption.
- Toxic substances, heavy metals, aflatoxins and pesticides were not detected in any brand. Oryzanol was found highest in Purna (1.81 per cent) and lowest in Riso (1.25 per cent) – all well above the minimum requirement 1 per cent.
- All the brands were refined. Some like Fortune, Ricela and Riso were refined by physical means.

Shelf Life

The declared shelf life of all tested brands is in the range of 6 to 9 months. Where the shelf life is six months, there is all the more need for the consumer to be aware, particularly if they are buying the large pack of five litres capacity. They must ensure that the oil remains stable within the consumption period.

How Should You Store Your Rice Bran Oil?

Store your rice bran oil in a cool dark place. Although rice bran has high antioxidant levels that protect the oil from degrading over time, it is best to store it in a cool cupboard away from sunlight.



Comparative Test

TEST RESULTS

FOR PHYSICOCHEMICAL PARAMETERS

Oryzanol | Saponification value | Iodine value | Unsaponifiable matter | Moisture and insoluble impurities | Refractive index | Colour | Specific gravity | Acid value | Argemone oil | Flash point | Mineral oil | Presence of hexane

◆ Oryzanol, %

Requirement: Not less than one per cent

Oryzanol is a natural antioxidant and is known to reduce the absorption and deposition of LDL and VLDL (bad) serum cholesterol. Oryzanol also helps in reducing hypertension. It improves bone-mineral density and liver function and gives relief from gastrointestinal distress. Clinical trials conducted in Japan have shown that 300 mg per day is the effective dose of oryzanol.

- Oryzanol was well above the minimum requirement in all tested brands, ranging between 1.25 per cent and 1.81 per cent.
- Porna had the highest percentage and Riso the lowest.

◆ Saponification value

The saponification value helps to detect the



presence of other oils/fats. Saponification value of rice bran oil should be between 180 and 195.

- All brands were within the specified limit.

◆ Iodine value

The iodine value is a measure of unsaturated fats.

- All brands were within the specified limit.

◆ Unsaponifiable matter

Unsaponifiable matter includes those substances frequently found dissolved in fatty acids and drying oils which cannot be saponified by caustic treatment,

PHYSICOCHEMICAL

Parameter ↓	Weightage (%)	Healthy Heart	Dhara	Ricela	Nature Pure	
Oryzanol	14	12.15	12.15	12.78	12.65	
Saponification value	5	4.08	4.64	4.04	4.93	
Iodine value	5	4.83	4.72	4.58	4.35	
Unsaponifiable matter	5	4.72	4.81	4.69	4.73	
Moisture and insoluble impurities	4	3.52	3.36	3.52	3.52	
Refractive index	4	3.84	3.04	3.04	3.39	
Colour	3	2.43	2.10	1.95	2.1	
Specific gravity	3	2.64	2.28	2.10	2.1	
Acid value	3	2.7	2.82	2.94	2.58	
Argemone oil	3	3.0	3.0	3.0	3.0	
Flash point	2	2.00	2.0	2.00	1.98	
Mineral oil	2	2.0	2.0	2.0	2.0	
Presence of hexane	2	2.0	2.0	2.0	2.0	

but which are soluble in the normal fat solvents. Unsaponifiable matter should not be more than 3.5 per cent for chemically refined oil and 4.5 per cent for physically refined oil.

- All brands were within the specified limit.

◆ Moisture and insoluble impurities

Moisture is the amount of water present in edible oils. The amount of water should be as low as possible.

- All brands were within the specified limit.

◆ Refractive index

- All brands were within the specified limit. They were clear and without any haziness.

◆ Colour in a one-inch cell on the Lovibond scale (expressed as Y+5R)

Colour is an important quality parameter of edible oil, both in the refining process and in the market place.

- The measured value of colour was between 15.8 and 19, thus meeting the specified requirement.
- Healthy Heart scored highest in this parameter.



◆ Specific gravity

Specific gravity is the ratio of the density of a material to the density of water. The specific gravity of edible oils must be in the range of 0.910–0.920.

- All brands were within the specified limit.

◆ Acid value

- All brands were within the specified limit.

◆ Argemone oil

- Argemone oil was not detected in any brand.

SCORES

	Sathi	Riso	Priya	Fortune	Tandul	Porna	Orysa
	12.65	10.85	11.1	11	11.27	13.20	12.44
	4.72	4.69	4.73	3.62	4.47	4.89	4.04
	3.98	4.82	4.68	4.86	4.18	3.72	3.97
	4.65	4.72	4.72	4.84	4.29	4.22	4.34
	3.20	3.20	3.20	3.36	3.68	3.20	3.52
	3.14	4.0	3.26	3.36	3.36	3.04	3.2
	2.4	2.32	2.02	1.95	2.25	2.05	2.16
	2.1	2.46	2.82	2.46	3	2.28	2.10
	2.58	2.58	2.76	2.82	2.88	2.94	2.7
	3.0	3.0	3.0	3.0	3.0	3.0	3.0
	1.98	1.96	2	1.98	1.96	1.96	1.98
	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	2.0	2.0	2.0	2.0	2.0	2.0	2.0

Comparative Test

◆ Flash point

The flash point of a volatile material is the lowest temperature at which it can vaporize to form an ignitable mixture in air. At the flash point, the vapour may cease to burn when the source of ignition is removed. It should not be less than 250 degrees Celsius in case of rice bran oil.

The higher the flash point of rice bran oil, the lower is the risk of ignition in the oil.

- Flash point was between 320 degrees Celsius and 322 degrees Celsius – well above the requirement.
- Healthy Heart, Dhara and Ricela were found to have higher flash points.

◆ Mineral oil

- Mineral oil was absent in all the tested brands.

◆ Presence of hexane

- No hexane was detected in any of the brands.

FOR FATTY ACID PROFILE

Monounsaturated fatty acid | Polyunsaturated fatty acid | Saturated fatty acid | Trans fatty acid

All edible oils have virtually the same fat content but the proportion of different types of fatty acids varies from one type of oil to another. To begin with, there are unsaturated and saturated fats. Saturated fats are mainly animal-based fats (desi ghee and butter, for example).

An average person should limit the saturated-fat intake to no more than 8 to 10 per cent. Eating a lot of saturated fat increases the level of bad cholesterol (low-density lipoproteins, or LDL) in the blood. And it is generally acknowledged that high levels of LDL place one at greater risk of heart disease.

Saturated and trans fats are unhealthy 'bad' fats that can increase one's cholesterol, harden the arteries and eventually increase one's risk for heart disease. Approximately 20 per cent to 35 per cent of one's total calories should come from 'good' fats, like PUFAs and MUFAs.

◆ Monounsaturated fatty acid (MUFA)

MUFAs lower the level of bad cholesterol (LDL) in the blood and raise the good cholesterol (HDL). Both polyunsaturated fats and monounsaturated fats, PUFAs and MUFAs, are healthy fats that can benefit your heart when you eat them in place of unhealthy fats.

- MUFA was found between 40.23 gm/100 gm and 44.48 gm/100 gm.
- The highest amount was in Priya and the lowest in Nature Pure.

◆ Polyunsaturated fatty acid (PUFA)

- PUFA was found in the range of 26.90 gm/100 gm to 37.44 gm/100 gm.
- The highest amount was in Nature Pure and the lowest in Poma.

◆ Saturated fatty acid

- Saturated fat was found between 21.68 gm/100 gm and 29.25 gm/100 gm.
- It was lowest in Dhara and highest in Poma.

◆ Trans fatty acid

- Trans fat was not detected in any brand.





FATTY ACID PROFILE*

Parameter	Weightage (%)	Healthy Heart	Dhara	Ricela	Nature Pure	Sathi	Riso	Priya	Fortune	Tandul	Porna	Orysa
Monounsaturated fatty acid	8	7.50	7.14	7.28	5.71	7.62	6.95	7.75	7.40	6.90	7.45	6.96
Polyunsaturated fatty acid	8	6.79	7.20	7.05	7.59	6.55	7.07	6.60	6.84	6.90	5.90	6.67
Saturated fatty acid	3	2.67	2.84	2.78	2.79	2.57	2.71	2.62	2.68	2.62	2.16	2.51
Trans fatty acid	2	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00

*Fatty acid profiling was done to examine various nutritional as well as harmful acids present in the edible oils.

FOR HEAVY METALS

◆ Heavy metals

All brands were checked for the presence of heavy metals such as lead, arsenic, cadmium and mercury.

- No heavy metal was detected in any brand.

FOR AFLATOXINS

• Aflatoxins (Aflatoxin B1,B2,G1,G2)

Aflatoxins are highly toxic for human and animal health. Long-term exposure to aflatoxin has been linked to increased incidence of liver cancer. Humans are exposed to aflatoxins by consuming foods contaminated with products of fungal growth. *Aspergillus flavus* and *Aspergillus parasiticus* are the moulds that produce aflatoxin. These fungi can produce their toxic compounds on almost any food that will support growth. Aflatoxin generally develops due to poor oil-seed storage conditions and presence of undesirable moisture in the oil seed.

All the brands were checked for aflatoxins B1, B2, G1 and G2.

- No aflatoxin was detected in any brand.

FOR PESTICIDES

Pesticides

Pesticides tested: Edifenphos, chlorobenzilate, hexachlorobenzene, *p,p'*-DDT, *o,p'*-DDT, *p,p'*-DDE, *p,p'*-DDD, α -HCH, β -HCH, γ -HCH (lindane), vinclozolin, coumaphos, malathion, phosalone

Pesticides are substances or a mixture of substances intended for preventing, destroying, repelling or mitigating any pest. 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 but must be absent in the final product.

- None of the above-mentioned pesticides was detected in any of the tested brands.

Comparative Test

Parameter	Weightage, %	Healthy Heart	Dhara	Ricela	Nature Pure	Sathi	Riso	Priya	Fortune	Tandul	Porna	Orysa
Heavy Metals	4	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Aflatoxins	2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Pesticides	3	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0

FOR SENSORY ATTRIBUTES

Pakodas made of besan (without adding salt and spices) were fried in the oil (for equal time) and judged by panel members on these attributes: colour and appearance, flavour/odour, taste, aftertaste feel and overall acceptability.

Overall Score

Brand	Score out of 10
Sathi	8.44
Healthy Heart	8.4
Nature Pure	8.18
Ricela	8.14
Fortune	8.06
Porna	7.96
Dhara	7.82
Orysa	7.74
Riso	7.72
Tandul	7.46
Priya	7.28



FOR GENERAL QUALITIES

◆ Packaging

The rice bran oil should be packed in food-grade material that does not affect the properties of the oil and at the same time maintains the shelf life of the product. For Eco mark requirements, the product shall be in such packages that can be recycled or packed in biodegradable materials.

- All brands were in polythene packaging of one litre capacity.

◆ Marking/Labelling

The containers shall be marked with name, grade and net volume of the material in the containers; manufacturer's name and trademark, if any; batch number, month and the year of manufacture.

- Most of the brands have given all the information.
- Some brands have not given storage instruction.

How to Best Match Oils to Foods

It is beneficial to consume a mix of oils to maintain a balance between the three fatty acids. All oils are good in one way or the other. It is advisable to use a combination of oils, either blended or by rotation – for example, mustard oil, groundnut oil, soya bean oil, sunflower oil, rice bran oil – so that you get the benefit of all. Any single oil alone is not preferred.

For blending, you take equal proportions of different oils in one container and then use it. This way you don't get prolonged exposure to the side effect of one type of oil and get the benefits of different oils. You could also have two or more different kinds of oils in your kitchen that you could use for different purposes.