



Cow Ghee

A spoonful of yellow magic

Cow ghee is a carrier of fat-soluble vitamins including A, D, E and K, which our bodies need in very small quantities but can't make for itself. These vitamins perform many essential functions. Similarly, the essential fatty acids, which cannot be synthesized in our body, are also supplied by ghee. Cow ghee is the pure clarified fat-derived solely from milk or curd or desi butter or from cream to which no colouring matter flavor or preservative gets added. Ghee is an important dairy product that enters inter-state trade too. Due to variation in its composition from region to region and season to season and also because it depends on the type of animal and the feed given, the establishment of its purity often involves elaborate analysis, as well as tests for its keeping quality. Hence, the Consumer Voice team this time singled out 11 popular /regular selling cow ghee brands and tested on different parameters including vitamin A, milk fat, adulteration, flavor and taste among others. Read on the report below to know the best cow ghee brand for your home!

The prime objective behind performing the comparative study was to assess and evaluate overall quality of the popular cow ghee brands available in the markets by following the relevant national standard. All the tested brands were evaluated and graded as per their overall performance based on the comprehensive lab test reports. The grading has been adopted based on an international grade scale where 5 is very good, 4 is good, 3 is average, 2 is poor and 1 is very poor.

How We Test

As per our standard procedure, we undertook random market research to identify the regular-selling cow ghee brands. We identified 11 brands and tested on various quality, safety and acceptability parameters. The comparative testing was carried out at a NABL accredited

laboratory. The key parameters for which the ghee brands were tested included milk fat, vitamins A, saturated fat, PUFA, MUFA, and trans fat. We also carried out a series of tests to check for adulteration with vegetable fats, animal fats, etc.

As there is no specific standard for cow ghee, the test program for comparative testing of cow ghee was prepared mainly based on FSSAI regulation (Food Safety & Standards Regulation) and BIS standard IS 16326:2015. The standard test methods of ghee were used for comparative testing.

Brands Tested

11 regular selling brands of cow ghee were undertaken for comparative testing and one can see the brand scores in the below table.

Rank	Total Score Out of 100 (rounded off)	Brands	Quantity, Gms	MRP, Rs	MRP per 100 ml	Agmark	Best Before, Months	Manufacturer/ marketer
1	91	Ananda	1L(900g)	550	55		9	Gopaljee Dairy Foods Pvt. Ltd.,
1	91	Amul	1 L (905g)	490	49	Agmark	9	Gujarat Co-operative Milk Marketing Federation Ltd.,
2	90	Milkfood	500 ml (449g) 1 L (902g)	258	51.6	-	9	Milk Food Ltd.,
3	89	Patanjali	500 ml (452.5g)	285	57	-	9	Patanjali Ayurved Ltd.,
4	88	Mother Dairy	500ml (451g)	275	55	Agmark	8	Mother Dairy Fruits & Vegetable Pvt. Ltd.
4	88	Verka	1 L (900g)	530	53	-	9	The Punjab State Cooperative Milk Producers' Federation Ltd.,
5	87	Anik	1 L (898g)	550	55	-	12	Anik Milk Products Pvt. Ltd.,
5	87	Fresh & Pure	1 L (902g)	530	53	-	6	Future Consumer Limited,
6	86	Britannia	200 ml (181g)	160	80	-	18	Britannia Dairy Pvt. Ltd.
7	85	Baidyanath	1 L (902g)	580	58		12	Shree Baidyanath Ayurved Bhawan Pvt. Ltd.,
8	83	Gowardhan	500ml(452g)	295	59		12	Parag Milk Foods Ltd.,

Note: Verka claimed to be cow milk fat.

Key Findings

- Based on the overall test findings, brands Ananda and Amul secured the number 1 position. And we recognized brand Amul as the value-for-money brand.
- We found beta carotene was highest in Ananda and Amul.
- Milk fat was highest in Ananda.
- There was no adulteration with vegetable fat and animal fat for any brand.
- All the brands had met the minimum requirements specified in the national standards.
- Therefore all brands are safe for consumption.

CV Recommendations



Value for money - Amul

Test Results

Vitamin A | Milk Fat | Saturated Fat | MUFA | PUFA | Trans Fatty Acid (Trans Fat) | Flavour & Taste | Baudouin Test | Presence of Animal Fat | Butyro-Refractometer Reading | Reichert-Meissl Value | Cholesterol | Coliform count cfu/gm | Peroxide Value

Comparative Testing of Cow Ghee

Brand Parameters	% weightage	Ananda	Amul	Milkfood	Patanjali	Mother Dairy	Verka	Anik	Fresh & Pure	Britannia	Baidyanath	Gowardhan
Physico-chemical Tests												
Description	2	2	2	2	2	2	2	2	2	2	2	2
Flavour & Taste	6	6	6	6	6	6	6	6	6	6	6	6
Presence of animal fat (other than milk fats)	4	4	4	4	4	4	4	4	4	4	4	4
Moisture	4	4.00	3.52	3.76	3.60	3.40	3.76	3.64	3.76	3.76	2.20	3.52
Free Fatty Acids	5	4.40	5.00	4.85	4.55	4.93	4.55	3.95	4.03	3.73	2.00	4.10
Reichert-Meissl Value	3	3	3	3	3	3	3	3	3	3	3	3
Saturated fat	5	3.28	3.92	2.80	3.06	4.74	3.39	2.61	3.35	2.58	4.00	3.32
Mono unsaturated fatty acid	5	4.07	3.92	3.25	3.69	3.90	3.85	3.41	4.12	3.23	4.46	3.65
Poly unsaturated fatty acid	5	3.51	3.80	4.40	3.99	2.95	3.57	3.36	3.55	3.96	5.00	3.34
Trans fatty acid(Trans Fat)	5	3.69	3.04	3.55	3.43	3.16	3.70	3.64	3.17	3.80	4.23	3.05
Cholesterol	4	2.73	3.60	4.00	3.08	3.51	2.83	3.08	2.08	2.33	2.78	2.58
Butyro-Refractometer Reading	4	3.80	3.80	3.60	3.60	3.40	3.60	3.40	3.60	3.60	3.80	3.80
Peroxide Value	4	4	4	4	4	4	4	4	4	4	4	4
Milk Fat	14	14.00	13.44	13.72	13.58	13.30	13.72	13.58	13.72	13.72	12.04	13.44
Vitamin A	7	6.23	5.47	5.26	6.10	5.24	5.35	5.59	5.91	5.66	6.88	4.97
Beta carotene	8	8.00	7.60	6.41	6.53	6.46	5.50	7.05	5.92	5.98	3.48	4.94
Baudouin test	5	5	5	5	5	5	5	5	5	5	5	5
Coliform count cfu/gm	3	3	3	3	3	3	3	3	3	3	3	3



TEST PARAMETERS

Vitamin A

For vitamin A, the FSSAI recommended dietary allowance (RDA) for adults is 600 micrograms daily. As for our tests, we checked the samples for vitamin A.

Let's take a closer look to know the health benefits of vitamin A:

- Vitamin A is critical for good vision.
- Plays an important role in healthy bone growth.
- Vitamin A is essential for reproduction.
- Plays a role in cell division and cell growth.
- Supports the immune system.
- Supports skin health.

We found vitamin A was highest in Baidyanath Cow Ghee at 3165.3 IU (international unit) for per 100g and it was lowest in Gowardhan Cow Ghee at 2619.3 IU, per 100g.

Beta Carotene

For beta carotene, the FSSAI recommended

dietary allowance (RDA) for adults is 4800 micrograms daily. Beta-carotene is a yellow/orange pigment found mostly in fruits and vegetables, especially carrots. The name beta carotene comes from Greek "beta" and latin "carota (carrot)". Other fruit and vegetables rich in beta-carotene are—mango, papaya, orange, apricot, melon, sweet potato, tomato, pumpkin, spinach, etc.

The test was conducted to detect / ascertain presence of beta carotene in cow ghee brands. As per US food and drug administration regulation 1 IU of vitamin A = 0.6 micrograms of beta carotene. The human body converts beta-carotene into vitamin A and beta-carotene is a precursor of vitamin A.

Beta carotene was found to be highest in Ananda Cow Ghee at 12.10 mg/kg.

Milk Fat

Fat is an essential part of any balanced diet, providing essential fatty acids, fat-soluble vitamins and a concentrated source of energy. The minimum requirement for milk fat in ghee

is 99.5 per cent. All the brands fulfilled the minimum requirement for milk fat content. Among the cow ghee brands, Ananda (99.95 percent) had the highest amount of milk fat and scored highest.

Free Fatty Acids (as Oleic Acid)

Free fatty acids are the percentage by weight of free acid groups in the oil or fat. Free fatty acids are an indication of hydrolytic rancidity, though other lipid oxidation processes can also produce acids. Free fatty acids should be 3 per cent maximum. We found all the brands within the specified limit. Amul and Mother Dairy scored highest.

Flavour and Taste

Cow ghee should have good flavour and taste. All the brands carried the characteristic taste and flavor of cow ghee.

Saturated Fat

Saturated fats are derived from animal fat as well as from vegetable fat. Saturated fats directly raise total and LDL (bad) cholesterol levels. Lower saturated fat is better for health. Saturated fat was found highest in Britannia at 76.12g/100gm and it was the lowest in Mother Dairy brand at 61.72 g/100 gm.

Mono Unsaturated Fatty Acid (MUFA)

MUFAs are referred to as healthy fats. MUFAs are associated with lowering the level of bad cholesterol (LDL) and total cholesterol while also increasing the production of good cholesterol (HDL). These fats can be found in vegetable oils like canola, peanut and olive oil, as well as in nuts. Higher MUFA is better for health. MUFA was found highest in Baidyanath Ghee at 25.28 g/100 gm and it was at the lowest in Britannia at 18.67 g/100 gm.

Poly Unsaturated Fatty Acid (PUFA)

PUFAs are found in plant and animal foods such as salmon, vegetable oils and some nuts and seeds. Eating moderate amounts of



polyunsaturated (and monounsaturated) fat in place of saturated and trans fats can benefit your health. Polyunsaturated fats can help lower your LDL (bad) cholesterol. Higher PUFA is better for health. PUFA was found highest in Baidyanath at 6.23 gm/100 gm and it was found lowest in Mother Dairy at 1.45g/100 gm.

Trans Fatty acid, g/100g

Trans fatty acids raise the level of 'bad' cholesterol in our blood. Lower trans fat is better for health. Highest amount of trans fat was found in Amul at 2.61gm/100 gm and it was found lowest in Baidyanath Cow Ghee at a 1.03 g/100gm.

Cholesterol

Lower cholesterol is better for health. Ghee is not advised for individuals suffering from high cholesterol. We found brand Fresh & Pure with the highest amount of cholesterol at 184.02 mg/100 gm and it was at the lowest in Milk Food at 154.46 m/100 gm.

Baudouin Test

This test we conducted to know if there is any adulteration of ghee with vanaspati ghee, vegetable oils/fats, etc. As ghee adulteration with vanaspati, vegetable oils/fats are a key concern. Ideally, Baudouin test results should be negative and in our test, all the brands had passed the test.



Packaging

Packaging plays an important role in maintaining the consistent quality of the product and in preventing its deterioration. Brands including Ananda, Baidhyanath, Anik, and Gowardhan were packed in plastic containers. Mother Dairy, Fresh & Pure brands were packed in PVC pouches while others were packed in tetra packs.

Marking/Labelling

Details including the following shall be there on the product label:

- a) Name of product,
- b) Net quantity,
- c) Name and address of the manufacturer,
- d) Date of packing,
- e) The words 'Best before',
- f) Batch or code or melt number,
- g) MRP.
- h) FSSAI license number,
- i) Customer-care details.

All the brands provided marking details as mentioned above.

Net Quantity

The net quantity in all the brands was as per the manufacturer's claim.

Physico-chemical Tests

Description

Ghee should be in a light yellow, it should have pleasant taste, flavour and free from rancid and objectionable flavour and rancidity. All the brands were light yellow colour and had pleasant taste and flavor. They were free from off flavour and rancidity.

Presence of animal fat (other than milk fats)

Cow ghee brands were tested for possible adulteration with animal fat materials like tallow which needs to be absent. Animal fat was not detected in any of the brands.

Moisture

Moisture generally refers to the presence of water in a product. Less amount of moisture is better as it translates into a longer shelf life. As per FSS Regulations, the moisture content in ghee should not be more than 0.5 per cent; as per Agmark, it should not be more than 0.3 per cent. Moisture content in all the brands was less than 0.3 per cent. Among the cow ghee brands, the lowest moisture content was in Ananda at 0.05 per cent and it was at the highest in Baidyanath.

Reichert-Meissl (RM) Value

The RM value is determined when examining fat. It is an indicator of how much volatile fatty acid can be extracted from fat through saponification. RM value varies from area to area of production. All the tested brands met the requirements set by the national standard.

Butyro-Refractometer (BR) Reading

BR reading is the index of purity of ghee. An increase in BR reading indicates adulteration of ghee with vegetable oil/animal fat.

BR reading varies from area to area of production. All the tested brands had met this requirement.

Peroxide Value

This parameter is an indicator of rancidity in the product. Peroxide value in ghee should be 0.6 milliliters maximum equivalent of peroxide oxygen per kg. Peroxide value was nil in all the brands tested, thus they all passed the test.

Microbial Test: Coliform Count

Coliform bacteria, the presence of which is an indicator of poor sanitation practices and/or water quality employed in the handling and

processing stages, were not detected in any of the ghee brands. All the brands passed the test.

Conclusion

Comparative testing of 11 popular brands was conducted in a NABL lab as per Food Safety and Standards Regulation. All the brands had met the requirements of national standards for Ghee. However, there is no specific standard for cow ghee. Brand Ananda and Amul secured top positions among the 11 brands tested. All brands were free from adulteration and passed the safety tests thus recommended for consumption.

BETTER TO KNOW

Physical Observations

- Ghee shall be free from excess moisture.
- On melting, the ghee shall be clear, transparent and free from sediment or foreign colouring matter.
- A good ghee sample should have well-developed granules dispersed fairly, thickly and uniformly over the entire mass. A bright yellow colour, caused by the presence of carotenoid pigments (beta carotene), is associated with cow ghee and constitutes a desirable criterion in areas where it is preferred. Buffalo ghee is white in colour. Sometimes, it may also have a greenish tinge depending on the region and feeding schedule. Ghee from mixed milk has a straw-yellow colour. The colour of fats always appears deeper to the eyes when melted than when in solid form.

Physical observations on the 11 samples were made by laboratory scientists, checking for colour and texture and whether they were free from sediment and objectionable flavour. Amul and Ananda were given the highest score.

Why cow ghee is more yellow?

Cow ghee is more yellow because of the pigment (the natural colouring matter of animal or plant tissue) beta-carotene. Beta-carotene comes from the cows' diet, which consists mostly of dried grass, grass, grains and cereals. The amount of beta carotene in the cow ghee depends on a few factors:

Cow feed is the most important (grass-fed dairy products contain more beta carotene than cows who are fed grains).

Cow's breed.

The season of the year is also important.

The biological makeup of milk changes throughout the lactation period.

Disclaimer: As there is no validated test method to authentic cow ghee, we could not carry out authentication tests. Comparative testing was conducted as per prescribed parameters in national standard for Ghee.