

Celebrate the Holidays With This Beloved Veggie

Spinach is a cool season green leafy vegetable that has risen in popularity over the last decade because of its reputation as one of the most nutrient-dense of all foods.

Analysis by Dr. Karen Shaw Becker



STORY AT-A-GLANCE

- Spinach contains numerous phytonutrients with antioxidant properties, including flavonols, polyphenols and alpha-lipoic acid
- This vegetable provides your pet with B vitamins, which have numerous functions in their body — from regulating energy metabolism and enzyme function to improving immune response
- When offering spinach as a treat, remember to limit its serving to 10% of your pet's daily caloric intake. Serve it plain, without any spices and seasonings
- Opt for organic or spray-free spinach from your local farmers market to make sure that your pet reaps the benefits of this vegetable without being exposed to toxic chemicals

Spinach (*Spinacia oleracea*) is a cool season green leafy vegetable that has risen in popularity over the last decade because of its reputation as "one of the most nutrient-dense of all foods,"¹ earning it superfood status.

It can be just as beneficial for your pet as it is for you when added to their nutritionally balanced, species-appropriate homemade diet or as a treat, which can constitute up to 10% of their daily caloric intake. Continue reading to learn how the nutrients in spinach may help improve your pet's health.



Did You Know?

Spinach originated in Persia (now known as Iran), where it was called "aspanakh," and was introduced to the U.S. during the early 19th century.² It belongs to the goosefoot family, along with Swiss chard and beets.³



Phytonutrients May Help Fight Free Radicals and More

Free radicals are caused by normal cellular metabolism as well as external factors like chemical exposure, stress and pollution. They can damage your pet's healthy cells and tissues, causing oxidative stress and chronic inflammation, which are the roots of aging and disease. To neutralize these free radicals, your pet needs antioxidants from whole food sources like spinach.⁴

"Spinach contains numerous phytonutrients with antioxidant properties, including flavonols such as spinacetin,

patuletin and jaceidin, as well as polyphenols like quercetin and luteolin."⁵

Another nutrient in spinach with antioxidative properties is beta-carotene, also known as pro-vitamin A. Aside from inhibiting oxidative damage, beta-carotene is also essential for eyesight, immune health, cell division and development of animals.^{6,7} One tablespoon of spinach contains 105.63 micrograms of this nutrient.⁸

Spinach is also a source of alpha-lipoic acid (ALA), a powerful compound that may help scavenge free radicals. A study published in The FASEB Journal showed that ALA may help improve the learning ability of dogs between 7 and 9 years old by slowing down cell aging and mitochondrial decay.⁹

Another noteworthy antioxidant compound found in spinach is thylakoids,¹⁰ which are green-plant membranes that have also been found to help regulate hunger and food cravings, potentially helping your pet maintain a healthy weight.¹¹



Spinach Fun Fact

Research found that cooking spinach may increase its bioavailable beta-carotene content by up to three times the amount found in raw form.¹² The most optimal way to cook this leafy green is by steaming, which also makes it more digestible for your pet.¹³



Spinach Is Home to Various Vitamins

There are many vitamins present in spinach that may contribute to your pet's optimal health. One of these is vitamin C, a well-known antioxidant that plays a role in a variety of biochemical processes, including collagen synthesis, which is necessary for the growth and repair of tissues.¹⁴ A tablespoon serving of this leafy green contains 0.53 milligrams of vitamin C.¹⁵

Spinach also provides your pet with B vitamins, which have numerous functions in their body — from regulating energy metabolism and enzyme function to improving immune response.^{16,17,18} A 1-tablespoon serving of spinach contains the following B vitamins:¹⁹

- **Thiamin** — 1.44 micrograms
- **Riboflavin** — 3.56 micrograms
- **Niacin** — 13.56 micrograms
- **Pantothenic acid** — 1.19 micrograms
- **Vitamin B6** — 3.63 micrograms
- **Folate** — 58.2 micrograms

Moreover, spinach provides your pet with 38.06 micrograms of vitamin E for every 1-tablespoon serving.²⁰ This fat-soluble vitamin may help inhibit oxidative stress and promote healthy immune, reproductive, muscular and nervous system function.^{21,22,23} Spinach also contains vitamin K (9.06 micrograms per 1-tablespoon serving),²⁴ which is crucial for blood clotting.²⁵

Fiber in Spinach May Be Beneficial for Your Pet's Gut Health

Spinach is a good source of fiber for your pet, containing 41.25 milligrams per 1-tablespoon serving.²⁶ This may help regulate your pet's bowel movement and improve their gut microbiome, thereby promoting a healthy immune system.²⁷ It's important to note, though, that companion animals only need small amounts of fiber in their diet (about 4%) to mimic the roughage in their ancestral diet, so make sure you don't overfeed your pet fibrous foods.

Which State Produces the Most Spinach?



Spinach is available in the U.S. all year round, with California being the largest producer, accounting for approximately 65% of fresh spinach production in the country. Other states that contribute to most of the yield include Arizona, New Jersey and Texas.²⁸



Tips to Keep in Mind When Offering Spinach to Your Pet

Misinformation about many healthy fruits, vegetables, nuts and seeds abounds on the internet. This is because websites have labeled all risks (such as the risk of overconsumption causing gastrointestinal issues, or choking on too large of pieces or pits) as "toxicities," which isn't true but has managed to confuse millions of pet lovers, nonetheless.

In the case of spinach, oxalates are the fear factor. These are plant compounds that act as the plant's natural defense mechanism against predators. However, oxalates bind to calcium in the blood, which then form tiny, sharp oxalic acid crystals.²⁹ If your pet has a genetic predisposition to calcium oxalate bladder stones, and if you want to include spinach as a part of a healthy, homemade diet, it's best to boil it first (which reduces oxalate levels) and restrict consumption to less than 2% of the recipes.

All "extras" added to a pet's diet should be less than 10% of total calories, so if you're feeding spinach to your pet in appropriate amounts, such as adding a few leaves to their meals as "toppers," then you won't have to worry about overfeeding this vegetable. Serve it plain, without any spices and seasonings.

Choose Safe and Sustainably Grown Spinach for Your Family

Spinach ranks No. 2 on the Environmental Working Group's (EWG) 2023 Dirty Dozen™ list, meaning it may contain high traces of pesticides when grown conventionally.³⁰ Buying and consuming inorganic spinach can have serious repercussions not only to your family's health but also to the environment.

Pesticides contaminate the soil and water, and harm other organisms including beneficial insects, birds and fish.³¹ Consuming crops that have been sprayed with these harmful chemicals also exposes you (and your pet) to antibiotic-resistant bacteria, which has become a global threat to health and food security.

In fact, a study published in the International Journal of Environmental Health Research confirmed the presence of bacteria that's resistant to multiple antibiotics in triple-washed, bagged and ready-to-eat baby spinach.³² Eating this can put your family at risk of bacterial infections that are harder to treat.

With that said, when shopping for spinach, make sure you're buying from farmers who use sustainable farming practices, so you and your pet can reap the benefits of this vegetable without the tagalong health and environmental risks. You can find organic or spray-free spinach from your local farmers market.

Sources and References

- ¹ [Agriculture Marketing Resource Center, Spinach](#)
 - ² [The Produce Box, "Time for Spinach"](#)
 - ³ [The Center for Agroecology and Sustainable Food Systems](#)
 - ⁴ [Can J Vet Res. 2017 Jul; 81\(3\): 206–216, Introduction](#)
 - ⁵ [Appetite. Volume 113, 1 June 2017, Pages 224-230. Introduction](#)
 - ⁶ [Harvard T.H. Chan, Vitamin A](#)
 - ⁷ [EXCLI J. 2016; 15: 1–4](#)
 - ^{8,15,19,20,24,26} [USDA FoodData Central, Spinach, raw](#)
 - ⁹ [FASEB J. 2007 Nov;21\(13\):3756-62](#)
 - ¹⁰ [J Am Coll Nutr. 2015 Nov 2; 34\(6\): 470–477](#)
 - ¹¹ [Appetite. 2015 Aug;91:209-19](#)
 - ¹² [J Nutr. 1998 May;128\(5\):913-6](#)
 - ¹³ [The New York Times, "Does Cooking Boost Nutrients in Tomatoes and Spinach?" September 1, 2017](#)
 - ¹⁴ [NIH Office of Dietary Supplements, Vitamin C](#)
 - ¹⁶ [Nutrients. 2016 Feb; 8\(2\): 68](#)
 - ¹⁷ [Harvard T.H. Chan, B Vitamins](#)
 - ¹⁸ [CNS Neuroscience & Therapeutics Volume 26, Issue 1 p. 5-13](#)
 - ²¹ [NIH Office of Dietary Supplements, Vitamin E](#)
 - ²² [Free Radic Biol Med. 1991;11\(2\):215-32](#)
 - ²³ [Vitamin E: Chemistry and Nutritional Benefits, 2019, pp. 1-11](#)
 - ²⁵ [Cornell University College of Veterinary Medicine, Vitamin K Deficiency](#)
 - ²⁷ [Adv Nutr. 2013 Jan; 4\(1\): 16–28](#)
 - ²⁸ [AgMRC, Spinach, August 2021](#)
 - ²⁹ [Advanced Naturopathic Medical Centre, What Are Oxalates?](#)
 - ³⁰ [EWG, Dirty Dozen™](#)
 - ³¹ [Interdiscip Toxicol. 2009 Mar; 2\(1\): 1–12](#)
 - ³² [Int J Environ Health Res. 2013;23\(2\):108-18](#)
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