



Kachchi Ghani Mustard: India's Golden Oil!

Mustard oil is a popular cooking medium in Indian kitchens. If we look back, we will see mustard oil as the only cooking option available in many Indian households. From making delicious food to curing numerous diseases, it has been used as an effective option for many years. It is intricately interwoven with Indian culture and Indians use this oil also to illuminate diyas during many rituals. Though rate of its usage has come down due to some rumours about its causing heart diseases, researches have proven that mustard oil is not only useful in controlling diabetes but also beneficial for curing cancers and abdominal diseases. Consumer VOICE carried out an extensive laboratory test of 14 brands of Kachchi ghani mustard oil to help you keep mustard oil as one of the preferred options in your kitchens. Now mustard oil is backed not only by traditional and experimental knowledge but also by the scientific fraternity for its beneficial properties.

What is Kachchi ghani?

Kachchi ghani refers to cold press extraction process for taking out oil from seeds. Traditionally, oil from seeds were extracted in kohlus (a wooden cold press used with the help of a cow). In this process, seeds are crushed at low temperature so natural properties, antioxidants and essential oils are retained in the oil.



Mustard Oil

Mustard oil (Sarson ka tel) is a vegetable oil and is obtained from seeds of the mustard plant. The oil is extracted from clean and sound mustard seeds, which belong to species namely *compestris*, *juncea* or *napus* varieties of brassica. Large quantity of the mustard oil as traditional oil is used for edible purpose in many states of India namely J&K, Himachal Pradesh, Punjab, Haryana, Uttar Pradesh, Rajasthan, Madya Pradesh, Bihar, Chattisgarh, Jharkhand, West Bengal and some regions of Maharastra & north eastern states.

Noticeably, India is the fourth largest oilseed producing country in

Brand	Rank
Engine	1
Kanodia	2
Nature fresh	3
Mashal	4
Kalash	5
Dhara	6
P. Mark	7
Tez	8
Bail Kolhu	9
RRO	10
Dalda	11
Fortune	12
HAFED	13
Krishan Bhog	14



Comparative Test

the world, with mustard seeds playing a major part in this.

Types of Mustard oil (As per AGMARK)

1. Refined: Refined mustard oil is obtained by a process of extraction of clean and sound mustard seeds of Brassica Campestris Linn (yellow and brown sarson) or Brassica Juncea Linn (lahi, Rai or laha) or Brassica napus (rape or toria) or mixture of these seeds, or by a process of solvent extraction of good quality of mustard oil cake or sound mustard seeds.

The oil is refined by neutralisation with alkali &/or physical refining / or miscella refining and by using permitted food grade solvents followed by bleaching with absorbent earth & or activated carbon and deodorisation with steam.

2. Grade I: Grade I mustard oil is also known as raw grade and is obtained by a process of cold pressing chain of clean and sound mustard seeds of species like Brassica campestris linn (yellow or brown) or brassica juncea linn (lahi, rai or laha) or

Key Findings

All tested brands were free from adulteration of Argemone, Linseed and Mineral oils. Good sign for those who consume mustard oil regularly.

Recommended

Based on the analysis and evaluation of all test parameters and observations brand Engine scored top among all the brands we tested followed by Kanodia and Nature Fresh.

Brand Engine was found to have the most quantity of Natural Essential oil (Allyl isothiocyanate) content followed by Kanodia and Dhara. This ensures good quality in Kachchi ghani mustard oil with positive health benefits.

All brands were found free from adulteration of added Allyl Isothiocyanate.

Not Recommended

Brand Krishan Bhog did not meet the minimum requirement for presence of natural essential oil.

Brand Krishan Bhog was found with false claim, as it claimed its net quantity to be 1 ltr. However the bottle was of 750 ml capacity and had only 736 gms. of mustard oil.

Brand Krishan Bhog is not recommended, since it does not meet the requirements of Kachchi ghani mustard oil key quality parameter as well as also does not have the natural inherent properties of Kachchi ghani mustard oil.

Value For Money

Brand Nature Fresh can be considered as a value for money product as its 1 litre pack is available in only ₹. 70 (Retail price of retail chain malls).

Star Performers

The state of Rajasthan leads in star performers like Engine, Nature Fresh, Mashal & Dhara.

brassica napus (rape or toria) or admixture of them.

Note: Brands Kalash, Mashal, HAFED, Kanodia, Bail Kolhu, P Mark and Engine have taken AGMARK for Grade I and also claim it as Kachchi ghani so standard of AGMARK Grade I mustard oil may be considered the standard of Kachchi ghani mustard oil.

3. Grade II: Grade II mustard oil is obtained by a process of expression of clean and sound mustard seeds of Brassica campestris linn (yellow or brown) or brassica juncea linn (lahi, rai or laha) or brassica napus (rape or toria) or admixture of these. It is not generally used for edible purpose, but is widely used for other therapeutic uses.

Natural Essential Oil (Allyl isothiocyanate)

Kachi ghani mustard oil is expected to be rich in presence of natural essential oil (allyl isothiocyanate) as it is extracted through cold pressing processes which retains the natural properties of mustard in end product and gives positive health impacts. **As per AGMARK, it should be between the range of 0.25 to 0.60.**

Sensory Tests

Kachchi Ghani mustard oil is expected to be rich in flavour and taste. We conducted organolaptic tests to judge the quality of Kachchi ghani mustard oil with the help of an expert panel of 5 to 6 experts in the laboratory and observed their views.

Most of the brands were having the natural colour of mustard oil with a clear and transparent appearance.

- Brand Krishan Bhog was observed with reddish colour and differed from other brands we tested.





- In flavour, brands Dhara, Engine, Fortune, Kalash and Tez were found medium in pungency and rest of the brands had mild flavour hence less pungent. However, pungency when strong, indicates purity in mustard oil.
- Eye irritation was medium in brands Dhara, Engine, Fortune and Tez, however rest of the brands had mild eye irritation, whereas strong eye irritation indicates good quality and presence of high natural essential oils.
- In sensory tests, brand Kalash was found better amongst all and scored on top, especially in flavour and pungency.
- Brand Krishan Bhog was found worse in sensory tests and scored low, because it did not have inherent properties of Kachchi ghani mustard oil. On retest, it was found that its lack of quality could be the result of using old seeds, which had lost their natural properties.

Iodine Value

The iodine value is a quality test for edible oils which is a measure of the unsaturation of fats and oils and is expressed in terms of the number of centigrams of iodine absorbed per gram of sample (% iodine absorbed).

AS per AGMARK, iodine value should be between 98 to 110.

All the brands we tested were found within or near the maximum limit of iodine value declared by AGMARK. We found iodine value between 100.62 to 110.59.

Brands P. Mark (110.22), Tez (110.59) and HAFED (110.18) were found slightly high than the maximum limit.

Acid Value

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 of the product and reduces the shelf life of the product. **As per AGMARK, it should not be more than 1.5.**

All the brands we tested were found within the maximum limit.

- Brand Kanodia (0.25) was found with lower acid value followed by Fortune (0.34) and P. Mark (0.38).
- Brand RRO (1.18) was found with higher acid value followed by Dhara (1.11) and Krishan Bhog (0.92).

Hexabromide Test

This test is to check the presence of linseed oil, as it is an adulterant and should not be present in mustard oil.

The oil is treated with chloroform then bromine and then with alcohol and ether in cold condition to check the presence of linseed oil. It was found that all the brands we tested were free from linseed oil. Hence, all the brands passed the test.

Presence of Argemone Oil

Argemone or yellow poppy, is a wild herb, which grows in mustard

field and bears capsules full of brown black seeds. Because of its resemblance with black mustard, it is often used as an adulterant. The oil is reported to cause glaucoma, dropsy and sometimes total blindness due to the presence of alkaloids namely, sanguinarine and dihydrosanguinaire. **As per AGMARK, it should not be present in mustard oil.**

Argemone oil was not detected in all the brands we tested, which is a good sign as far as the consumer point of view is concerned.

Presence of Hydrocyanic Acid

Hydrocyanic acid is sometimes present as an impurity in synthetic allyl isothiocyanate which is commonly used as an adulterant to enhance the flavour of poor quality mustard oil. **As per AGMARK, its presence should be negative in mustard oil.**

It was not detected in any of the brands we tested, thus all of them passed the test.

Presence of Mineral Oil

Mineral oil is an oil of various colourless, odourless, light mixtures of alkanes from a non-vegetable (mineral) source, particularly a



Comparative Test

Health Benefits of Mustard Oil:

Stimulant: This oil is a very strong stimulant. It is very effective in stimulating excretion, circulation and digestion. If this is used for massaging, it stimulates circulation very effectively. Mustard oil stimulates digestion by the production of bile and gastric juices from liver and spleen.

Appetiser: This oil acts like an appetiser and increases hunger.

Irritant: Even though it is considered as an irritant, it is beneficial sometimes. Irritation is defined as a reaction of an organ to any external agent and also shows that the organ is responding to the external stimuli. This is the benefit with mustard oil. This property helps in bringing back the sensation to the organs that suffer from lack of sensation or numbness. This property is used for pumping up muscles as well.

Antibacterial: Mustard has antibacterial properties. If taken internally, it combats bacterial infections in urinary tract, excretory system, digestive system, colon and so on. If applied externally, it treats bacterial infections of the skin as well.

Insect repellent: Insects and other small animals stay away from this oil. Hence, mustard oil acts like an insect repellent as well. This oil can also be used in vaporisers and fumigants for driving away insects.

Anti fungal: Mustard oil serves like an anti fungal agent because of Allyl isothiocyanate. It doesn't let fungal growth and even inhibits fungal growth if there is any.

Hair vitaliser: The stimulating effect and presence of some fatty acids like linoleic acid and oleic acid, if combined, make an effective hair vitaliser. The stimulating effects of oil enhance blood circulation in scalp whereas the fatty acids nourish the roots of hair. It has been observed that long term use of this oil on the hair strengthens and prevents hair fall efficiently.

Diaphoretic: Mustard oil promotes sweating whether taken internally or applied externally. It stimulates sweat glands to secrete more sweat and also enlarges the openings of skin pores. This property of mustard oil is useful in reducing body temperature and also in removing toxins, excess water and salts from the body.

Cordial: The feeling of warmth exuded by mustard oil, makes it a cordial. This warms up the internal systems like respiratory system and safeguards it from accumulation and formation of phlegm. Also it warms up your body in winter season to some extent. This can be due to the irritating and stimulating effects.

Tonic: Mustard oil serves as an all round tonic for health. It tones up all the systems in the body, boosts immunity and also gives strength.

Anti arthritic and anti rheumatic: This oil gives relief from arthritis and rheumatism and has been used for massaging.

Other benefits: This is very effective in curing cold, cough, body pains and aches, congestion caused by cold, headache and its massage is good for muscular growth. When gums are massaged with mustard oil it strengthens them and also protects them from decay.

<http://www.organicfacts.net>

distillate of petroleum. It should not be present in edible oils.

It was not detected in any of the brand tested. Thus all the brands passed this test.

Volatile Oil

It is expected to be higher in Kachchi ghani mustard oil.

- Brand Engine (0.40) was found with higher content of volatile

oil followed by Tez (0.38) and Nature Fresh (0.37).

Specific Gravity

Specific gravity is the ratio of the density of a material as compared to the density of water. The density of water is about 1 gram per cubic centimeter (g/cc). Materials which are lighter than water (specific gravity less than 1.0) will float.

Most materials have specific gravities exceeding 1.0, which means they are heavier than water and so will sink. **As per the AGMARK, specific gravity should be between 0.907 to 0.910 at 30°C/30°C temperature.**

All brands except Krishan Bhog were found within the permissible range.

- Brand Krishan Bhog was found with specific gravity (0.915) more than the maximum limit and got less score in this test.

Colour

As per AGMARK, colour of Grade I (Kachchi ghani) mustard oil in ¼ inch cell on the lovibond scale (a method in the test) should not be deeper than 50 when expressed as Y+5R units.

All the brands we tested were found within the maximum limit specified in AGMARK. Colour levels were found between the range of 21.4 to 25.0.

Flash Point

Flash point is the temperature at which oils get fired. It should be not less than 250°C.

Flash point of all the brands we tested was found beyond 250°C, which is good from safety point of view.

Net Volume/Weight

As per Weights & Measures Act, maximum permissible error limit for edible oil of 1 ltr. pack size is 1%.

- All the brands except Krishan Bhog fell under the maximum permissible limit of Weights & Measures Act.
- Brands Dhara (915.71g), P. Mark and Tez (1812.49g) were found with net content more than they claimed.
- Brand Krishan Bhog (733.88g) was found underweight and scored low amongst all.



Moisture and Insoluble Impurities

Moisture content of oils and fats is the loss in mass of the sample on heating at $105 \pm 1^\circ\text{C}$.

It is the moisture that promotes decay of the commodity. Virtually moisture-free, mustard oil has no such problem. It will retain its original freshness and flavour for months.

As per AGMARK it should not be more than 0.25.

Most of the brands were found within the specified limit set by AGMARK.

- Brands Dhara (0.30), Engine (0.38) and Kanodia (0.27) were found with moisture & insoluble impurities content beyond the limit declared in standards.
- Brand Krishan Bhog (0.064) was found with lower percentage of moisture & insoluble impurities.

Marking

The containers of mustard oil should be marked with the following particulars:

- a) Name, type and grade of the material.
- b) Quantity of the material in the container.
- c) Manufacturer's name and his recognised trade-mark, if any.

- d) Batch number or lot number in code or otherwise.
- e) Month and Year of manufacture and best before period.
- f) Claim as free from adulterants and argemone oil.
- g) Standard mark if any.
 - Brands Bail Kolhu, Dhara, Fortune, Kalash, Nature Fresh, HAFED and Mashal were found with adequate information marked on their labels.
 - Storage instruction was not mentioned on brands Dalda, Engine, Kanodia, P. Mark, RRO and Tez.
 - Brand Krishan Bhog did not mark batch number and storage instruction & claim as free from

argemone oil on its label, thus getting the lower score.

Packing

Mustard oil should be packed in suitable, tightly closed containers to retain its quality within its shelf life. The packaging criterion was based on bottle quality, shape, tamper proof cap & seal etc.

All the brands were packed in good quality PET bottle except brand Krishan Bhog which was packed in the bottle having low quality plastic in comparison to others brands.

How We Tested?

The test programme of comparative testing of mustard oil was mainly based on AGMARK, PFA and IS: 546 : 1975. The testing of mustard oil was carried out in a NABL accredited laboratory situated in New Delhi.

The testing was mainly based on the requirements of AGMARK, out of overall parameters the key parameters for which mustard oil brands tested were presence of natural essential oil, organolaptic qualities of oil, saponification value, unsaponifiable matter, iodine value, acid value, presence of argemone oil, linseed oil and mineral oils etc.

Adulteration of Mustard Oil

Argemone oil contains a toxic alkaloid, sanguinarine. Adulteration of mustard oil with argemone oil causes disease-Dropsy.

Dropsy epidemic was witnessed in Delhi and neighboring states and caused some deaths in the months of August and September 1998.

Considering the gravity of the problem, standard of Rapeseed or Mustard Oil

(A17.18) of the Prevention of Food Adulteration (PFA) Rules, 1955 was amended for following:

"Test for Argemone oil shall be negative"



Comparative Test

AUGUST 2011

COMPARATIVE PERFORMANCE SCORE OF MUSTARD OIL (KACHCHI GHANI)

Parameter	Brand	Wt. %	Engine	Kanodia	Nature Fresh	Mashal	Kalash	Dhara	P. Mark	Tez	Bail Kolhu	RRO	Dalda	Fortune	HAFED	Krishan Bhog
MRP, ₹ per litre			100	95	125	95	100	92	105	96	104	106	97	98	86	80
Retail Price, ₹, per litre			85	90	70	75	75	70	95	85	75	70	75	74	67	60
Physico-chemical Tests	79%															
Natural Essential Oil		15	14.4	11.4	10.2	9.9	9.9	10.8	9.6	8.25	9.0	10.2	9.0	9	9.0	1.5
Saponification Value		4	2.82	3.01	3.13	3.56	3.73	2.83	2.85	3.08	3.97	3.68	2.99	3.14	3.37	2.97
Unsaponifiable Matter		5	4.08	4.24	2.5	3.91	3.08	4.16	3.58	5	3.16	4.24	3.49	2.74	3.16	2.99
Iodine Value		5	3.72	3.77	3.6	3.52	3.66	4.31	3.44	3.35	4.39	3.65	4.09	4.07	3.45	4.15
Acid Value		4	2.64	4	3.51	3.59	2.59	2.19	3.71	3.04	2.91	2.04	3.02	3.79	2.93	2.51
Hexabromide Test		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	3.0
Presence of Argemone Oil		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Presence of Hydrocyanic Acid		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	3.0
Presence of Mineral Oil		4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Moisture & Insoluble Impurities		3	0.9	1.41	2.85	1.5	2.85	1.28	2.17	2.17	2.17	2.17	1.5	1.45	2.85	3.0
Colour		3	1.55	1.55	1.61	1.77	1.61	1.5	1.77	1.55	1.72	1.66	1.61	1.88	1.66	1.49
Specific Gravity		3	2.7	2.7	2.7	2.7	2.1	2.7	2.7	2.7	2.59	2.1	2.59	2.7	2.1	1.5
Refractive Index		3	2.86	2.47	2.47	2.86	2.47	2.47	2.47	2.47	2.47	2.47	2.86	2.47	2.86	2.86
Bellier's Turbidity Temperature		4	3.28	3.76	4.0	3.04	3.76	3.52	3.04	3.04	3.04	3.04	3.76	3.28	3.04	1.2
Density		3	2.45	2.45	2.45	2.40	2.40	2.45	2.45	2.45	2.51	2.40	2.51	2.45	2.40	2.85
Volatile Oil		5	4	4.8	4.6	3.59	3.59	3.59	4	4.4	3.5	3.5	3.59	3.5	3.5	3.5
Flash Point		4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Net Volume		3	3.0	2.5	2.4	2.7	2.8	3.0	3.0	3.0	2.0	2.1	2.1	2.2	2.2	0.3
Sansory Tests	13%															
Colour, Appearance, Flavour, Eye Irritation & Darkness in colour		13	12.4	12.5	12.5	12.5	12.9	12.4	12.5	12.4	12.5	12.5	12.5	12.4	12.5	12.3
General Parameters	8%															
Packing		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	2.8
Marking		5	4.5	4.5	5.0	5.0	5.0	5.0	4.5	4.5	5.0	4.5	4.5	5.0	5.0	3.5
Overall Score		100	87.3	87.06	85.52	84.59	84.44	84.2	83.78	83.4	82.9	82.25	82.11	82.07	82.02	68.42

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