

Cow's milk, grass-fed

Grass feeding is a practice not yet familiar to all consumers. 100% grass-fed cow's milk comes from cows who have grazed in pasture year-round rather than being fed a processed diet for much of their life. Grass feeding improves the quality of cow's milk, and makes the milk richer in omega-3 fats, vitamin E, beta-carotene, and CLA (a beneficial fatty acid named conjugated linoleic acid). (For more detailed information about grass feeding, please click [here](#).) Just how important is grass feeding for cow's milk quality? As you will see in the chart below, we have included grass feeding as one of our top-level recommendations for anyone who plans to include cow's milk in their meal plan:

Shopping for Cow's Milk	
Stick with organic	Organic standards help lower risk of contaminated feed and organic cow's milk usually has higher nutrient quality. However, remember that organic by itself does not guarantee a natural lifestyle for the dairy cows.
Ask for 100% grass-fed	Go beyond organic by asking for 100% grass-fed. Don't get sidetracked by the confusing array of labeling terms like "natural" or "pasture-raised." Labeling laws allow products to display these terms even if dairy cows spend little or no time outdoors in a pasture setting. Unfortunately, even the term "grass-fed" is not sufficient since grass-fed dairy cows may have spent a relatively small amount of time grass feeding. The standard to look for on the label is "100% grass-fed." Talk to your grocer or the dairy cow farmer and find out how the animals were actually raised. In addition, if you would like more information about the practice of grass feeding, please click here .
Consider local farms	Organic, 100% grass-fed cow's milk may be available from local farms with small flocks, which provide a natural lifestyle for their dairy cows. Two websites that can help you find small local farms in your area are www.localharvest.org and www.eatwild.com . Both sites are searchable by zip code.

One thing you'll notice about the chart above is an absence of recommendations about percent fat. Provided that you keep your serving size for grass-fed cow's milk at 4 ounces or less, we recommend that you consume it in the form of whole milk. Not only is whole milk the least processed form of milk (placing it in the category of a whole, natural food), it's also the form of grass-fed milk that will provide you with the most omega-3s and other key nutrients. Traditionally, health organizations have not recommended whole milk in the diet but rather reduced fat milk, including 2%, skim, and nonfat milk. Since too much total fat, too much saturated fat, and too many calories in a daily meal plan can raise the risk of certain health problems, this traditional approach makes sense for individuals who cannot make room in their daily meal plan for the amount of total fat, saturated fat, and calories contained in whole milk. However, we believe that many people who may want to include a 4-ounce serving of grass-fed milk in their meal plan will be able to include it in the form of whole milk while still remaining within the guidelines for intake of total fat, saturated fat, and calories.

What's New and Beneficial About Grass-Fed Cow's Milk

- CLA (conjugated linoleic acid) is a type of fat associated with a wide variety of health benefits, including immune and inflammatory system support, improved bone mass, improved blood sugar regulation, reduced body fat, reduced risk of heart attack, and maintenance of lean body mass. According to recent studies, you'll find yourself getting at least 75 milligrams of CLA from an 8-ounce serving of grass-fed cow's milk. (In some cases, you may even get two to three times this amount. The amount of CLA in cow's milk tends to increase along with consumption of fresh grasses by the cows, and when cows have had ample access to fresh pasture, you are likely to get increased amounts of CLA.) Since the CLA content of milk from 100% grass-fed cows is typically two to five times greater than the CLA content of milk from conventionally fed cows, 100% grass-fed milk can provide you with increased health benefits in the areas described above.
- Improved intake of omega-3 fat is another health benefit that can be obtained from 100% grass-fed cow's milk. The omega-3 fat content of grass-fed cow's milk can vary widely, due to the wide variety of forage crops that can be planted in pastures (or that grow on pastureland in the wild). This omega-3 content also varies with the age, breed, and health of cows and seasonal plant cycles in pastureland. At the lower end of the spectrum, recent research shows 50-65 milligrams of omega-3s (in the form of alpha-linolenic acid, or ALA) in 8 ounces of grass-fed cow's milk. At the higher end of the spectrum, those same 8 ounces may provide 120-150 milligrams of omega-3s. While these amounts of ALA are not large, they're going to be helpful to many individuals who are deficient in omega-3s. The relatively low ratio of omega-6s to omega-3s in 100% grass-fed cow's milk may also enhance the benefits that you get from these omega-3s. This ratio typically falls between 2:1 and 3:1—quite unlike the ratio in milk from traditionally fed cows, which often fall into the range of 8:1 or higher. Since omega-6 metabolism can interfere with omega-3 metabolism, the relatively reduced amounts of omega-6s in 100% grass-fed cow's milk may help improve the metabolism of omega-3s in your body after you've consumed the milk.
- Based on recent research studies, the overall fat composition of 100% grass-fed milk is not what you might think. There are about 8 grams of total fat in 8 ounces of whole grass-fed cow's milk. About 2 grams (or 25%) come from monounsaturated fat in the form of oleic acid. This omega-9 fatty acid is the primary fatty acid found in olive oil, and when it replaces other types of fat in the diet, it's been linked to reduction in high blood pressure as well as reduction in high blood cholesterol levels. About 4.5 grams (or 56%) come from saturated fat - a type of fat that we often associate with unwanted health consequences. However, the type of saturated fat in 100% grass-fed cow's milk does not fully fit the "unwanted" fat category. About 6-7% of this saturated fat is "short-chain" saturated fat and it can function as a "probiotic" that supports the health of friendly bacteria in the intestine. Nearly half of the saturated fat is "medium chain" saturated fat—the kind that is predominant in coconut oil. Medium chain saturated fat is more easily digested and metabolized in the body, and in some studies, it's been associated with immune system benefits. Within the 4.5 grams of saturated fat in 8 ounces of 100% grass-fed whole milk, only 25-30% come from palmitic acid—a long chain fat that's been more closely associated with heart disease risk than other saturated fats. When taken as a whole, the fat

composition of 100% grass-fed whole cow's milk is much more balanced in terms of health risks and benefits than many people assume.

Cow's milk, grass-fed		Calories: 74
4.00 oz (122.00 grams)		GI: low
Nutrient	DRI/DV	
vitamin B12	23%	
iodine	19%	
vitamin B2	16%	
vitamin D	16%	
phosphorus	15%	
calcium	14%	
pantothenic acid	9%	
selenium	8%	
protein	8%	
biotin	8%	
vitamin A	6%	

Health Benefits

Broad-Based Nutrient Support

When obtained from 100% grass-fed cows, whole milk contains a surprising diversity of both conventional and phytonutrients. In the conventional category, you'll find milk to be a very good source of vitamin B2 (riboflavin), vitamin D, and vitamin B12. It's also a very good source of the minerals iodine and phosphorus, and a good source of calcium. Our rating system also qualifies whole cow's milk as a good source of protein.

As described previously, the fat composition of 100% grass-fed whole cow's milk is not what you might think. In an 8-ounce serving, you're likely to get at least 50-65 milligrams of omega-3s (in the form of alpha-linolenic acid, or ALA) and perhaps as much as 120-150 milligrams. You're also going to get a relative low ratio of omega-6:omega-3 fat in the range of 2:1 to 3:1. That ratio is healthier than the 8:1 (or higher) ratio you're likely to get from conventionally fed cows, and it's also much healthier than the ratio currently consumed by the average U.S. adult. Included within the fat composition of 100% grass-fed whole milk is CLA (conjugated linoleic acid), a type of fat associated with immune, cardiovascular and other benefits.

In terms of phytonutrients, you're likely to get 16-40 micrograms of beta-carotene in 8 ounces of 100% grass-fed whole cow's milk, along with isoflavones like formononetin, biochanin A, and prunetin depending on the type of fresh pasture and silage consumed by the cows. You're also like to get lignans like secoisolariciresinol and matairesinol, once again, depending on the cows' diet. The chart below gives some simple examples of the relationship between a cow's diet and phytonutrients in milk.

Type of Silage	Phytonutrients Found to Increase in the Cow's Milk
red clover	formononetin (isoflavone)
alfalfa	biochanin A (isoflavone) and prunetin (isoflavone)
birdsfoot trefoil	secoisolariciresinol (lignan) and matairesinol (lignan)

Grass silage has also been shown to increase the beta-carotene content in grass-fed cow's milk to levels of approximately 40 micrograms in 8 ounces. These levels are about 4 times higher than the amount of beta-carotene found in conventional cow's milk.

Antioxidant Support

Antioxidants found in 100% grass-fed whole milk can include the isoflavones formononetin, biochanin A, and prunetin. Antioxidant lignans can include secoisolariciresinol and matairesinol. Vitamin antioxidants include vitamin E (which is increased by about 50% in milk from 100% grass-fed cows versus conventionally fed cows) and mineral antioxidants include selenium and zinc. Grass feeding also increases the amount of another key antioxidant—beta-carotene—in cow's milk. At approximately 40 micrograms per 8 ounces, this level is about 4 times higher than the level in milk from conventionally fed cows.

Other Health Benefits

There are preliminary studies on the health benefits of cow's milk in a variety of areas. However, we're not aware of any large-scale studies done exclusively on 100% grass-fed whole milk. Most of the studies have been conducted using milk from conventionally fed cows on relatively small groups of participants. Within this context, there is some evidence of improved weight loss and improved fat loss when cow's milk is incorporated into a closely monitored low-calorie diet.

There is also evidence of decreased risk of gout in both men and women when milk is consumed in relatively high amounts (averaging at least one cup per day, and often 2-4 cups). Researchers are not clear about the mechanism of action here, but continue to look at relationships between increased intake of cow's milk and decreased levels of uric acid in the blood. (High levels of uric acid usually precede the occurrence of gout.)

While cow's milk has been widely promoted as a source of calcium and good bone health, we have not seen large-scale studies showing significantly improved bone health in adults who regularly consume cow's milk. We have seen several studies involving decreased risk of bone fracture in children and teens who regularly consume milk, and we've also seen animal studies showing reduced risk of osteoporosis following regular milk consumption. Some of the research on bone health and the natural nutrient composition of cow's milk is complicated by widespread fortification of cow's milk with vitamin D. (Vitamin D plays an important role in bone health, and the addition of vitamin D to cow's milk during processing might account for improved bone health.)

Studies on the relationship between cow's milk intake and cancer risk are confusing, and to a certain extent, contradictory. Some studies have shown mild decreases in cancer risk (for example, breast cancer in one group of French women), while other studies have shown mild increases in risk (for example breast cancer in one group of Japanese women). Other studies have shown no connection between cow's milk intake and cancer risk. We have yet to see any large-scale studies that examined the relationship between milk from 100% grass-fed cows and cancer of any type.

Some of this confusion might be related to the widespread presence of hormonal residues in cow's milk from conventionally fed cows, which may have increased cancer risk. These hormonal residues can have two sources. First, hormones may have been injected into the cows or added to their feed in order to increase rate of growth or milk yield. But equally important may be higher levels of hormones produced by the cows themselves. Unlike milking practices adopted by ancient nomadic cultures that restricted milking to the early months of pregnancy (when hormonal levels in the pregnant cows were relatively low), modern dairy farms maintain pregnancy in dairy cows about 80% of the year and milk throughout pregnancy, even during months when hormonal levels are relatively high.

Description

Like their fellow mammals, female cows can produce milk through the process called lactation. (In fact, the very word "mammal" refers to this milk-producing process, since milk is produced by the mammary glands in female animals and *mamma* in Latin means "breast.") While this distinction holds true for all female cows, not all female cows are considered dairy cows. In the commercial milk industry, dairy cows consist of very specialized breeds that can produce very large amounts of milk. Over 90% of dairy cows in the U.S. are black and white Holsteins. After Holsteins, the most common U.S. dairy cows are Jerseys. Other dairy breeds include Ayrshires, Brown Swiss, and Guernseys.

Around two years of age, female dairy cows typically have their first calf, and along with calving, they begin to produce milk (lactation). Through a combination of steps (usually including artificial insemination to re-initiate pregnancy following the end of the first lactation cycle), dairy cows can be managed in such a way as to produce milk about 80% of the year for a period of 6-10 years. Specialized milking breeds like the ones described above average about 20,000 pounds of milk per year in the U.S., with some cows producing up to 37,500 pounds.

All cows belong to the *Bovidae* family of cloven-hooved, ruminant animals that includes bison, buffalo, sheep, goats, antelopes, gazelles, and muskoxen. Most also belong to the *Bos Taurus* genus and species in this animal family.

History

Many animals—including cows—have been milked for the purpose of providing humans with food for thousands of years. However, cows were not native to North America and did not arrive in what is now the United States until the 15th century AD when the Spanish brought them on ships from Europe. Over the next three and one-half centuries, most of the cows present in the U.S. belonged to families on family farms. It was not until the 1900's that the dairy industry as we know it today began to develop, following invention of the pasteurization process and other events (such as the capacity to test dairy herds for the infectious disease tuberculosis).

Today there are approximately nine million dairy cows in the U.S., with five states (California, Wisconsin, New York, Pennsylvania, and Idaho) accounting for most of U.S. dairy production. This total number of dairy cows is about 25% lower than the number of dairy cows in the 1970's. However, even though the total number of dairy cows has decreased, the total volume of milk from these cows has nearly doubled to an average level of about 20,000 pounds per year. In the U.S. the average dairy herd size is approximately 100 cows—translating into about 90,000 dairy farms in all U.S. states combined.

How to Select and Store

When purchasing milk, always use the "sell-by" date as a guide to the shelf life of the milk. Smell the top of the container to make sure that the milk doesn't smell of spoilage that could have been caused by being stored for a period of time outside of the refrigerator. Select milk from the coldest part of the refrigerator case, which are usually the lower sections.

Milk should always be refrigerated since higher temperatures can cause it to turn sour rather quickly. Always seal or close the milk container when storing it to prevent the milk from absorbing the aromas of other foods in the refrigerator. Avoid storing milk on the refrigerator door since this exposes it to too much heat each time the refrigerator is opened and closed.

How to Enjoy

A Few Quick Serving Ideas:

- Blend together milk, a banana and your other favorite fruits for a delicious shake.

- Add milk, raisins, cinnamon and nutmeg to a pot of cooked brown rice to make rice pudding.
- Make hot chocolate by combining milk, unsweetened dark chocolate and honey in a saucepan over low heat. Stir frequently.
- Splash some milk over your morning bowl of hot cereal.

For some of our favorite recipes, click [Recipes](#).

Safety

Adverse Reactions to Cow's Milk

Although allergic reactions can occur to virtually any food, research studies on food allergy consistently report more problems with some foods than with others. Cow's milk is one of these foods. We've created a special Q & A on adverse reactions to cow's milk, including cow's milk allergy and cow's milk intolerance. To read this detailed Q & A, please click [here](#).

Production and Processing of Cow's Milk

Both consumers and scientists have raised concerns about the production and processing of cow's milk. Three areas of special concern include pasteurization and homogenization. We've created in-depth Q & As in each of these areas. For more detailed information, please click on either of the links below:

- [Homogenization](#)
- [Pasteurization](#)

Other Controversies

Some animal foods and some plants foods have been the subject of ongoing controversy that extends well beyond the scope of food, nutrient-richness, and personal health. This controversy often involves environmental issues, or issues related to the natural lifestyle of animals or to the native habitat for plants. Cow's milk has been a topic of ongoing controversy in this regard. Our [Controversial Foods Q & A](#) will provide you with more detailed information about these issues.

Nutritional Profile

Introduction to Food Rating System Chart

The following chart shows the nutrients for which this food is either an excellent, very good or good source. Next to the nutrient name you will find the following information: the amount of the nutrient that is included in the noted serving of this food; the %Daily Value (DV) that that amount represents (similar to other information presented in the website, this DV is calculated for 25-50 year old healthy woman); the nutrient density rating; and, the food's World's Healthiest Foods Rating. Underneath the chart is a table that summarizes how the ratings were devised. Read detailed information on our [Food and Recipe Rating System](#).

Cow's milk, grass-fed				
4.00 oz 122.00 grams			Calories: 74 GI: low	
Nutrient	Amount	DRI/DV (%)	Nutrient Density	World's Healthiest Foods Rating
vitamin B12	0.55 mcg	23	5.5	very good
iodine	28.06 mcg	19	4.5	very good
vitamin B2	0.21 mg	16	3.9	very good
vitamin D	62.22 IU	16	3.8	very good
phosphorus	102.48 mg	15	3.5	very good
calcium	137.86 mg	14	3.3	good
pantothenic acid	0.46 mg	9	2.2	good
selenium	4.51 mcg	8	2.0	good
biotin	2.32 mcg	8	1.9	good
protein	3.84 g	8	1.9	good
vitamin A	56.12 mcg RAE	6	1.5	good
World's Healthiest Foods Rating		Rule		
excellent		DRI/DV \geq 75% OR Density \geq 7.6 AND DRI/DV \geq 10%		
very good		DRI/DV \geq 50% OR Density \geq 3.4 AND DRI/DV \geq 5%		
good		DRI/DV \geq 25% OR Density \geq 1.5 AND DRI/DV \geq 2.5%		

References

- Agricultural Research Service. Putting Cows Out to Pasture: An Environmental Plus. U.S. Department of Agriculture, Agricultural Research Service. *Agricultural Research Magazine*, May/June 2011; vol. 59(5): pages 18-19.
- Benbrook CM, Butler G, Latif MA, et al. (2013). Organic Production Enhances Milk Nutritional Quality by Shifting Fatty Acid Composition: A United States—Wide, 18-Month Study. *PLoS ONE* 8(12): e82429.
- Choi HK, Atkinson K, Karlson EW, et al. Purine-rich foods, dairy and protein intake, and the risk of gout in men. *N Engl J Med*. 2004 Mar 11;350(11):1093-103. 2004.
- Claeys WL, Cardoen S, Daube G et al. Raw or heated cow milk consumption: Review of risks and benefits. *Food Control*, Volume 31, Issue 1, May 2013, Pages 251-262.
- Cornish J, Callon KE, Naot D et al. Lactoferrin is a potent regulator of bone cell activity and increases bone formation in vivo. *Endocrinology* September 1, 2004 vol. 145 no. 9 4366-4374.
- Couvreur S, Hurtaud C, Lopez C et al. The Linear Relationship Between the Proportion of Fresh Grass in the Cow Diet, Milk Fatty Acid Composition, and Butter Properties. *Journal of Dairy Science*, Volume 89, Issue 6, June 2006, Pages 1956-1969.
- Crittenden RG and Bennett LE. Cow's milk allergy: a complex disorder. *J Am Coll Nutr* December 2005 vol. 24 no. suppl 6 582S-591S.
- Dewhurst RJ, Fisher WJ, Tweed JKS et al. Comparison of Grass and Legume Silages for Milk Production. 1. Production Responses with Different Levels of Concentrate. *Journal of Dairy Science*, Volume 86, Issue 8, August 2003, Pages 2598-2611.
- Elgersma A, Ellen G, van der Horst H et al. Quick changes in milk fat composition from cows after transition from fresh grass to a silage diet. *Animal Feed Science and Technology*, Volume 117, Issues 1-2, 10 November 2004, Pages 13-27.
- Hojer A, Adler S, Martinsson K et al. Effect of legume-grass silages and α -tocopherol supplementation on fatty acid composition and α -tocopherol, β -carotene and retinol concentrations in organically produced bovine milk. *Livestock Science*, Volume 148, Issue 3, October 2012, Pages 268-281.
- Hojer A, Adler S, Purup S et al. Effects of feeding dairy cows different legume-grass silages on milk phytoestrogen concentration. *J Dairy Sci*. 2012 Aug;95(8):4526-40. doi: 10.3168/jds.2011-5226.
- Lake IR, Foxall CD, Fernandes A et al. Seasonal variations in the levels of PCDD/Fs, PCBs and PBDEs in cows-milk. *Chemosphere*, Volume 90, Issue 1, January 2013, Pages 72-79.
- Lerch Sm SHingfield KJ, Ferlay A et al. Rapeseed or linseed in grass-based diets: Effects on conjugated linoleic and conjugated linolenic acid isomers in milk fat from Holstein cows over 2 consecutive lactations. *Journal of Dairy Science*, Volume 95, Issue 12, December 2012, Pages 7269-7287.
- Lock AL and Garnsworthy PC. Seasonal variation in milk conjugated linoleic acid and delta 9-desaturase activity in dairy cows. *Livestock Production Science*, Volume 79, Issue 1, January 2003, Pages 47-59.
- Moorby JM, Lee MRF, Davies DR, et al. Assessment of dietary ratios of red clover and grass silages on milk production and milk quality in dairy cows. *Journal of Dairy Science*, Volume 92, Issue 3, March 2009, Pages 1148-1160.
- Noziere P, Grolier P, Durand D et al. Variations in Carotenoids, Fat-Soluble Micronutrients, and Color in Cows-Plasma and Milk Following Changes in Forage and Feeding Level. *Journal of Dairy Science*, Volume 89, Issue 7, July 2006, Pages 2634-2648.
- O'Brien D, Shalloo L, Patton J et al. A life cycle assessment of seasonal grass-based and confinement dairy farms. *Agricultural Systems*, Volume 107, March 2012, Pages 33-46.
- O'Driscoll K, Olmos G, Llamas Moya S et al. A reduction in milking frequency and feed allowance improves dairy cow immune status. *J Dairy Sci*. 2012 Mar;95(3):1177-87. doi: 10.3168/jds.2011-4408.
- Patel M, Wredle E, and Bertilsson J. Effect of dietary proportion of grass silage on milk fat with emphasis on odd- and branched-chain fatty acids in dairy cows. *J Dairy Sci*. 2012 Oct 10. doi:pii: S0022-0302(12)00754-0. 10.3168/jds.2012-5441. [Epub ahead of print].
- Rego OA, Regalo SMM, Rosa HJD et al. Effects of Grass Silage and Soybean Meal Supplementation on Milk Production and Milk Fatty Acid Profiles of Grazing Dairy Cows. *Journal of Dairy Science*, Volume 91, Issue 7, July 2008, Pages 2736-2743.
- Roggeman S, van den Brink N, Van Praet N et al. Metal exposure and accumulation patterns in free-range cows (*Bos taurus*) in a contaminated natural area: Influence of spatial and social behavior. *Environmental Pollution*, Volume 172, January 2013, Pages 186-199.
- Soyeur H, Dehareng F, Mayeres P et al. Variation of Delta 9-desaturase activity in dairy cattle. *J Dairy Sci*. 2008 Aug;91(8):3211-24. doi: 10.3168/jds.2007-0518.
- Sterk A, Johansson BEO, Taweel HZ et al. Effects of forage type, forage to concentrate ratio, and crushed linseed supplementation on milk fatty acid profile in lactating dairy cows. *Journal of Dairy Science*, Volume 94, Issue 12, December 2011, Pages 6078-6091.
- Tempesta T and Vecchiato D. An analysis of the territorial factors affecting milk purchase in Italy. *Food Quality and Preference*, Volume 27, Issue 1, January 2013, Pages 35-43.
- Zemel MB, Richards J, Milstead A et al. Effects of calcium and dairy on body composition and weight loss in African-American adults. *Obes Res*. 2005 Jul;13(7):1218-25.
- Zemel MB, Thompson W, Milstead A et al. Calcium and dairy acceleration of weight and fat loss during energy restriction in obese adults. *Obes Res*. 2004 Apr;12(4):582-90.

[privacy policy and visitor agreement](#) | [who we are](#) | [site map](#) | [what's new](#)

For education only, consult a healthcare practitioner for any health problems.

© 2001-2016 The George Mateljan Foundation, All Rights Reserved