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Plant-Based Milks Review (Almond, Cashew, Coconut, Flax, Hemp, Macadamia, Oat, Pea, and Soy)

Find the Best Non-Dairy Milk Alternative. ConsumerLab Tests Reveal What's Really In Plant-Based Milks.

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Summary

- **Are almond milk, soy milk, oat milk or other plant-based milks better than regular milk?** Plant-based milks can be a more healthful alternative to regular milk. They contain less saturated fat (except for coconut milk) and, if they contain no added sugar, fewer calories. Some also provide as much protein as cow's milk and most provide as much or more vitamin D and vitamin B12. They often also provide as much calcium, although it may not be absorbed as well as from cow's milk. Being non-dairy, they are also a good milk substitute for people with milk allergy, lactose intolerance, or who are vegan. Plant-based milks are also more environmentally-friendly than cow's milk. (See **What They Are** and **Why to Consider Them**)

- **What did CL's tests of almond milk, soy milk, oat milk and other plant-based milks show?** Lab tests showed that most products contained the nutrients they listed, but one contained *only 62% of its promised calcium as well as 240% of one of its listed vitamins*. (See **What CL Found** and How Products Were Evaluated.)

- **How do almond milk, soy milk, oat milk and other plant-based milks taste?** We focused mainly on unsweetened plant-based milks and although none of these was delicious, several were mild tasting and could be used as an alternative to milk, such as in cereal or in coffee, adding creamy texture and some whiteness. The best tasting product contained added sugar (created by conversion of carbs from one of its key ingredients). (See the taste comparisons in the 2nd column of the **Results table**)

- **Which plant-based milk is best?** Our ***Top Picks*** were not only acceptable in taste, but more nutritious than regular 1% milk. All of the plant-based milks cost more than regular milk, but our *Top Picks* were in the middle range for cost. Among the tested almond, soy, oat, coconut, hemp, macadamia, and cashew milks, see our *Top Picks* for **Nutrition** and our *Top Pick* for **Taste**.

- **Are plant-based milks safe?** Most plant-based milks contain added vitamins and minerals. To avoid excessive intakes, particularly of calcium, limit intake to one cup at a time and no more than two cups per day, and consider cutting back on supplements that provide the same nutrients. (If you choose a plant-based milk without added vitamin D and calcium, be sure you're getting enough elsewhere). Also check that products don't contain ingredients to which you are allergic, such as soy, almonds, and cashews. (See **Concerns and Cautions**)

Products tested in 2020

What They Are:

Plant-based milks are, like milk, mostly water, to which plant-based oils and gums are added, yielding, to varying degrees, a creamy texture. Other plant-based ingredients are added to provide particular flavors and/or nutrients. For example, a substantial amount of calcium is added to nearly all products and soy or pea protein is added to some (delivering as much protein as regular milk). Most nut-based milks (such as almond, cashew, and macadamia) focus more on flavor than overall nutrition. Oats are used in some products to provide flavor and sweetness (by converting starch in oats into maltose, as sugar).

Why to Consider Them:

Nutrition

Although it is hard to match the delicious taste of whole or low-fat milk, that taste comes at a price: sugar (from lactose) and saturated fats, both of which contribute calories. Even lactose-free milks contain a significant amount of sugar, as the lactose has been converted to glucose and galactose which, by the way, have a greater impact on blood sugar than lactose. What plant-based milks offer is an alternative with little to no saturated fat and, if you choose, little to no sugar, while providing good fats, plenty of calcium, and, in many cases, significant amounts of protein and other vitamins and minerals.

Dietary restrictions

Plant-based milks are dairy-free and lactose-free, making them suitable for people with a milk allergy or lactose intolerance, as well as to vegans. Many products are listed as kosher and they are generally considered non-dairy items under Jewish law.

Environmental impact

Plant-based milks tend to be more environmentally-friendly than regular milk in terms of lower production of greenhouse gases (cows produce large amounts of methane, a heat-trapping gas) and utilization of resources such as water (although almonds in almond milk also require large amounts of water).

What CL Found:

We approached the plant-based milks as we approach dietary supplements, testing whether they provide the nutrients they claim and are relatively free of contamination from heavy metals (lead, arsenic, and cadmium). For the most part, the answer was *yes*. At the same time, the milks varied widely in their levels of key nutrients, making these important distinguishing features, along with taste.

The one product that **failed** our tests was ***Tempt Hempmilk - Unsweetened Vanilla***. Instead of providing its claimed 300 mg of calcium per cup, it contained only 185 mg. We also discovered that it contained more than twice the amount of vitamin B12 per cup as listed on the label — 3.6 mcg instead of 1.5 mcg per cup, which further suggests poor quality control but is not a health concern. These findings were confirmed in a second independent laboratory.

Although we did not test **rice milk** in this Review, be aware that it can be contaminated with arsenic — a known issue with products made from brown rice. This was seen in a small sampling of plant-based milks by the FDA. Rice milks averaged 3.8 mcg of total arsenic per cup versus 2.4 mcg and 1.2 mcg in hemp and coconut milk, respectively. However, these amounts are well below the cancer-warning threshold of the State of California, which is 10 mcg per daily serving and based on specific form of arsenic — inorganic arsenic, which is considered the most toxic form. There was no detectible arsenic in samples of almond, cashew, oat, pea, or soy milk. Product names were not listed and amounts of inorganic arsenic were not reported (Redan, J Food Compost Anal 2023).

Key Differences Among Plant-based Milks:

Calcium

Nearly every plant-based milk, except *Real Coco*, promises and delivers about as much **calcium** as regular 1% milk, which is about 325 mg per cup, and some deliver even more — up to 450 mg, as shown in the graph below. (Even *Tempt Hempmilk* promised 300 mg, although it fell far short.) That's a substantial portion of the recommended daily intake of calcium for adults of 1,000 mg to 1,200 mg. But keep in mind that this calcium has been

added, so, it's like taking a calcium supplement rather than getting it naturally from milk. Studies show that you can't absorb more than 500 mg of calcium at a time and getting too much calcium from supplements (more than 1,000 per day) may increase the risk of stroke and heart attack, although this has not been seen with calcium from milk.

Be aware that the "tricalcium phosphate" form of calcium used in some plant-based milks is not absorbed quite as well from these products as calcium in the "calcium carbonate" form (which is absorbed as well as calcium from milk, which is in a mixture of forms). This may relate to interaction between plant phytates and tricalcium phosphate. Clinical studies suggest that people absorb about 25% less calcium from plant-based milks made with tricalcium phosphate as opposed to calcium carbonate (Yongdong, J Nutr 2005; Heaney, Am J Clin Nutr 2000).

Vitamins D and B12

Most plant-based milks provide as much or more **vitamin D** as regular milk. As shown in the graph below, other than *Real Coco* and *Califia Farms Almondmilk* which provide *no* vitamin D, the plant-based milks tended to provide a bit more vitamin D than real milk (2 mcg or 80 IU) per cup, with most providing 2.5 mcg (100 IU). Even greater amounts were in *Oatly* (3.6 mcg; 144 IU) and *Ripple* (6 mcg; 240 IU), although these amounts are still safe and nowhere near the upper daily limit of 100 mcg (4,000 IU).

Vitamin B12 is not typically listed on labels of regular milk but averages about 1.2 mcg per cup (ODS Fact Sheet) of low-fat cow's milk, which is half of the recommended daily allowance for most adults (2.4 mcg). This is similar to the amounts of B12 found in *Oatly Oat Milk* and *Good Karma Flaxmilk*. *Ripple* provided 2.5 mcg of B12, *Silk Organic Soy*, 3 mcg, and *Temp Hempmilk*, 3.6 mcg (which was 240% of what it listed). Be aware, however, that you cannot actively absorb more than about 1.5 mcg of B12 from foods (or supplements) in any 4 to 6-hour period, so most of these milks provide more than enough B12 per serving. These overages are not dangerous. *Califia Farms Almondmilk* and *Real Coco* did not claim any B12.

For comparisons of amounts of these and other vitamins and minerals (including vitamins A and E, riboflavin, folate, sodium, iron, magnesium, potassium, and phosphorus) in the products, see columns 4 and 5 of the Results table.

Carbs, Fats & Protein

Although many people don't realize it, regular milk contains about 12 grams (or 2.4 teaspoons) of **sugar** per cup, in the form of lactose, which makes up the bulk of its **carbohydrates**. Even lactose-free milk tends to contain that much sugar, with the lactose having been converted to glucose and galactose. In contrast, *most plant-based milks contain little sugar* — unless it has been added. Our review focused on unsweetened plant milks, so most contained just 1 to 3 grams of carbohydrates per cup, shown as the green bar in the graph below.

The exception was *Oatly*, which contained even more carbs than milk — 16 grams. You won't find sugar as an ingredient in *Oatly*, though, because the manufacturer uses a process that predigests some of the healthful, complex carbohydrates in oats and converts them into sugar (mostly maltose), yielding 7 grams per cup. It is legally required to list this as "added" sugar. This chemical conversion is one of the reasons many people like the taste of *Oatly* — it's sweeter than milk, but it's also the reason why it has 120 Calories per cup (similar to real milk) while the unsweetened plant-milks provide just 30 to 80 Calories (see graph further below).

However, due to its oats, *Oatly* provides 2 grams of **fiber**. *Silk Organic Soy* milk also provides 2 grams of fiber, while the others provide less. Real milk contains no fiber.

An area where most plant-based milks have regular milk beat (other than skimmed milk) is with **fats**. It's not that they all have less fat, but they have less *saturated* fat — the kind that contributes to atherosclerosis. (The exception is *Real Coco*, in which 90% of the fat is saturated.) Most of the fat in regular milk is saturated, while the fats in most plant-based milks are added (to provide a creamier texture) from plant sources like sunflower lecithin, rapeseed oil, or flaxseed oil which contain mainly unsaturated or partially saturated fats. A 1% milk contains about 2.5 grams of fat per cup (of which 1.5 grams are saturated). *Tempt Hempmilk* was highest in fat, containing 8 grams per cup, while most other milks contain between 2 and 5 grams.

As to **protein**, *Good Karma Flax Milk* and *Ripple* — both made with pea protein -- rival regular milk by providing 8 grams per cup. Not far behind is *Silk Soy* milk with 7 grams. *Oatly* contains less than half the protein (3 grams) of regular milk, *Tempt Hempmilk* provides just 2 grams, while the almond and macadamia milks provide only 1 gram. There is no protein in *Real Coco* and *Silk Creamy Cashew*. Be aware that proteins in plant-based milks may contain a lower ratio of essential to total amino acids compared to protein in regular milk, and some may be low in specific essential amino acids such as lysine or methionine (see our Protein Supplements Review).

Cost

Plant-based milks tend to cost at least 2 to 3 times as much as regular milk. As shown in the graph below, regular milk is about 30 cents per cup, while the plant-based milks cost 52 cents to $1.66 per cup. The products that were more expensive tended to come in 32 fl oz unrefrigerated cartons, as opposed to 48 to 64 fl oz refrigerated containers.

Taste, Appearance, and In Coffee

As noted earlier, the focus of our review was mainly on unsweetened versions of each plant-based milk, so, other than having hints of flavor of their plant-sources, the products were fairly bland. Notable exceptions were *Oatly*, which had a nice sweet (thanks to its sugar) and slightly "oaty" flavor, and *Real Coco*, which clearly tasted of coconut. We didn't care for the tastes of *Good Karma Flaxmilk Omega-3+ Protein*, which was slightly fishy, *Califia Farms Almondmilk Unsweetened Vanilla*, which tasted and smelled a bit like Play-Doh with an artificial almond vanilla flavor, or *Tempt Hempmilk — Unsweetened Vanilla*, which was slightly bitter (See the 2nd column of the Results table below for taste descriptions.)

Most of the products were somewhat creamy (due to plant oils and gums), although *Almond Breeze* was more watery than creamy.

In terms of **appearance**, nut-based milks (almond, cashew, and macadamia) tended to have a light purple-grey hue, hemp milk was slightly gray, and the others had yellow undertones, except for *Real Coco*, which was bright white.

We were curious to what plant-based milks did to **coffee**, so we added three tablespoons of each to a cup of black coffee. *Ripple* and *Oatly* went best in coffee, lightening the coffee and adding some creaminess, as did *Oatly*, which also added sweetness. We didn't like the almond or cashew milks in coffee and *Real Coco* created a white film on the surface.

Top Picks:

Here are our picks within each category, why we chose them, and what we particularly liked or didn't like in each category:

Top Picks* for *Nutrition*: *Ripple - Unsweetened and ***Silk Organic Soy - Unsweet***
Both of these provide about the same amount of protein that you'd expect from milk with 40% fewer calories and they taste fine, even in coffee. They also provide key vitamins and minerals found in milk. *Silk* hews closer to what's in milk and *Ripple* tends to go a bit beyond. For example, they each provide a good amount of calcium per cup: 300 mg in *Silk Soy* and whopping 440 mg in *Ripple* — although the calcium in *Ripple* is in phosphate forms that may not be absorbed quite as well as calcium in the carbonate form in *Silk Soy*. Each also provides some vitamin D: 3 mcg in *Silk* (about the same as in milk) and 6 mcg in *Ripple*. Additionally, each provides a bit more than then the daily requirement for vitamin B12, which is twice as much as milk. Unlike *Ripple*, *Silk* offers a small amount of fiber — 2 grams per cup.

Soy milk contains soy isoflavones, which can have a weak estrogenic effect. While this may concern some women, the isoflavones in soy milk are not likely to have a negative effect, particularly in pre-menopausal women. An 11-year study of seventy-six thousand French women over 50 years of age found use of soy isoflavone supplements (which typically provide at least twice the amount of soy isoflavones in a cup of soy milk), overall, was not associated with risk of breast cancer. However, current soy isoflavone use was associated with a 36% increase in the risk of breast cancer among those with a *family history of breast cancer*. In contrast, among women who were *premenopausal* (in whom estrogen levels are still high) or *recently menopausal*, the risk of developing an estrogen receptor-positive breast cancer was reduced by half with soy isoflavone use (Touillaud, Am J Clin Nutr 2019).

Silk Soy costs 62 cents per cup, while *Ripple* is a bit more expensive at 83 cents per cup, so they cost at least twice as much as regular milk but not as much as some of the more expensive plant-based milks that can cost over $1 per cup.

Top Pick* for *Taste*: *Oatly Oat-Milk The Original
Oatly had a nice, sweet, slightly oaty flavor, as well as being somewhat creamy, and went well in coffee. Of course, it had an unfair advantage with regard to taste, as it was the only product in this review with added sugar (from converted starch in oats), giving it a sweeter taste, but also at least 50% more calories than other products, amounting to 120 per cup, just behind regular 1% milk at 130.

Nutritionally, *Oatly* has about half the protein of milk but about the same amount of calcium and vitamin B12. Unlike milk, however, it has little saturated fat (0.5 gram) and provides a bit of fiber (2 grams). It costs 69 cents per cup — so twice as expensive as milk but not particularly pricey for plant-based milks. (Note: If you have impaired kidney function, be aware that *Oatly* has a relatively high amount of phosphorus from phosphate additives -- see Concerns and Cautions for details).

Test Results by Product:

Results of ConsumerLab.com Testing of Plant Based Milks (PER CUP)

(Price Checks are not included in printed reviews)

Approval Status **Product Name**	**Contained** **Claimed** **Tested Nutrients** **Heavy Metals** ***Taste***	**Cost** **Price** **Storage**	**Vitamins**	**Protein & Minerals**	**Carbohydrates & Cholesterol**	**Calories & Fats**	**Notable Features**	**Nutritional Facts**	**Ingredients**
Almond Milk:									
APPROVED Blue Diamond Almonds® Almond Breeze® - Unsweetened Vanilla  Dist. by Blue Diamond Growers	Tested nutrients: ✓ Heavy metals: Passed *Slight roasted-almond flavor, watery*	$0.81 $6.49/64 fl oz [1,890 ml] bottle (approx. 8 servings) Refrigerate after opening and enjoy with 7 days.	A: 150 mcg (500 IU) B12: Not listed D: 2.5 mcg (100 IU) E: 15 IU Riboflavin: 0.034 mg	Protein: 1 g Calcium: 450 mg ✓ Sodium: 170 mg Potassium: 160 mg Iron: 0.72 mg Phosphorus: 20 mg Magnesium: 16 mg Copper: 0.04 mg Manganese: 0.092 mg	Total carbs: 1 g Total sugars: 0 g Dietary fiber: <1 g Cholesterol: 0 mg	Calories: 30 Total fat: 2 g Sat. fat: 0 g Trans fat: 0 g Monounsat. fat: 1.5 g	*Non GMO Project Verified seal. Rainforest Alliance Certified seal. Free of dairy, soy, lactose, cholesterol, peanuts, casein, gluten, eggs, saturated fat and MSG. Vegan. Excellent source of vitamin D and E.* **Precaution:** Contains Almonds. Not for use as an infant formula.	Calories 30, Calories from Fat 20, Total Fat 2.5 g, Saturated Fat 0 g, Trans Fat 0 g, Polyunsaturated Fat 0.5 g, Monounsaturated Fat 1.5 g, Cholesterol 0 mg, Sodium 170 mg, Potassium 160 mg, Total Carbohydrate 1 g, Dietary Fiber <1 g, Sugars 0 g, Protein 1 g, Percent of recommended daily intake: Vitamin A 10%, Vitamin C 0%, Calcium 45%, Iron 4%, Vitamin D 25%, Vitamin E 50%, Riboflavin 2%, Phosphorus 2%, Magnesium 4%, Zinc 0%, Copper 2%, Manganese 4%.	Ingredients: Almondmilk (Filter Water, Almonds), Calcium Carbonate, Natural Flavors, Sea Salt, Potassium Citrate, Sunflower Lecithin, Gellan Gum, Vitamin A Palmitate, Vitamin D2, D-Alpha-Tocopherol (Natural Vitamin E).

APPROVED Califia Farms® Almondmilk - Unsweetened Vanilla  Dist. by Califia Farms LLC	Tested nutrients: ✓ Heavy metals: Passed *Artificial almond/vanilla flavor, like "Play-Doh", creamy* (Gave coffee an artificial taste)	$0.83 $4.99/48 fl oz [1,400 ml] bottle (approx. 6 servings) Refrigerate after opening and use within 7-10 days.	B12: Not listed D: 0 mcg	Protein: 1 g Calcium: 430 mg ✓ Sodium: 160 mg Iron: 1 mg Potassium: 35 mg	Total carbs: 2 g Total sugars: 0 g Dietary fiber: 1 g Cholesterol: 0 mg	Calories: 45 Total fat: 3 g Sat. fat: 0 g Trans fat: 0 g	*Non GMO Project Verified seal. Kosher. Gluten Free. Vegan. BPA Free. Lactose Free. Carrageenan Free. Soy Free. Dairy Free.* **Precaution:** Allergen Statement: Contains Almond.	Calories 45, Total Fat 3 g, Saturated Fat 0 g, Trans Fat 0 g, Cholesterol 0 mg, Sodium 160 mg, Total Carbohydrate 2 g, Dietary Fiber 1 g, Total Sugars [Includes 0 g Added Sugars] 0 g, Protein 1 g, Vitamin D 0 mcg, Calcium 430 mg, Iron 1 mg, Potassium 35 mg.	Ingredients: Almondmilk (Water, Almonds), Natural Flavors, Calcium Carbonate, Sunflower Lecithin, Sea Salt, Locust Bean Gum, Potassium Citrate.
Cashew Milk:									
APPROVED Silk® Creamy Cashew - Unsweet  Dist. by Danone US, LLC	Tested nutrients: ✓ Heavy metals: Passed *Mild soy flavor, creamy*	$0.52 $4.19/64 fl oz [1,890 ml] bottle (approx. 8 servings) Refrigerate after open.	A: 150 mcg (500 IU) B12: Not listed D: 2.5 mcg (100 IU) E: 4 mg	Protein: <1 g Calcium: 450 mg ✓ Sodium: 160 mg Iron: 0.5 mg	Total carbs: 1 g Total sugars: 0 g Dietary fiber: 0 g Cholesterol: 0 mg	Calories: 25 Total fat: 2 g Sat. fat: 0 g Trans fat: 0 g Polyunsat. fat: 0 g Monounsat. fat: 1 g	*Non GMO Project Verified seal. Rainforest Alliance Certified seal. Kosher. Free From: Dairy; Gluten; Carrageenan; Cholesterol; Soy; Artificial Colors & Flavors.* **Precaution:** Contains Cashew And Almond. May contain other tree nuts. Produced in a facility that also processes soy. Not For Use As Infant Formula.	Calories 25, Total Fat 2 g, Saturated Fat 0 g, Trans Fat 0 g, Polyunsaturated Fat 0 g, Monounsaturated Fat 1 g, Cholesterol 0 mg, Sodium 160 mg, Total Carbohydrate 1 g, Dietary Fiber 0 g, Total Sugars [Includes 0 g Added Sugars] 0 g, Protein <1 g, Vitamin D 2.5 mcg, Calcium 450 mg, Iron 0.5 mg, Potassium 0 mg, Vitamin A 150 mcg, Vitamin E 4 mg.	Ingredients: Cashewmilk (Filtered Water, Cashews), Contains 2% of Less of: Almonds, Vitamin and Mineral Blend (Calcium Carbonate, Vitamin E Acetate, Vitamin A Palmitate, Vitamin D2), Salt, Locust Bean Gum, Sunflower Lecithin, Natural Flavor, Gellan Gum, Ascorbic Acid (to protect freshness).
Coconut Milk:									

APPROVED Real Coco Original Organic Coconut Milk  Dist. by Real Coco USA, LLC	Tested nutrients: ✓ Heavy metals: Passed *Definite coconut flavor, creamy, leaves a fatty film* (In coffee, fats float to surface)	$1.66 $6.64/33.8 fl oz [1,000 ml] bottle (approx. 4 servings) Must be refrigerated. Stays fresh 7-10 days after opening.	B12: Not listed D: 0 mcg	Protein: <1 g Calcium: 10 mg Sodium: 80 mg Potassium: 70 mg	Total carbs: 2 g Total sugars: 0 g Dietary fiber: 0 g Cholesterol: 0 mg	Calories: 50 Total fat: 5 g Sat. fat: 4.5 g Trans fat: 0 g	*USDA Organic seal. Non GMO. No Added Sugar. Original Organic Coconut Milk. Vegan. Gluten Free. Free of Saturated Fats.*	Calories 50, Total Fat 5 g, Saturated Fat 4.5 g, Trans Fat 0 g, Cholesterol 0 mg, Sodium 80 mg, Total Carbohydrate 2 g, Dietary Fiber 0 g, Total Sugars [Includes 0 g Added Sugars] 0 g, Protein <1 g, Vitamin D 0 mcg, Calcium 10 mg, Iron 0 mg, Potassium 70 mg.	Ingredients: Filtered Water, Organic Coconut Cream, Natural Flavor, Xanthan Gum, Salt.
Flax Milk:									
APPROVED Good Karma® Flaxmilk Omega-3 + Protein - Unsweetened  Dist. by Good Karma Foods, Inc.	Tested nutrients: ✓ Heavy metals: Passed *Slight fishy flavor, creamy*	$0.87 $3.49/32 fl oz [946 ml] bottle (approx. 4 servings) Keep refrigerated. Please consume within 7 days after opening.	A: 150 mcg (500 IU) B12: 1.5 mcg ✓ D: 2.5 mcg (100 IU)	Protein: 8 g ✓ Calcium: 300 mg ✓ Sodium: 110 mg Phosphorus: 150 mg	Total carbs: 2 g Total sugars: 0 g Dietary fiber: 0 g Cholesterol: 0 mg	Calories: 70 Total fat: 3.5 g Sat. fat: 0 g Trans fat: 0 g Polyunsat. fat: 2 g Monounsat. fat: 0.5 g	*Non GMO Project Verified seal. Free Of: Dairy; Lactose; Nuts; Soy; Gluten. Kosher. Vegan. Excellent source of calcium and vitamin D. Zero cholesterol.* **Precaution:** Not To Be Used As Infant Formula.	Calories 70, Fat Cal 30, Total Fat 3.5 g, Saturated Fat 0 g, Trans Fat 0 g, Polyunsaturated Fat 2 g, Monounsaturated Fat 0.5 g, Cholesterol 0 mg, Sodium 110 mg, Total Carb 2 mg, Dietary Fiber 0 g, Sugars 0 g, Protein 8 g, Percent of recommended daily intake: Vit A 10%, Vit C 0%, Calcium 30%, Iron 0%, Vit D 25%, Vit B12 25%, Phosphorus 15%.	Ingredients: Flaxmilk (Filtered Water, Cold Pressed Flax Oil), Pea Protein Isolate, Tapioca Starch, Natural Flavors, Tricalcium Phosphate, Sunflower Lecithin, Sea Salt, Gellan Gum, Xanthan Gum, Vitamin A Palmitate, Vitamin D2, Vitamin B12.
Hemp Milk:									

***NOT* APPROVED** Tempt® Hempmilk - Unsweetened Vanilla  Dist. by Living Harvest Foods, Inc.	Tested nutrients: Found only 61.7% of listed calcium and 239.2% B12. Heavy metals: Passed *Slight vanilla flavor, mildly hempy and bitter, slightly creamy*	$1.03 $4.13/32 fl oz [946 ml] bottle (approx. 4 servings) Refrigerate after opening and use within 7-10 days.	A: 150 mcg (500 IU) B12: 1.5 mcg ✗ Found 3.6 mcg per cup (239.2% of listed amount) D: 2.5 mcg (100 IU) E: 2.4 IU Riboflavin: 0.425 mg Folic Acid: 8 mcg	Protein: 2 g Calcium: 300 mg ✗ Found only 185 mg per cup (61.7% of listed amount) Sodium: 135 mg Iron: 1.1 mg Phosphorus: 200 mg Magnesium: 40 mg Zinc: 0.6 mg	Total carbs: 1 g Total sugars: 0 g Dietary fiber: 0 g Cholesterol: 0 mg	Calories: 80 Total fat: 8 g Sat. fat: 0.5 g Trans fat: 0 g Polyunsat. fat: 1 g	*Non GMO Project Verified seal. Kosher. Gluten Free. Dairy and Soy Free. Peanut and tree-nut free, Vegan, Low sodium, No trans-fats. Carrageenan Free.*	Calories 80, Calories from Fat 70, Total Fat 8 g, Saturated Fat 0.5 g, Trans Fat 0 g, Polyunsaturated Fat 6 g, Monounsaturated Fat 1 g, Cholesterol 0 mg, Sodium 135 mg, Total Carbohydrate 1 g, Dietary Fiber 0 g, Sugars 0 g, Protein 2 g, Percent of recommended daily intake: Vitamin A 10%, Vitamin C 0%, Calcium 30%, Iron 6%, Vitamin D 25%, Vitamin E 8%, Riboflavin 25%, Folic Acid 2%, Vitamin B12 25%, Phosphorus 20%, Magnesium 10%, Zinc 4%.	Ingredients: Hemp Nut Base (Filtered Water, Hemp Nut [Shelled Hemp Seed]), Vanilla Extract, Sunflower Lecithin, Sea Salt, Gellan Gum, Dipotassium Phosphate, Vitamin A Palmitate, Vitamin D2, Riboflavin, Vitamin B12.
Macadamia Milk:									

APPROVED Milkadamia® - Unsweetened Macadamia Milk  Dist. by Jindilli Beverages LLC	Tested nutrients: ✓ Heavy metals: Passed *Slight sweet, mild nutty flavor, slightly creamy*	$1.37 $5.49/32 fl oz [946 ml] bottle (approx. 4 servings) Refrigerate after opening & consume within 7 days.	A: 150 mcg (500 IU) B12: 3 mcg ✓ D: 2.5 mcg (100 IU)	Protein: 1 g Calcium: 450 mg ✓ Sodium: 95 mg Iron: 0.36 mg	Total carbs: 1 g Total sugars: 0 g Dietary fiber: 1 g Cholesterol: 0 mg	Calories: 50 Total fat: 5 g Sat. fat: 1 g Trans fat: 0 g	*Non GMO Project Verified seal. Vegan. Free From: Dairy; Lactose; Soy; Cholesterol; Carrageenan. Excellent Source of Vitamin D and vitamin B12.* **Precaution:** Contains: Macadamias. Not For Use As An Infant Formula.	Calories 50, Calories from Fat 40, Total Fat 5 g, Saturated 1 g, Trans Fat 0 g, Cholesterol 0 mg, Sodium 95 mg, Total Carbohydrate 1 g, Dietary Fiber 1 g, Sugars 0 g, Protein 1 g, Percent of recommended daily intake: Vitamin A 10%, Vitamin C 0%, Calcium 45%, Iron 2%, Vitamin D 25%, Vitamin B12 50%.	Ingredients: Macadamia Milk (Filtered Water, Macadamias), Calcium Phosphate, Pea Protein, Natural Flavors, Locust Bean Gum, Sea Salt, Sunflower Lecithin, Gellan Gum, Vitamin A Palmitate, Vitamin D2, Vitamin B12.
Oat Milk:									
APPROVED Top Pick for taste Oatly Oat-Milk The Original  Dist. by Oatly Inc.	Tested nutrients: ✓ Heavy metals: Passed *Sweet, oat-like flavor, creamy*	$0.69 $5.49/64 fl oz [1,890 ml] bottle (approx. 8 servings) Keep refrigerated. Fresh for 7-10 days after opening.	B12: 1.2 mcg ✓ D: 3.6 mcg (144 IU)	Protein: 3 g ✓ Calcium: 350 mg ✓ Sodium: 100 mg Iron 0.3 mg Potassium 390 mg Phosphorus 270 mg	Total carbs: 16 g Total sugars: 7 g (Includes 7 g sugar added) Dietary fiber: 2 g Soluble fiber: 1 g Cholesterol: 0 mg	Calories: 120 Total fat: 5 g Sat. fat: 0.5 g Trans fat: 0 mg	*Non GMO Project Verified seal. Certified Vegan Vegan.org seal. Kosher. Gluten-Free. No dairy. No nuts. No gluten.*	Calories 120, Total Fat 5 g, Saturated Fat 0.5 g, Trans Fat 0 g, Cholesterol 0 mg, Sodium 100 mg, Total Carbohydrate 16 g, Dietary Fiber 2 g, Soluble Fiber 1 g, Total Sugars [Includes 7 g Added Sugars] 7 g, Protein 3 g, Vitamin D 3.6 mcg, Calcium 350 mg, Iron 0.3 mg, Potassium 390 mg, Vitamin A 160 mcg, Riboflavin 0.6 mg, Vitamin B12 1.2 mcg, Phosphorus 270 mg.	Ingredients: Oatmilk (water, oats). Contains 2% or less of: low erucic acid rapeseed oil, dipotassium phosphate, calcium carbonate, tricalcium phosphate, sea salt, dicalcium phosphate, riboflavin, vitamin A, vitamin D2, vitamin B12.
Pea Milk:									

APPROVED Top Pick for nutrition Ripple® - Unsweetened Original Nutritious Plant-Based Milk  Dist. by Ripple Foods	Tested nutrients: ✓ Heavy metals: Passed *Mostly bland, mild mashed-pea flavor, creamy*	$0.83 $4.99/48 fl oz [1,420 ml] bottle (approx. 6 servings) Must refrigerate. Stays fresh 7-10 days after opening.	A: 110 mcg (366.7 IU) B12: 2.5 mcg ✓ D: 6 mcg (240 IU) ✓	Protein: 8 g ✓ Calcium: 440 mg ✓ Sodium: 110 mg Potassium: 405 mg	Total carbs: <1 g Total sugars: 0 g Dietary fiber: <1 g Cholesterol: 0 mg	Calories: 80 Total fat: 4.5 g Sat. fat: 0.5 g Trans fat: 0 g Polyunsat. fat: 1 g Monounsat. fat: 3 g	*Non GMO Project Verified seal. Kosher. Dairy-Free. Soy Free, Nut Free, Gluten Free, 100% Vegan. Lactose Free.* **Precaution:** Made In A Facility That Also Processes Allergens. Not For Use As Infant Formula.	Calories 80, Total Fat 4.5 g, Saturated Fat 0.5 g, Trans Fat 0 g, Polyunsaturated Fat 1 g, Monounsaturated Fat 3 g, Cholesterol 0 mg, Sodium 110 mg, Total Carbohydrate <1, Total Sugars [Includes 0 g Added Sugars] 0 g, Protein 8 g, Vitamin 6 mcg, Calcium 440 mg, Iron 0 mg, Potassium 405 mg, Vitamin A 110 mcg, Vitamin B12 2.5 mcg.	Ingredients: Water, Ripptein® (Water, Pea Protein), Sunflower Oil, Contains 1% Or Less Of: Vitamin A Palmitate, Vitamin D2, Vitamin B12, DHA Algal Oil, Tricalcium Phosphate, Dipotassium Phosphate, Sunflower Lecithin, Sea Salt, Natural Flavor, Guar Gum, Gellan Gum.
Soy Milk:									

APPROVED Top Pick for nutrition Silk® Organic Soy - Unsweet  Dist. by WhiteWave Foods	Tested nutrients: ✓ Heavy metals: Passed *Mild soy flavor, creamy*	$0.62 $4.99/64 fl oz [1,890 ml] bottle (approx. 8 servings) Refrigerate after opening and enjoy within 7 days.	A: 150 mcg (500 IU) B12: 3 mcg ✓ D: 3 mcg (120 IU) Riboflavin 0.4 mg Folate: 50 mcg DFE	Protein: 7 g ✓ Calcium: 300 mg ✓ Sodium: 75 mg Iron: 1 mg Potassium: 350 mg Phosphorus: 80 mg Magnesium: 40 mg	Total carbs: 3 g Total sugars: 1 g Dietary fiber: 2 g Cholesterol: 0 mg	Calories: 80 Total fat: 4 g Sat. fat: 0.5 g Polyunsat. fat: 2.5 g Monunsat. Fat: 1 g	*Kosher. Non GMO Project Verified seal. USDA Organic. Rainforest Alliance Certified seal. Free From: Dairy; Gluten; Carrageenan; Cholesterol; Artificial Colors & Flavors.* **Precaution:** Contains Soy. Produced in a facility that also processes tree nuts. Not To Be Used As Infant Formula.	Calories 80, Total Fat 4 g, Saturated Fat 0.5 g, Trans Fat 0 g, Polyunsaturated Fat 2.5 g, Monounsaturated Fat 1 g, Cholesterol 0 mg, Sodium 75 mg, Total Carbohydrate 3 g, Dietary Fiber 2 g, Total Sugars [Includes 0 g Added Sugars] 1 g, Protein 7 g, Vitamin D 3 mcg, Calcium 300 mg, Iron 1 mg, Potassium 350 mg, Vitamin A 150 mcg, Riboflavin 0.4 mg, Folate 50 mcg DFE, Vitamin B12 3 mcg, Phosphorus 80 mg, Magnesium 40 mg.	Ingredients: Organic Soymilk (Filtered Water, Organic Soybeans), Vitamin and Mineral Blend (Calcium Carbonate, Vitamin A Palmitate, Vitamin D2, Riboflavin [B2], Vitamin B12), Sea Salt, Gellan Gum, Ascorbic Acid (to protect freshness), Natural Flavor.

Unless otherwise noted, information about the products listed above is based on the samples purchased by ConsumerLab.com (CL) for this Product Review. The samples are from a single lot of the respective product. Be aware that there may lot-to-lot variation in products, particularly natural products. Manufacturers may change ingredients and label information at any time, so be sure to check labels carefully when evaluating the product you use or buy as it may be different from the product we tested. Manufacturers may also change ingredient suppliers, which can affect product quality. Pricing can change over time and vary based on retailer, promotions, and other factors.

The information contained in this report is based on the compilation and review of information from product labeling and analytic testing. CL applies what it believes to be the most appropriate testing methods and standards. The information in this report does not reflect the opinion or recommendation of CL, its officers or employees. CL cannot assure the accuracy of information.

Products tested in 2020

Concerns and Cautions:

People **allergic to oats, soy, peas, flaxseed, almonds, cashews, or macadamia nuts** (which are actually seeds, but some people are allergic to them) need to be cautious of these ingredients in plant-based milks. In fact, plant-based milks are considered to be high-risk for anaphylactic reactions in people who may be allergic due to their highly concentrated form, the potential for insufficient protein denaturation (i.e. proteins may remain intact), and the short gastrointestinal transit time of liquids (Prager, J Dtsch Dermatol Ges 2023).

Most plant-based milks contain added vitamins and minerals in amounts per cup that can be similar to, or even more than, those in a daily multivitamin/multimineral, although some contain much less, and the phosphate form of calcium used in some plant-based milks is somewhat less bioavailable than the carbonate form in cow's milk (see above). Nevertheless, to avoid excessive intakes, particularly of **calcium**, limit intake to one cup at a time and no more than two cups per day, and cut back on supplements that provide the same nutrients. Limiting intake of plant-based milk is particularly important for young children to avoid excess calcium. Getting more than 1,000 mg of calcium from a supplement (which includes plant-based milks) may increase the risk of **heart attack and/or stroke** as well as **kidney stones**. Calcium can also **interfere with many drugs**. For more details, see the **Concerns and Cautions** section of the Calcium Supplements Review.

On the other hand, if you choose a plant-based milk that *does not* have added **vitamin D and calcium**, be sure to get these nutrients elsewhere in your diet (or from the sun for vitamin D), to protect your bones. A study in Finland showed that a 12-week diet high in protein from plant sources (including unfortified plant-based milks) resulted in a higher ratio of blood markers of bone resorption (breakdown) to bone formation compared to a diet high in animal protein that included dairy products fortified with vitamin D. Vitamin D and calcium intakes were found to be below recommended levels in the plant group (Itkonen, J Nutr 2021).

People with a history of **kidney stones** who are advised to follow a low-oxalate diet (typically < 50 mg of oxalates per day) should also be aware that some plant-based milks can contain **high concentrations of oxalates**. An analysis of 12 plant-based milks sold in the U.S. found that almond milk had the highest oxalate concentration, followed by cashew, hazelnut, and soy. For example, per cup of milk, *Silk Almond Milk Original* contained the highest amounts of oxalates (27 mg), followed by *Forager Cashew Milk* (17.2 mg), *Pacific Foods Hazelnut Milk* (11.3 mg) and *Silk Soy Milk Original* (9.6 mg). Modest to low concentrations were found in *Pacific Foods Hemp Milk* (4.5 mg), *Oatly Oat Milk* (3.5 mg), *Milkadamia Macadamia Milk* (1.1 mg), and *Rice Dream Enriched Rice Milk* (0.71 mg), while *Good Karma Flax Milk* and *So Delicious Coconut Milk* contained little to no oxalate (undetectable levels). When also taking into consideration the labeled amounts of sodium, calcium and potassium in each milk, the researchers concluded that oat, macadamia, rice, and soy milk may be the best choices of plant-based milk for people with kidney stones, with a similar risk profile as regular dairy milk (Borin, J Ren Nutr 2021).

People with chronic **kidney disease** or on **dialysis** who have trouble removing phosphorus (an essential mineral) from their bodies should be aware that some plant-based milks may contain considerable amounts of **added phosphate** — a form of **phosphorus**. Excess phosphorus may cause mineral and bone disorders. Regular milk provides about 250 mg of naturally occurring phosphorus per cup (USDA 2018). *Oatly* had the highest phosphorus content of all the milks tested (270 mg per cup) from three forms of phosphate additives. The phosphorus in phosphate additives is generally better absorbed than that from foods, adding to the concern (Ritz, Dtsch Arztebl Int 2012).

Long-term intake of large amounts of soy milk and other soy products may cause **gynecomastia (swelling of male breast tissue)**, but this is unlikely with moderate consumption. The concern stems from the fact that soy milk contains isoflavones, constituents with weak estrogen-like effects. Cases of gynecomastia have generally involved daily ingestion providing over 300 mg of soy isoflavones. Examples include a 60-year-old man who had been consuming 3 quarts soy milk daily (estimated to provide about 360 mg of isoflavones) (Martinez, Endocr Pract 2008). Symptoms of gynecomastia typically resolve within 6 to 12 months of discontinuing intake, although they persisted (and required surgical intervention) in a 33-year-old man who had been consuming about 0.5 to 1 quart per day of homemade soybean milk *since adolescence* (Widjajahakim, Int Med Case Rep J 2025). Numerous clinical studies have found no increased risk of gynecomastia or elevated estrogen levels in men consuming up to 150 mg of soy isoflavones daily (Messina, Nutrients 2016), which is higher than the amount typically found in a daily serving of **soy isoflavone supplements** (typically 40 to 80 mg of soy isoflavone) or **soy protein**, which typically provides only 12 to 100 mg of isoflavones per 100 grams of soy protein.

Plant-based milks (with the exception of fortified soy milk) are *not* recommended for exclusive consumption in place of dairy milk among children 12 months to 5 years unless medically necessary (e.g., allergy or intolerance to cow's milk) or dietary preference (e.g., vegan), in which case it should be done after consulting with a health care provider to ensure that adequate amounts of the nutrients normally obtained from dairy milk are being obtained. Plant-based milks are not nutritionally equivalent to dairy milk. For example, most plant-based milks (except soy milk) contain less protein and, unless fortified, many contain less vitamin D and calcium than dairy milk. Even when fortified, it is unclear if the bioavailability of the added nutrients is equivalent to that in dairy milk (Dietary Guidelines for Americans, 2020-2025; Healthy Beverage Consumption in Early Childhood, 9/2019). Adverse effects associated with misuse of certain plant-based beverages in young children include failure to gain weight, decreased stature, protein malnutrition, electrolyte disorders, kidney stones and severe nutrient deficiencies including iron deficiency anemia, rickets and scurvy (Merritt, J Pediatr Gastroenterol Nutr 2020). An observational study among 7,195 Canadian children ages 1 to 10-years-old (average age 3) that were followed for about 3 years found that each 250 mL (about 8.4 fl oz.) cup of plant-based milk consumed daily was associated with *slightly* lower BMI-for-age and height-for-age z-scores compared to consuming an equal amount of dairy milk, with trends similar for soy milk vs. other plant-based milks. It was

estimated that a 5-year-old child who consumed three cups of plant-based milk daily would weigh about 1.1 lbs less and be 0.3 inches shorter than the same-age child who consumed three cups of dairy milk daily. Interestingly, plant-based milk consumption was *not* associated with a lower risk of obesity compared to dairy milk (Soczynska, J Nutr 2024).

Plant-based milks also naturally contain **very little iodine**, providing, on average, about 3 mcg of iodine per cup (8 oz) compared to an average of about 85 mcg per cup in cow's milk, with the higher amounts of iodine in cow's milk primarily resulting from iodine in cow's feed, although iodine levels in soil and grass, as well as use of iodine for sanitation also play a role. Because cow's milk and dairy products are generally a significant source of iodine in the American diet, consuming only plant-based milks that are not fortified with iodine could increase the risk of **iodine deficiency**, which can cause **hypothyroidism, goiter, and other adverse effects**, in people not consuming adequate iodine from other sources (Lundquist, JDS Commun 2024). For example, iodine deficiency, goiter, and hypothyroidism were reported in a 22-month-old boy in Italy who had been consuming soy milk exclusively, as part of a restricted diet, due to an allergy to cow's milk (Caprio, Front Endocrinol (Lausanne) 2022). This is also of importance for vegetarians and vegans, and **women who are pregnant or breastfeeding**, who require more iodine (220 mcg and 290 mcg, respectively) than the general daily requirement for adults (150 mcg) (see the ConsumerTips section of our Multivitamins Review for more information about a iodine requirements during pregnancy).

Due to its higher concentration of calcium and lower concentration of phosphorus, **almond milk may cause elevated blood levels of calcium and low blood levels of phosphorus in children**, as was reported in a 14-month-old girl who had exclusively consumed almond milk for two months. After 6 days of treatment with intravenous fluids and switching to a formula with higher phosphorus and lower calcium concentrations, the girl's blood levels of calcium and phosphorus normalized (Salama, J Ped Endocrinol Metab 2024). Although the mineral content of almond milk varies by brand, unsweetened almond milk can contain 422 mg of calcium and only 73.2 mg of phosphorus compared to 306 mg and 251 mg of calcium and phosphorus in whole milk.

Like dairy milk, plant-based milks are not recommended as a substitute for breast milk or formula for infants and children younger than 12 months due to the risk of malnutrition (Healthy Beverage Consumption in Early Childhood, 9/2019). In one reported case, a 5-month-old infant developed **seizures** caused by very low blood levels of sodium (hyponatremia) three weeks after her mother replaced regular feeding with baby formula (which was causing reflux) with almond milk (Houck, Cureus 2019).

As hemp-based milks may contain very small amounts of delta-9-THC, which is included on California's Proposition 65 list and does *not* include a safe harbor level (a level below which exposure is not believed to cause a significant risk), labels for products that contain *any amount* of delta-9-THC must include a **Proposition 65 warning about the possible risk of reproductive harm** if the product is to be sold in California. The warning is based on evidence showing that exposure of animals to THC during pregnancy or lactation affected the brain, behavior and/or learning ability of the offspring and increased the risk of the offspring becoming addicted to drugs later in life (Proposition 65 THC Fact Sheet). As of October 1, 2022, such products intended for ingestion should include the following statement, although the specific warning language is not mandatory if consumers are provided an alternative warning that is "clear and reasonable": "**WARNING**: Consuming this product during pregnancy exposes your child to delta-9-THC, which can affect your child's behavior and learning ability. For more information go to www.P65Warnings.ca.gov/cannabis," although manufacturers have until October 1, 2023 to be compliant (OEHHA, 8-8-22).

Concerns have been raised that oat milk might contain **glyphosate (*RoundUp*)**, as some oat crops are treated with this herbicide. However, a study published in 2023 (Mamavation 2023) of 13 popular oat milks on the market in the U.S., including products from *Califia Farms*, *Chobani*, and *Kirkland Signature*, found that only one, *Silk Original Oat Deliciously Creamy*, had any detectible glyphosate, and the amount was relatively small (3.4 mcg per cup), which is far lower than the amount for which the state of California requires a warning label (1,100 mcg of glyphosate per daily serving). The concentration of glyphosate in *Silk* was only 14 ppb, which is lower than reported in oat cereals, (20 ppb to 800 ppb), and far lower than the European Union Minimal Risk Level for cow's milk of 50 ppb -- there is currently no established limit in milk in the U.S.) and lower than the maximum contaminant level permitted for glyphosate in drinking water in the U.S. (700 ppb). Furthermore, according to the EPA, there is no indication that glyphosate is an endocrine disrupter or causes cancer in humans, and the trace amounts found in foods and beverages on the market are not of concern (see our article about glyphosate).

+ 24 sources

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