

MUSHROOMS: A SUPER SOURCE OF VITAMIN D

By Sharon Palmer, RD

You already know that mushrooms are delicious, offering that classic earthy, umami flavor to a variety of foods, such as stir-fries, casseroles, salads, pizza, and soups. But did you know that mushrooms go beyond flavor to furnish the important nutrient vitamin D?

Vitamin D is called the “sunshine vitamin”, because your skin can harness the sun’s rays and manufacture its own vitamin D, an essential nutrient that plays many important roles in good health. Vitamin D is important for bone health, and it also helps strengthen your immune system to fight infection.

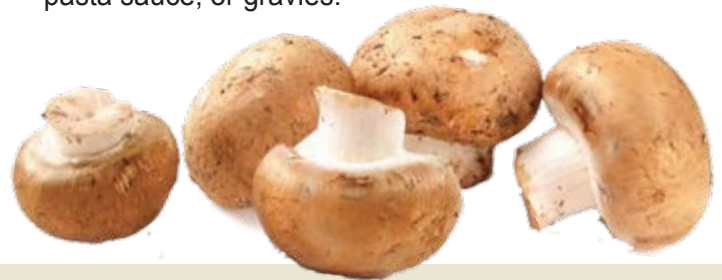
Unfortunately, most Americans don’t get enough vitamin D. Thanks to the industrial revolution, not many people work outdoors any longer, and many of us live in areas that receive lower levels of sun exposure. It’s no wonder we’re not getting much of that all important sunshine vitamin these days. The recent Dietary Guidelines Advisory Committee Report noted that vitamin D is a key shortfall nutrient in the diets of Americans, and even falls short in the recommended USDA food patterns. Currently, the recommended intake for vitamin D is 600 International Units (IU) per day for adults up to 70 years of age, according to the Institute of Medicine. However, many experts believe that this recommendation is too low.^{2,3}

Vitamin D is found in very few foods: fatty fish is the best source, though small amounts may be found in liver, cheese and egg yolks. Milk is fortified with vitamin D, as are other foods. But there’s another place you can stock up on vitamin D: mushrooms.

Mushrooms are amazing! Neither plant nor animal, they’re classified in the fungi kingdom. And mushrooms have the unique ability to synthesize vitamin D from the sun, just like humans do. USDA Research found that UV-treated mushrooms (mushrooms exposed to light) contained 446 IUs of vitamin D per 100 grams (about 3.5 ounces)—that’s about 75% of one’s daily vitamin D needs.⁴

The levels of vitamin D in mushrooms varies, but if you want to power up on those rich in vitamin D, look for “UV-treated” on the package label. Try to fit mushrooms into your diet every day with the following tips:

- Sauté mushrooms for breakfast in an egg or tofu scramble, or veggie burrito.
- Pack mushrooms for a healthy crudité snack with hummus.
- Toss sliced mushrooms into salads.
- Stir mushrooms into soups or stews.
- Stir-fry mushrooms in an Asian-inspired vegetable skillet with brown rice.
- Include mushrooms in classic casseroles, such as broccoli or green bean casserole.
- Layer sliced mushrooms in sandwiches and pizzas.
- Add mushrooms to sauces, such as white sauce, pasta sauce, or gravies.



Sharon Palmer, RDN, *The Plant-Powered Dietitian™*, is an award-winning food and nutrition expert, journalist, and editor. She is author of *The Plant-Powered Diet: The Lifelong Eating Plan for Achieving Health, Beginning Today* (The Experiment, 2012) and *Plant-Powered for Life: Eat Your Way to Lasting Health with 52 Simple Steps & 125 Delicious Recipes* (The Experiment, 2014). Sharon also is editor of *Environmental Nutrition*, nutrition editor of *Today’s Dietitian*, blogger for *The Plant-Powered Blog*, and publisher of her monthly *The Plant-Powered Newsletter*. Living in the chaparral hills overlooking Los Angeles with her husband and two sons, Sharon enjoys visiting her local farmers market, gardening, and cooking for friends and family.

Client Education Resources

Interested in educating your clients about the importance of vitamin D? We created the “[Mushrooms: A Natural Source of Vitamin D](#)” handout to help you explain the benefits of this nutrient and how mushrooms are one of the few unfortified food sources of vitamin D.



RD Mushroom Love in the Media



A Mushroom-Blended Graffiti Burger. (Deb Lindsey/ For The Washington Post)

[The Washington Post: Should you buy lean or regular ground meat?](#)

To add vegetable nutrition to meaty dishes, mix finely chopped, sauteed mushrooms with ground meat, one of Ellie Krieger's favorite techniques. You can do this with The Washington Post Food section's recipes for [Shepherd's Pie](#) (developed by Krieger) or [Mushroom-Blended Graffiti Burgers](#)

[Yahoo! Health: 5 White Foods You Should Be Eating](#)

Mushrooms are associated with umami, the fifth basic taste after sweet, salty, bitter, and sour. They make savory dishes smile and they're low in calories, fat-free, cholesterol-free, and gluten-free, with barely any sodium. Plus, they're loaded with selenium, potassium (8% DV), riboflavin, niacin, and vitamin D. – Bonnie Taub Dix, MA, RDN, CDN

[Tampa Bay Times: Mushrooms: Great as a meal or medicine](#)

Maitake and reishi mushrooms are best noted for their beta glucans or glycoproteins, which enhance immune function and help ward off infectious diseases from bacteria, viruses and fungi or mold. Maitake mushrooms have the highest vitamin D levels (ergosterols or vitamin D-2) of the most commonly consumed mushrooms. - Betty Wedman, PhD, RD, LD

[Huffington Post: Missing Cheese? How to Go Dairy-Free Without Going Flavor-Free](#)

Mushrooms: Umami -- that satisfying flavor that you get from things like meat and cheese -- is also found in mushrooms. So, add sautéed mushrooms to dishes that you'd typically add cheese to. Mushrooms are an especially satisfying replacement for cheese when they're combined with one or two of the other replacements (avocado, cashew puree, cheezy flakes, etc.) – Willow Jarosh, MS, RD and Stephanie Clarke, MS, RD

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NEW MUSHROOM RESEARCH

Research Trends from Experimental Biology

Hot topics from the molecular to the practical dominated the many research sessions at Experimental Biology, held March 28th-April 1st in Boston, MA. Here's the short list of what was covered:

- Nutrition and the microbiome
- Gut microbiota
- Bioactive compounds, mechanism of action and molecular targets
- Nutrition, immunity and infection
- Nutrient and gene interactions
- Bone, muscle and fat – osteosarcopenia
- Epidemiology research and health outcomes
- Nutrition translation from science to public policy, practice and the consumer

The growing area of functional foods is driving bioactive research that looks at health benefits these compounds confer beyond meeting basic nutrient requirements. In addition, the gut, popularly referred to as the “**Inner Tube of Life**,” is increasingly recognized as critical for health. A healthy microbiota – the microorganisms that reside in our gastrointestinal tract - acts as a barrier to pathogens, supports development and appropriate response of the immune system, and tolerance to food antigens and harmless microbes.

Mushroom research has been addressing several of these hot topic areas. A 2013 animal study published in *The Journal of Nutrition* fed mice the equivalent of 75 g of white button mushrooms for six weeks and found improvement in gut microbial diversity and reduction in potentially pathogenic bacteria (i.e. *Clostridia*) in the GI tract. Furthermore, mice fed the mushroom diet recovered better from gastrointestinal injury and infection compared to the control group⁵. Research suggests that polysaccharides in mushrooms may effect immune regulation or inflammatory response. In addition, mushrooms may influence healing of the gastrointestinal track through the action of prebiotics, nondigestible fermentable fibers that stimulate the


growth and/or activity of good bacteria in the digestive system. More research is needed to investigate whether both the microbiota and the host use the nutrients in white button mushrooms and/or whether the microbiota then make bioactive compounds from the polysaccharides⁶.

A recent clinical trial out of the University of Florida investigated whether consumption of whole, dried *Lentinula edodes* (shiitake) mushrooms could improve human immune function by activating and proliferating gamma delta ($\gamma\delta$) T cells and secreting cytokines. $\gamma\delta$ -T cells are ubiquitous in organ linings where they act as the first line of defense against invading pathogens in the gut, lungs and urinary/reproductive tract. 52 healthy adults, aged 21-41, consumed 3 or 6 ounces of shiitake mushrooms for four weeks. Blood samples were drawn prior to and four weeks after mushroom consumption and saliva was collected to investigate changes in mucosal immunity⁷.

Results indicated that mushroom consumption – a source of polysaccharide beta-glucans - enhanced $\gamma\delta$ -T cell and Natural Killer T cell (NK-T cell) proliferation and activation. Consumption of mushrooms also increased secretory IgA (sIgA), indicating an improvement in gut immunity, and reduced C-reactive protein (CRP), suggesting lower inflammation⁷. Lead researcher Susan Percival PhD, Chair and Professor, Food Science and Human Nutrition, explains, “If you eat a shiitake mushroom every day, you could see changes in their immune system that are beneficial. We’re enhancing the immune system, but we’re also reducing the inflammation that the immune system produces.”

The Mushroom Council is committed to supporting mushroom research in these and other areas to help the public better understand the role nutrients contained in mushrooms play in improving health.

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Mushroom & Beef Tacos with Salsa & Cotija Cheese

These tacos are perfect for feeding a family of 5 (with leftovers). Increase your portion sizes by just adding meaty mushrooms.

INGREDIENTS

2 tbsp. vegetable oil
1 cup diced onions
1/2 tbsp. minced garlic
1 lb. mushroom and meat mixture
1 tbsp. chili powder blend
1 tbsp. chopped cilantro
1 tsp. salt, to taste
Lime juice, to taste, about 2 tbsp.
12 fresh corn tortillas taco shells, warmed
1 cup finely shredded green cabbage
1/2 cup salsa of your choice
1 avocado cut into 12 slices
6 oz. grated cotija cheese
Ground black pepper, to taste
Lime juice, to taste
12 cilantro sprigs for garnish

DIRECTIONS

Heat a 10-inch sauté pan over medium-high heat. Add the oil to the pan, then the onions and season with a pinch of salt. Sauté the onions over medium heat until golden brown. Add the garlic and cook until fragrant. Stir in the mushroom-beef mixture and chili powder. Sauté for 2-3 minutes until the flavors meld and warm through. Stir in the cilantro and adjust the seasonings with salt, pepper, and lime juice. Keep warm.

To assemble: Place 1 tablespoon of shredded cabbage on a warm taco shell. Top with 2 tablespoons of mushroom and meat mixture. Top with a generous tablespoon of salsa, a slice of avocado, some cotija cheese, lime juice, and a sprig of cilantro. Makes 12 tacos.

Recipe courtesy of The Culinary Institute of America (CIA) and the Mushroom Council

Visit www.mushroominfo.com for the latest news, recipes and blog posts from the Mushroom Council.



The Mushroom Council is composed of fresh market producers or importers who average more than 500,000 pounds of mushrooms produced or imported annually. The mushroom program is authorized by the Mushroom Promotion, Research and Consumer Information Act of 1990 and is administered by the Mushroom Council under the supervision of the Agricultural Marketing Service. Research and promotion programs help to expand, maintain and develop markets for individual agricultural commodities in the United States and abroad. These industry self-help programs are requested and funded by the industry groups that they serve.