



# Vanaspati: Desi Vegetable Ghee

In the modern Indian markets vanaspati is being used to refer to vegetable oil that has been hydrogenated and hardened. Vanaspati ghee is a cheaper substitute for the clarified butter that is made from milk. Vanaspati means any refined edible vegetable oil or oils subjected to a process of hydrogenation in any form.

Consumer VOICE tested 12 brands of hydrogenated vegetable oil or vanaspati, and found that all brands were made from palm/palmolein oil. Hydrogenation is performed using a catalyst known as "supported nickel catalyst", in reactors at low medium pressure. Vanaspati ghee contains trans fats.



## Good and Bad Fat Acid Found in Vanaspati

**Unsaturated Fatty Acids:** There are two types of good unsaturated fatty acids, MUFA and PUFA. As per the Heart Association of America, an individual should consume PUFA upto 10% and MUFA upto 15% of his/her total calories of the daily intake. MUFAs lower the level of bad cholesterol (LDL) in the blood and raise the good cholesterol (HDL). PUFAs reduce both the good and the bad cholesterol. In our tests we considered these as higher the better

in vanaspati.

Rath (49.80g/100g) was found with the highest MUFA content followed by Shaktibhog (48.84g/100g) and Raag (48.26g/100g). Rasoi (35.86g/100g) was found with lowest MUFA content among all followed by Anchal (38.50g/100g) and Gagan (38.73g/100g).

Only Dalda, Gagan, Anchal and Scooter were found with PUFA content, rest all brands did not have PUFA hence got lower weightage in this test. Dalda (6.71g/100g) was

found with the highest PUFA content among all.

Brand	Rank
Dalda	1
Anchal	2
Gagan	3
Scooter	4
Rath	5
Raag	6
Gemini	7
Nature Fresh	8
Panghat	9
Shaktibhog	10
Super Jhoola	11
Rasoi	12

## Key findings

- **Dalda** was found with lesser amount of saturated fat followed by **Rath** and **Shakti Bhog**, however Rasoi had higher saturated fat.
- **Dalda** had the lowest and **Shakti Bhog** the highest amount of Trans fat.
- **Rath** was found rich in MUFA content followed by **Shakti Bhog** and **Raag**. None of the brands contained adulteration of Argemone oil, Castor oil, Mineral oil or any other adulterants or impurities.
- **Raag** scored highest in sensory properties like colour, appearance, flavor and Taste.
- Only **Scooter** contained Vitamin D though other brands had also claimed Vitamin D.
- There was lesser than the minimum quantity of Vitamin A required in all the brands of vanaspati.
- All the vanaspati brands were manufactured from PALM/PALMOLEIN OILS, as declared by them.

**Saturated Fat:** Saturated fats are inherent fats in ghee, butter and vanaspati etc. An average person should limit his saturated fat daily intake to not more than 8-10 percent as these are generally bad category of fat for consumption. Eating a lot of saturated fat increases the level of bad cholesterol (low density lipoproteins - LDL) in the blood. It is generally acknowledged that high levels of LDL place you at a greater risk of heart disease. We considered it lower the better.

Dalda (49.34g/100g) was found with the lowest saturated fat content followed by Rath (50.20g/100g) and Shaktibhog (51.16g/100g). Rasoi



(64.13g/100g) was found with the highest saturated fat followed by Anchal (56.56g/100g) and Scooter (56.46g/100g).

**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 is expected to be as low as possible in vanaspati.

Dalda (5.14g/100g) was found with the lowest trans fat followed by Gagan (6.80g/100g) and Anchal (8.27g/100g). Shaktibhog (26.83g/100g) was found with highest trans fat content followed by Raag (16.64g/100g) and Scooter (13.18g/100g).

**Free Fatty Acids as Oleic Acid:** The edible oils permitted for manufacturing Vanaspati contain certain percentage of free fatty acids (FFA). These free fatty acids are expected to be lower in vanaspati. Nature Fresh (0.05%) was found with lowest percent of free fatty acids, whereas Scooter (0.25%) was

found with the highest free fatty acids percent.

## Vanaspati Provides Energy too

The Energy value is the amount of calories which our body obtains from the foods. Anchal (899.91kcal/100g) was found with higher energy value, however Rasoi (899.40kcal/100g) was found with the lowest.

## Sesame Oil found

The Baudouin test is specific for Sesame oil which is compulsorily added to vanaspati. As per the Indian Standard, sample should be found positive in this test to pass the test. **All the brands were found positive in this test, getting full score.**

## Vanaspati not adulterated with castor oil

This test is for the detection of castor oil in vanaspati. If sample found positive in this test that indicates the adulteration of castor oil in vanaspati. **None of the brand of vanaspati was found adulterated with castor oil.**

## Vanaspati free from nickel as catalyst

To convert vegetable edible oils into vanaspati, nickel is used



## Difference between Palm Oil and Palmolein

**Palm Oil:** Palm oil is extracted from the flesh of the fruit of *E. Guineensis* using pressure. In its unrefined form, the palm oil is bright orange in color due to high amounts of carotene pigments. The oil is semi-solid at room temperature and is highly resistant to oxidation and prolonged exposure to heat. Palm oil is widely used in margarine and vegetable shortenings.

**Palmolein:** When the semi-solid palm oil is refined, it separates into palm olein and palm stearine. The palm olein has different characteristics than the palm oil, most notably that it remains completely liquid at room temperature. It is highly heat resistant, similar to palm oil, and it also resists the formation of breakdown products during frying and increases the shelf life of many products.

Although palm oil and palm olein are produced from the same plant and share many similar properties, the main difference between them is their chemical state at room temperature. Semi-solid palm oil is used more frequently as a fat in bakery products, whereas liquid palm olein is considered the "gold standard" and is the most widely used oil for frying in the world.

Source: [www.ehow.com](http://www.ehow.com)

as a catalyst in the hydrogenation process. Nickel should be absent in the finished product. Traces of nickel might be found in vanaspati, as an impurity, which can be hazardous for health. As per the Indian Standard, It should not be more than 1.5mg/kg in vanaspati. **All brands were found free from the presence of Nickel.**

### Vitamins in Vanaspati

**Vitamin A:** Vitamin A is essential for good health—notably for eyes and skin, immune function, reproduction, and bone growth. As per the Indian Standard, vitamin A should be minimum 25IU/g in vanaspati at manufacturing stage.

**Nature Fresh (20.55IU/g) was found with highest vitamin A content** followed by Gemini (20.52IU/g) and Dalda (20.09IU/g). **Raso (11.43IU/g) was found with lowest vitamin A content among all.**

**Vitamin D:** Vitamin D is a group of fat-soluble secosteroids.

In humans vitamin D is unique both because it functions as a prohormone and the body can synthesize it (as vitamin D3) when sun exposure is adequate. Vitamin D prevents rickets. Except Scooter Vitamin D was not detected in any of the brands.

### Vanaspati free of suspected foreign agents

**Argemone Oil Not Detected:** Argemone or yellow poppy, is a wild herb. The oil is reported to cause Glaucoma, Dropsy and sometimes total blindness due to the presence of alkaloids namely, sanguinarine and dihydrosanguanine. **All brands were found free from adulteration of argemone oil.**

**No Unsaponifiable Matter:** Unsaponifiable matter includes substances frequently found dissolved in fatty acids and drying oils which cannot be saponified by caustic treatment, but which are soluble in the normal fat solvents, that include the higher aliphatic alcohols, sterols, pigments, and hydrocarbons. As per

the Indian Standard, It should not be more than 2.0% in vanaspati. All the brands were found well within the limit of unsaponifiable matter and passed the test. Raag (0.56%) was found with higher unsaponifiable matter, and Rath (0.34%) had the lowest.

### Some Results at a Glance

#### Moisture within limits:

Moisture content of oils and fats is the loss in mass of the sample on heating at 105 ±10C. It's the moisture that promotes decay. Virtually moisture-free, vanaspati has no such problem. It will retain its original freshness and flavour for months. As per the Indian Standard, moisture should not be more than 0.25% in vanaspati. All the brands were found within the limit for moisture content and passed the test. Nature Fresh (0.08%) was found with highest moisture content among all, however brand Anchal (0.01%) was found with lowest.

#### Acid Value within required limits:

Acid value of vanaspati is related to its shelf life. If acid value does not meet the requirement, it causes contamination and reduces the shelf life of vanaspati. As per the Indian Standard, It should not be more than 0.5. Except Super Jhoola (1.47) all the brands meet the requirement for acid value.





## Consumer Advice:

### Best Choice!

It is advisable that consumers of Vanaspati should choose a brand with more of MUFA & PUFA and less of Saturated fat and Trans fat. Dalda fits in this category easily

### Top Scorers

Based on the analysis and evaluation of all test parameters and observations Brand Dalda scored top score among all the brands we tested followed by Anchal & Gagan.

### Intelligent Buy

Based on the retail price comparison Brand Gagan is an intelligent buy as its costs only Rs 66 per kg which is the least among all the brands.

**Melting Point was as per Indian Standards:** The melting point is the temperature at which the oil changes state from solid to liquid. As per the Indian Standard, melting point of vanaspati should be between 31 to 41°C. All the brands were found with melting point as per the standards and pass the test.

**Net Quantity matched the labelling:** All the brands were found with the quantity mentioned on their labels, hence got full weightage.

**No Added Colour:** This test is for the detection of artificial colour in vanaspati, which may have been added during the final production of vanaspati. None of the brands was found with any artificial colour and passed the test.

**None of the products tested decomposed:** Rancidity is the chemical decomposition of fats, oils and other lipids. When these processes

occur in food articles, undesirable odours and flavours can take place. None of the brand we tested were found rancid, hence got full weightage.

## Free from Mineral Oil

A mineral oil is any of the various colourless, odourless, light mixtures of alkanes from a non-vegetable (mineral) source, particularly a distillate of petroleum. Most often, mineral oil is a liquid by-product of the distillation of petroleum to produce gasoline and other petroleum-based products from crude oil. All the brands were found free from any adulteration of mineral oil.

## Sensory Test

As per the Indian Standards, Vanaspati should be of white to pale yellow in colour. It should be clear in appearance on melting. Vanaspati should be free from sediments, suspended and other foreign matters separated water, added colouring or flavorings substances or any other substances deleterious to health.

Vanaspati should have a characteristic odour and taste. It should be free from rancidity or staleness, foreign odour and taste. If any flavor is used, it should be distinct from that of ghee, in accordance with a list of permissible flavours and in such quantities as may be prescribed by standards. **All brands scored**

**more than 10 out of 12 in the sensory test.**

## Packing

The Vanaspati should be packed in suitable sealed cartons or flexible packs or plastic containers or tin containers. All the brands were properly packed in Ply Pack.

**Marking:** The labelling on the package should contain information like Name of the material, Net mass/volume, name and percentage of antioxidants added, if any; MADE FROM VEGETABLE OILS ONLY provided on the label affixed to the container or lithographed or stenciled thereon with indelible ink of type of size of not less than 12.5 mm in case of 15 kg/15 liters or above tin containers, and so on. None of the brand scored full marks in this parameter.

## Conclusion

The Comparative Test of 12 Vanaspati Brands was mainly based on the requirements of Indian Standard IS 10633: 1999, FSSAI and Vegetable Oil Products (Regulation) Order. Out of overall parameters, the key parameters for which Vanaspati Brands were tested for Mono Unsaturated Fatty Acids (MUFA), Poly Unsaturated Fatty Acids (PUFA), Saturated Fat, Trans Fat, Presence of adulteration with other non edible oil like argemone oil, castor oil and

## Saturated Fat Less harmful than Transfat

Everyday a common question is asked what to eat: saturated ghee, butter, oil or trans-fat enriched vanaspati ghee (hydrogenated oil). There is no doubt that saturated fat (desi ghee or butter) is made mainly from animal products, is thus high in cholesterol and raises bad cholesterol in the body. Trans-fats are bad as they increase (though less than the saturated fat or butter) bad LDL cholesterol but also lowers good HDL cholesterol. Consumption of saturated fats (desi ghee or butter) raises only the LDL bad cholesterol concentration. They do not lower good HDL cholesterol. Thus they may not be as harmful as trans-fats. Desi ghee is therefore better than trans-fats.

Source: [www.itimes.com](http://www.itimes.com)



mineral oil. Sensory (organoleptic) properties of Vanaspati were also tested. Vanaspati is made from the hydrogenation process, hence it tends to have trans fat in its composition but the presence of

trans fats is expected to be as low as possible in Vanaspati. Saturated fat is also a significant parameter and is very important from health point of view, on the other hand MUFA and PUFA are unsaturated fats which

have good health properties hence expected to be high in Vanaspati. **Dalda topped in the rankings followed by Anchal and Gagan.**

### Vitamin A limit in Vanaspati: At manufacturing and not at retail level

As per Food Safety and Standards (Food Product-Standards and Food Additives) Regulation, 2011, effective from August 05, 2011, prescribed limit of Synthetic Vitamin A in Vanaspati is "Not less than 25.0 International Units (I.U.) per gram **at the time of packing** and shall test positive when tested with Antimony Trichloride (Carr-Price Reagent), as per IS: 5886-1970", **no limit prescribed at retail level from where consumer purchases.**

Whereas in the same above regulation, Iodine content in Iodised Salt should be as follows:

- (a) **Manufacture level:** Not less than 30 ppm on dry weight basis
- (b) **Distribution channel, including retail level:** Not less than 15 ppm on dry weight basis

We are not able to understand why limit of "Synthetic Vitamin A" in Vanaspati is not prescribed at retail level in the above regulation. It seems that Food Safety & Standards Authority of India is not bothered about interest and health of consumers.

For clarification, we have written letter to Food Safety & Standards Authority of India, reply still awaited.

**Prepared/processed Foods, (cookies for example) in which Vanaspati is used has to declare "Contains trans fats", but not required for packaged Vanaspati which is the main source of trans fats.**

As per Food Safety and Standards (Packaging and labeling) Regulations, 2011, effective from August 05, 2011, under Nutritional information head, the food in which hydrogenated vegetable fats (Vanaspati) or bakery shortening is used shall declare on the label that '**hydrogenated vegetable fats or bakery shortening used – contains trans fats**' but such a declaration is not required on hydrogenated vegetable fats/oils (Vanaspati) and bakery shortening which are the source of trans fats.

For clarification, we have written a letter to Food Safety & Standards Authority of India, reply awaited.

Exploiting the loop hole in Regulation, some Vanaspati brands have not declared their product contains trans fats, which are Dalda, Gagan, Panghat, Jhoola, Shakti Bhog, Rasoi, Anchal and Raag.

Only the following brands declared that the product contains trans fats are Nature Fresh, Gemini, Scooter and Rath.

### Regulation Ignored:

As per Food Safety and Standards (Packaging and labelling) Regulations, 2011, effective from August 05, 2011, where a claim is made regarding the amount or type of fatty acids or the amount of cholesterol, the amount of trans fatty acid (trans fat) shall be declared.

Some brands declared themselves boldly as 'Zero Cholesterol' as marketing gimmick to allure consumers. Cholesterol in any case is not present in plant sourced products and is present only in products which have an animal source, like desi ghee.

But the following brands openly flouted the Regulation as under:

1. **Dalda:** Claimed Cholesterol as zero but trans fat not disclosed. *However our test for transfats proved Dalda to be safer in this category.*
2. **Raag:** Claimed Cholesterol as zero but trans fat not disclosed. *Unsafe*
3. **Jhoola:** Claimed for fatty acids but trans fat not disclosed. *Relatively safer than Raag.*
4. **Shakti Bhog:** Claimed for fatty acids, Cholesterol zero but trans fat not disclosed. *Failed the test.*



### COMPARATIVE PERFORMANCE SCORE OF VANASPATI

Parameter	Brand	Wt.%	Dalda	Anchal	Gagan	Scooter	Rath	Raag	Gemini	Nature Fresh	Panghat	Shakti Bhog	Super Jhoola	Rasoi
MRP/Retail Price per kg, ₹			90/72	80/80	86/66	113/85	95/72	84/71	100/86	95/80	90/65	83/80	90/90	70/60
<b>Physico-chemical Tests</b>	<b>81%</b>													
MUFA	8	7.09	6.28	6.31	6.54	8	7.73	6.51	7.44	7.37	7.82	7.27	5.88	
PUFA	8	8	7.71	7.43	6.5	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	2.64
Saturated Fat	7	7	6.11	6.21	6.12	6.85	6.67	6.42	6.44	6.39	6.74	6.32	5.25	
Trans Fat	7	7	6.32	6.62	5.3	6.15	4.59	6.23	5.9	6.09	2.48	5.63	5.77	
Vitamin A	5	4.04	3.97	3.63	3.41	3.29	3.65	4.13	4.14	3.46	3.9	3.89	2.28	
Vitamin D	2	0.4	0.4	0.4	2	0.4	2	0.4	0.4	0.4	0.4	0.4	0.4	
Energy Value	5	4.87	4.96	4.87	4.93	4.9	4.9	4.93	4.75	4.93	4.93	4.84	4.79	
Free Fatty Acids	5	4.8	4.95	4.8	4.56	4.82	4.95	4.89	5	4.93	4.78	3.5	4.6	
Moisture & Separated Water	4	3.89	4	3.89	3.96	3.93	3.93	3.96	3.76	3.96	3.96	3.86	3.79	
Acid value	3	2.51	2.89	2.53	1.95	2.56	2.87	2.69	3	2.82	2.48	0.9	2.07	
Unsaponifiable Matter	3	2.91	2.95	2.96	2.9	3	2.86	2.92	2.97	2.94	2.96	2.9	2.96	
Melting point	4	3.28	3.04	3.04	3.52	3.52	3.28	3.52	3.04	3.28	3.52	3.28	3.04	
Added Colouring Matter	1	1	1	1	1	1	1	1	1	1	1	1	1	
Baudouin Test	4	4	4	4	4	4	4	4	4	4	4	4	4	
Rancidity	1	1	1	1	1	1	1	1	1	1	1	1	1	
Turbidity	1	1	1	1	1	1	1	1	1	1	1	1	1	
Nickel	2	2	2	2	2	2	2	2	2	2	2	2	2	
Presence of Argemone oil, Mineral oil & Castor oil	7	7	7	7	7	7	7	7	7	7	7	7	7	
Antioxidant	1	1	1	1	1	1	1	1	1	1	1	1	1	
Net Quantity	3	3	3	3	3	3	3	3	3	3	3	3	3	
<b>Sensory Tests*</b>	<b>12%</b>	10.66	10.7	10.5	10.64	10.54	10.8	10.62	10.34	10.5	10.52	10.54	10.5	
<b>General Parameters</b>	<b>7%</b>													
Packing	2	2	2	2	2	2	2	2	2	2	2	2	2	
Marking	5	3.5	3.5	4	3.5	4.5	4	4.5	4.5	3.5	4.5	4	4	
<b>Overall Score</b>	<b>100</b>	91.95	89.78	89.19	87.83	86.06	85.83	85.32	85.28	84.17	82.59	80.93	79.97	

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

\* Sensory tests include Colour, Appearance, Flavour & Odour conducted with panel experts.