



Handbook for Dietitians and Health Professionals

January 2022

FEED YOUR IMMUNE SYSTEM

What a great time it is to be a mushroom fan! Thank you to all the dietitians and health professionals who have already written about mushrooms and helped elevate them to the rockstar status they are at today.

The following handbook includes the latest on how certain nutrients, including those found in mushrooms, can help support a healthy immune system. As you'll see, mushrooms are a delicious way to consume important nutrients such as selenium, B vitamins and vitamin D. For more information on mushroom nutrition, please visit MushroomCouncil.org (for health professionals) and MushroomCouncil.com (for consumers).





IMMUNITY

Immunity is certainly a hot topic today, but not necessarily new news. Historically, the importance of micronutrients in the immune system and on infection was based on vitamin C deficiency and the occurrence of scurvy. In the first recorded controlled clinical trial¹, published in 1753, James Lind fed different diets to groups of men suffering from scurvy and noted that those who consumed citrus fruit made the most remarkable recovery. Since then, it has been established that several micronutrients are essential to the immune system and have synergistic roles based on their complementary modes of action.

We know the immune system is important for staying healthy, but what exactly is it and what can we do to support it?

The immune system is a complicated network of cells, tissues and organs in your body that protect against infection and disease. Given there are so many pieces to the puzzle, there's not one easy fix that can transform a weak immune system into a strong one in a snap of the fingers, but nutrition certainly plays an important role in its function.

Role of Micronutrients in Supporting the Immune Response

Nutrition plays multiple roles in supporting the immune system². The diet provides:

- Fuel for the immune system to function.
- Building blocks for the generation of RNA and DNA, and for the production of proteins – antibodies, cytokines, receptors, acute phase proteins etc. – and new cells.
- Specific substrates for the production of immune-active metabolites e.g., arginine as a substrate for nitric oxide.
- Regulators of immune cell metabolism including vitamin A and zinc.
- Nutrients with specific antibacterial or anti-viral functions. For example, vitamin D and zinc.

¹ Bartholomew, M. (2002). James Lind's Treatise of the Scurvy (1753). *Postgrad. Med. J.* 78, 695–696. <https://pmj.bmj.com/content/78/925/695>

² Calder, P.C. (2021) Nutrition and immunity: lessons for COVID-19. *Eur J Clin Nutr*, 75, 1309-1318. <https://doi.org/10.1038/s41430-021-00949-8>

- Regulators that protect the host from oxidative and inflammatory stress e.g., vitamin C, vitamin E, zinc, selenium, long-chain omega-3 fatty acids and many plant polyphenols.
- Substrates for the intestinal microbiota that, in turn, modulate the immune system.

Key Nutrients for Supporting Your Immune System

There are certain micronutrients in the foods we eat that play a key role in supporting the immune system³. An important step you can take for your immunity is to ensure you're getting the recommended daily allowances⁴ of these nutrients.

NUTRIENT	DAILY VALUE	FOUND IN FOODS
Vitamin D	20 mcg	UV-light exposed mushrooms, trout, salmon, fortified milk and eggs (6%DV).
Vitamin C	90 mg	Citrus fruits, tomatoes, sweet peppers, broccoli and strawberries.
Vitamin A	900 mcg RAE	Sweet potatoes, spinach, carrots and cheese.
Vitamin B6	1.7 mg	Shiitake mushrooms, chicken, tuna, chickpeas, bananas and squash.
Vitamin B12	2.4 mcg	Salmon, tuna, beef, chicken, eggs and milk.
Vitamin E	15 mg alpha-tocopherol	Almonds, hazelnuts, sunflower seeds and peanut butter.
Selenium	55 mcg	Crimini and portabella mushrooms, Brazil nuts, halibut, ham, beef and turkey.
Iron	18 mg	Oysters, lentils, potatoes, fortified breakfast cereals and dark chocolate.
Zinc	11 mg	Mushrooms (4-8%DV), lobster, beef, pork and Swiss cheese.
Folate	400 mcg DFE	Spinach, asparagus, avocado, broccoli and peas.
Copper	0.9 mg	Shiitake mushrooms, potatoes, cashews, turkey and dark chocolate.

Source: FDA.gov⁵

³ <https://lpi.oregonstate.edu/mic/health-disease/immunity>. Written in March 2016 by: Giana Angelo, Ph.D. Linus Pauling Institute, Oregon State University. Reviewed in February 2017 by: Catherine Field, Ph.D. Professor of Nutrition, Department of Agricultural, Food and Nutritional Science, University of Alberta. This link leads to a website provided by the Linus Pauling Institute at Oregon State University. The Mushroom Council® is not affiliated or endorsed by the Linus Pauling Institute or Oregon State University.

⁴ <https://www.fda.gov/media/99069/download>

⁵ <https://www.fda.gov/food/new-nutrition-facts-label/daily-value-new-nutrition-and-supplement-facts-labels>



NUTRITION FACTS

Nutrition Facts	
1 serving Serving size 5 medium mushrooms (90g)	
Amount per serving	
Calories	20
<small>% Daily Value*</small>	
Total Fat 0g	0%
Saturated Fat 0g	0%
<i>Trans</i> Fat 0g	0%
Cholesterol 0mg	0%
Sodium 5mg	0%
Total Carbohydrate 3g	0%
Dietary Fiber 1g	4%
Total Sugars 2g	
Includes 0g Added Sugars	0%
Protein 3g	
Vitamin D 0.18mcg	1%
Calcium 3mg	0%
Iron 0.45mg	3%
Potassium 286mg	6%
Copper 0.285mg	32%
Selenium 8.35mg	15%
Riboflavin (B-2) 0.36mg	28%
Pantothenic Acid (B-5) 1.345mg	27%
Niacin (B-3) 3.245mg	20%
<small>*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.</small>	

Nutrition Facts	
1 serving Serving size 4 crimini mushrooms (80g)	
Amount per serving	
Calories	18
<small>% Daily Value*</small>	
Total Fat 0g	0%
Saturated Fat 0g	0%
<i>Trans</i> Fat 0g	0%
Cholesterol 0mg	0%
Sodium 5mg	0%
Total Carbohydrate 3g	0%
Dietary Fiber 0.48g	2%
Total Sugars 1g	
Includes 0g Added Sugars	0%
Protein 2g	
Vitamin D 0.08mcg	0%
Calcium 14.4mg	1%
Iron 0.32mg	2%
Potassium 358mg	8%
Copper 0.4mg	44%
Selenium 20.8mcg	38%
Riboflavin (B-2) 0.392mg	30%
Pantothenic Acid (B-5) 1.2mg	24%
Niacin (B-3) 3.04mg	19%
<small>*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.</small>	

Nutrition Facts	
1 serving Serving size 1 piece whole portabella mushroom (84g)	
Amount per serving	
Calories	19
<small>% Daily Value*</small>	
Total Fat 0g	0%
Saturated Fat 0g	0%
<i>Trans</i> Fat 0g	
Cholesterol 0mg	0%
Sodium 8mg	0%
Total Carbohydrate 3g	0%
Dietary Fiber 1g	4%
Total Sugars 2g	
Includes 0g Added Sugars	0%
Protein 2g	
Vitamin D 0.252mcg	1%
Calcium 3mg	0%
Iron 0.26mg	1%
Potassium 306mg	7%
Copper 0.24mg	27%
Selenium 15.6mcg	28%
Pantothenic Acid (B-5) 0.958mg	19%
Niacin (B-3) 3.78mg	24%
<small>*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.</small>	

Nutrition Facts	
1 serving Serving size 6 small oyster mushrooms (90g)	
Amount per serving	
Calories	30
<small>% Daily Value*</small>	
Total Fat 0g	0%
Saturated Fat 0g	0%
<i>Trans</i> Fat 0g	
Cholesterol 0mg	0%
Sodium 16mg	1%
Total Carbohydrate 5g	2%
Dietary Fiber 2g	8%
Total Sugars 1g	
Includes 0g Added Sugars	0%
Protein 3g	
Vitamin D 0.63mcg	3%
Calcium 3mg	0%
Iron 1.19mg	7%
Potassium 378mg	8%
Copper 0.222mg	25%
Riboflavin (B-2) 0.312mg	24%
Folate (B-9) 34mcg	9%
Thiamin (B-1) 0.114mg	10%
Pantothenic Acid (B-5) 1.16mg	23%
Niacin (B-3) 4mg	28%
<small>*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.</small>	

Nutrition Facts	
1 serving Serving size 4 whole shiitake mushrooms (76g)	
Amount per serving	
Calories	26
<small>% Daily Value*</small>	
Total Fat 0g	0%
Saturated Fat 0g	0%
<i>Trans</i> Fat 0g	
Cholesterol 0mg	0%
Sodium 7mg	0%
Total Carbohydrate 5g	2%
Dietary Fiber 2g	8%
Total Sugars 2g	
Includes 0g Added Sugars	0%
Protein 2g	
Vitamin D 0.304mcg	2%
Calcium 2mg	0%
Iron 0.3mg	2%
Potassium 231mg	5%
Copper 0.108mg	12%
Riboflavin (B-2) 0.164mg	13%
Pantothenic Acid (B-5) 1.14mg	23%
Niacin (B-3) 3mg	18%
Vitamin B6 0.224mg	13%
<small>*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.</small>	

Nutrition Facts	
1 serving Serving size 1 cup diced maitake mushrooms (70g)	
Amount per serving	
Calories	22
<small>% Daily Value*</small>	
Total Fat 0g	0%
Saturated Fat 0g	0%
<i>Trans</i> Fat 0g	
Cholesterol 0mg	0%
Sodium 0mg	0%
Total Carbohydrate 5g	2%
Dietary Fiber 2g	8%
Total Sugars 1g	
Includes 0g Added Sugars	0%
Protein 1g	
Vitamin D 19.7mcg	99%
Calcium 1mg	0%
Iron 0.21mg	1%
Potassium 143mg	3%
Copper 0.176mg	20%
Riboflavin (B-2) 0.169mg	13%
Niacin (B-3) 5mg	29%
<small>*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.</small>	



VITAMIN D

The 2020-2025 Dietary Guidelines for Americans state that more than 90% of U.S. men and women over the age of 19 do not get enough vitamin D.⁶

COVID-19 and Vitamin D Association

A retrospective study⁷ published in September 2020 found people deficient in vitamin D might have a higher risk of contracting COVID-19. Researchers looked at data on 489 patients who had had their vitamin D levels tested one year before being tested for COVID-19. The study found that patients who had tested as deficient in vitamin D had a 21.6% chance of getting COVID versus 12.2% for patients who had sufficient vitamin D status. This means suboptimal patients had a 1.77-times higher risk of testing positive for COVID-19.

Types of Naturally Occurring Vitamin D

Vitamin D2

(ergocalciferol)

Found in specially labeled “High Vitamin D” mushrooms.

Vitamin D3

(cholecalciferol)

Found in animal sources including oily fish, egg yolks, select types of liver.

Mushrooms and Vitamin D

All mushrooms contain some vitamin D (1-3% RDA).

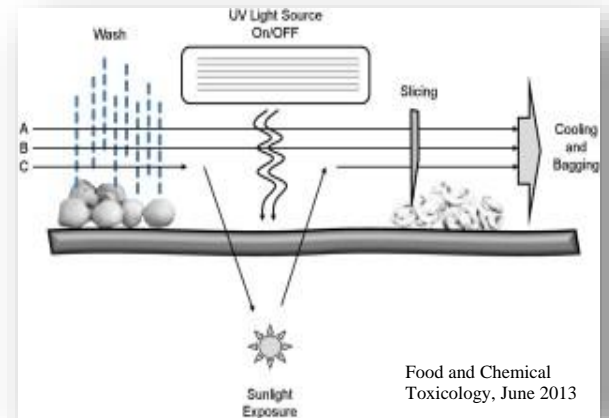
UV-exposed mushrooms are the only produce item with significant levels (50-128% RDA) of naturally occurring vitamin D.

⁶ U.S. Department of Agriculture and U.S. Department of Health and Human Services. Dietary Guidelines for Americans, 2020-2025.

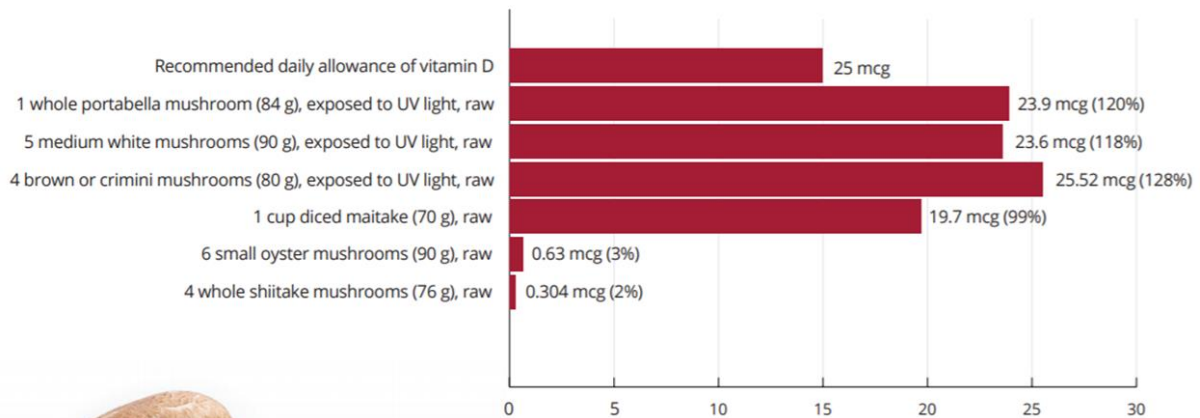
⁷ Meltzer DO, Best TJ, Zhang H, Vokes T, Arora V, Solway J. Association of Vitamin D Status and Other Clinical Characteristics With COVID-19 Test Results. *JAMA Netw Open*. 2020;3(9):e2019722. doi:10.1001/jamanetworkopen.2020.19722

How Vitamin D is Increased in Mushrooms

The mushrooms are exposed to a precise wavelength of ultraviolet light within the UV spectrum. Naturally occurring ergosterol i.e., pre-vitamin D within the mushrooms is converted to ergocalciferol or vitamin D2 once exposed to UV light. During the light exposure, there is a series of photochemical and thermal reactions that convert the ergosterol to vitamin D2. This photochemical process is similar to the process by which vitamin D3 is produced in human skin. The vitamin D process is controlled with a specific time and intensity of light exposure in order to obtain specific levels of vitamin D2 in the mushrooms.



Vitamin D Levels in Mushroom Varieties



Data Source: U.S. Department of Agriculture, Agricultural Research Service, FoodData Central, 2019. fdc.nal.usda.gov.





MUSHROOM VARIETIES & KEY IMMUNITY NUTRIENTS

White Mushrooms

5 medium mushrooms



U.S. Department of Agriculture, Agricultural Research Service, FoodData Central, 2019.

Micronutrient	Amount	RDA
Vitamin D*	23.6 mcg	118%
Copper	0.29 mg	32%
Riboflavin	0.36 mg	28%
Pantothenic Acid	1.35 mg	27%
Niacin	3.25 mg	20%
Selenium	8.35 mcg	15%
Vitamin B6	0.1 mg	6%
Thiamin	0.075 mg	6%
Zinc	0.5 mg	4%
Folate	15 mcg	4%
Iron	0.45 mg	3%
Vitamin B12	0.04 mcg	1%

* UV-light exposed

Crimini Mushrooms

4 mushrooms



U.S. Department of Agriculture, Agricultural Research Service, FoodData Central, 2019.

Micronutrient	Amount	RDA
Vitamin D*	25.5 mcg	128%
Copper	0.4 mg	44%
Selenium	21 mcg	38%
Riboflavin	0.39 mg	30%
Pantothenic Acid	1.2 mg	24%
Niacin	3.04 mg	19%
Zinc	0.88 mg	8%
Thiamin	0.076 mg	6%
Vitamin B6	0.1 mg	5%
Folate	20 mcg	5%
Vitamin B12	0.08 mcg	3%
Iron	0.32 mg	2%

* UV-light exposed

Portabella Mushrooms

1 whole portabella mushroom



U.S. Department of Agriculture, Agricultural Research Service, FoodData Central, 2019.

Micronutrient	Amount	RDA
Vitamin D*	23.9 mcg	120%
Copper	0.24 mg	27%
Selenium	16 mcg	28%
Niacin	3.78 mg	24%
Pantothenic Acid	0.96 mg	19%
Riboflavin	0.12 mg	8%
Vitamin B6	0.124 mg	7%
Folate	24 mcg	6%
Zinc	0.45 mg	4%
Thiamin	0.05 mg	4%
Vitamin B12	0.042 mcg	2%
Iron	0.26 mg	1%

* UV-light exposed

Shiitake Mushrooms

4 whole shiitake mushrooms



U.S. Department of Agriculture, Agricultural Research Service, FoodData Central, 2019.

Micronutrient	Amount	RDA
Pantothenic Acid	1.14 mg	23%
Niacin	3 mg	18%
Riboflavin	0.16 mg	13%
Vitamin B6	0.224 mg	13%
Copper	0.11 mg	12%
Selenium	4.32 mcg	8%
Zinc	0.78 mg	7%
Folate	10 mcg	2%
Vitamin D	0.3 mcg	2%
Iron	0.3 mg	2%
Thiamin	0.012 mg	1%

Oyster Mushrooms

6 small oyster mushrooms



U.S. Department of Agriculture, Agricultural Research Service, FoodData Central, 2019.

Micronutrient	Amount	RDA
Niacin	4 mg	28%
Copper	0.22 mg	25%
Riboflavin	0.31 mg	24%
Pantothenic Acid	1.16 mg	23%
Thiamin	0.114 mg	10%
Folate	34 mcg	9%
Iron	1.19 mg	7%
Zinc	0.69 mg	6%
Vitamin B6	0.1 mg	6%
Selenium	2.34 mcg	4%
Vitamin D	0.63 mcg	3%

Maitake Mushrooms

1 cup diced maitake mushrooms



U.S. Department of Agriculture, Agricultural Research Service, FoodData Central, 2019.

Micronutrient	Amount	RDA
Vitamin D	23.9 mcg	99%
Niacin	5 mg	29%
Copper	0.18 mg	20%
Riboflavin	0.17 mg	13%
Thiamin	0.1 mg	9%
Zinc	0.53 mg	5%
Folate	14 mcg	4%
Pantothenic Acid	0.19 mg	4%
Selenium	1.5 mcg	3%
Vitamin B6	0.04 mg	2%
Iron	0.21 mg	1%

Lion's Mane Mushrooms

4 medium pieces



Micronutrient	Amount	RDA
Biotin	17 mcg	57%
Copper	0.18 mg	20%
Thiamin	0.15 mg	12%
Niacin	1.63 mg	10%
Folate	30 mcg	8%
Zinc	0.74 mg	7%
Vitamin B6	0.07 mg	4%
Iron	0.69 mg	4%
Selenium	1.8 mcg	3%



ON THE PLATE

The Blend™

The development of The Blend™ is the culinary technique of blending finely chopped mushrooms with ground meat. For a burger like this, you're looking at a 75/25 meat to mushroom ratio. But let's take a closer look at this burger. By making the right choices, you could be getting vitamin C from your tomato and onion, iron from your whole wheat bun, vitamin A from lettuce, selenium and zinc from your mushrooms and Swiss and, by blending in high vitamin D mushrooms to your ground meat, you get that vitamin D too.

The Blended Burger



Following are a few of our favorite recipes for feeding your immune system. For more delicious and nutritious recipes, please visit mushroomcouncil.com/recipes.

CRIMINI MUSHROOM FARRO POWER BOWL

Developed by Ashleigh Amoroso

Yield: 4 servings

INGREDIENTS

- 1/4 cup olive oil, plus more as needed
- 2 pounds sweet potatoes, peeled and cut into 1/2-inch pieces
- 1/2 lemon
- 1 bunch broccoli, cut down to florets
- 1 clove garlic, thinly sliced
- 4 medium leeks, white and light green parts, thinly sliced
- 1 1/2 pounds crimini mushrooms, sliced (about 6 cups)
- Kosher salt and freshly ground black pepper
- 1 3/4 cups semi-pearled farro (semi-pearled is ideal, pearled OK as substitute)
- 4 cups vegetable broth or mushroom broth, if possible
- 2 cups water
- 1/2 cup finely chopped chives (from about 1 bunch)
- 1 tablespoon finely grated lemon zest, plus lemon wedges for squeezing
- Plain Greek yogurt and pomegranate seeds, for serving



INSTRUCTIONS

1. Preheat oven to 425 degrees F. Set aside two sheet pans. To the first, drizzle olive oil over sweet potato cubes, toss to coat and distribute in a single layer across the sheet pan. Sprinkle with salt and pepper and set aside. To the second sheet pan, drizzle olive oil and squeeze lemon over the broccoli florets and sliced garlic, toss to coat and distribute in a single layer across the sheet pan. Sprinkle with salt and pepper. Place both pans in the oven and roast for 16-20 minutes, tossing as needed. Set aside.
2. Heat olive oil in a large Dutch oven over medium-high heat. Add half the leeks and half the mushrooms, and season with salt and pepper. Cook, stirring occasionally, until the mushrooms are browned and crisped, 12 to 15 minutes. They will start giving off moisture and steaming a little before this happens.
3. Using a slotted spoon, transfer them to a medium bowl leaving any olive oil behind. They will have absorbed the oil as they cook and released it back as they crisp. Add a bit more olive oil so there's another 1/4 cup or so in the pot. Cook the remaining leeks and mushrooms until soft, about 4 to 5 minutes. Season with salt and pepper, as necessary. Add them to the bowl with the other mushrooms and set aside.

4. Without wiping the pot or removing any of the oil, add farro and season with salt and pepper. Cook over that same medium-high heat, stirring frequently, until farro is toasted on the outside. It will go from pale golden brown to a toastier golden brown, about 5 minutes. Add broth and 2 cups water; season with salt and pepper.
5. Bring to a strong simmer and reduce heat to medium-low. Simmer gently, stirring occasionally, until farro is fully cooked and most but not all of the liquid has been absorbed, 20 to 25 minutes. It should still look a bit loose, like risotto or a porridge. Remove from heat and add half the chives.
6. Toss remaining chives and lemon zest together in a small bowl. To serve, season farro with salt and pepper and ladle into bowls. Top with mushrooms, broccoli, sweet potatoes, leeks, pomegranate seeds and yogurt. Serve lemon wedges alongside for squeezing.

AL PASTOR MUSHROOM TACOS

Developed by Davy Khy, Love in My Belly

Yield: 4 servings

INGREDIENTS

- 1 pound portabella mushrooms
- 2 teaspoons achiote powder
- 1 teaspoon cumin
- 1 teaspoon oregano
- 1 teaspoon garlic powder
- 1/2 teaspoon chili powder
- 1/2 teaspoon salt
- 1/2 teaspoon sugar
- 1/4 cup orange juice
- 1/4 cup pineapple juice
- 1 lime, juiced
- 1 tablespoon olive oil

Additional Ingredients:

- 1 cup of fresh pineapple slices
- Small street style white corn tortillas
- 1 mixed cup of chopped cilantro and diced sweet yellow onion
- 2 limes, sliced for serving
- Salsa

INSTRUCTIONS

1. Clean portabella mushrooms and pat dry. Slice into strips of medium thickness.
2. To prepare marinade, mix together achiote powder, cumin, oregano, garlic powder, chili powder, salt, sugar, fruit juices and olive oil. Add mushroom strips.
3. In a large skillet over medium high heat, add olive oil and sauté mushrooms until cooked through. Set aside.
4. Char pineapple slices in another skillet or keep raw.
5. Warm tortillas in a separate skillet.
6. Assemble tacos. In tortilla, add cooked mushrooms, sprinkle cilantro and onions, top with pineapple and serve with fresh lime wedges and salsa.



ASIAN BBQ SESAME SALMON WITH NOODLES & VEGGIES

Developed by Emily Weeks, RDN, LD

Yield: 4 servings

INGREDIENTS

For the sauce:

- 1/2 cup soy sauce
- 2 tablespoons brown sugar
- 1 tablespoon rice vinegar
- 2 cloves garlic, minced
- 1 teaspoon fresh ginger, minced
- 1 teaspoon chili garlic sauce (optional — for heat)
- 1 tablespoon toasted sesame oil
- 2 tablespoons your favorite BBQ sauce
- 2 tablespoons water
- 2 teaspoon cornstarch

For the dish:

- 1 1/2 pounds (4 filets) salmon
- 12 ounces stir-fry rice noodles or pad thai noodles
- 1 tablespoon toasted sesame oil
- 1 pound white mushrooms, sliced
- 1 cup sugar snap peas
- 1 large broccoli head, cut into bite-size florets
- 2–3 green onions, thinly sliced
- Sesame seeds for garnish

INSTRUCTIONS

1. Preheat oven to 400 degrees F.
2. Whisk together sauce ingredients except water and cornstarch in a small saucepan. Bring to a boil over high heat, then reduce heat to a simmer. In a small bowl, whisk together water and cornstarch. Pour into the pan and cook on low, whisking often, until the sauce thickens, 3-5 minutes. Remove from heat and set aside.
3. Pour 3 tablespoons of the sauce into a small bowl. Brush the salmon filets with reserved sauce and place on a baking sheet. Bake for 15 minutes, or until salmon is flaky. Discard the small bowl of sauce if any remains.
4. Cook the stir-fry noodles according to the package directions. Drain, rinse and set aside.
5. Heat a large skillet over medium heat. Add the sesame oil. Add mushrooms, snap peas and broccoli. Cook, stirring often, until veggies are tender-crisp, 7-8



minutes. Add the noodles and the remaining sauce from the pan. Toss to combine.

6. To serve, divide noodles, veggies and salmon between plates. Top with sliced green onions and sesame seeds.

GARLIC-ROSEMARY BUTTER ROASTED CHICKEN THIGHS AND VEGGIES WITH MUSHROOM ORZO RISOTTO

Developed by Emily Weeks, RDN, LD

Yield: 4 servings

INGREDIENTS

Chicken Ingredients

- 8 boneless, skinless chicken thighs
- Salt and pepper, to taste
- 6 tablespoons unsalted butter
- 16 ounces crimini mushrooms, quartered
- 3 zucchini, sliced in half moons
- 3 large carrots, thinly sliced
- 4 cloves garlic, minced
- 4 sprigs fresh rosemary, leaves removed and roughly chopped

Orzo Ingredients

- 4 cups chicken or vegetable broth
- 1 tablespoon unsalted butter
- 1 tablespoon extra-virgin olive oil
- 1 small yellow onion, diced
- 2 garlic cloves, minced
- 16 ounces crimini mushrooms, finely chopped
- 1 cup uncooked orzo pasta
- 1/8 teaspoon black pepper
- 1/3 cup white wine
- 1/3 cup shredded Parmesan cheese

INSTRUCTIONS

For the chicken:

1. Preheat the oven to 450 degrees F.
2. Pat chicken dry. Season with salt and pepper. Melt butter over medium-high heat in a large skillet. Sear chicken until brown on both sides, 4-5 minutes on each side.
3. Meanwhile, prepare vegetables. Toss quartered mushrooms, zucchini and carrots in a large bowl with garlic and rosemary.
4. Spread veggies out onto a large baking sheet. Nestle chicken into vegetables. Drizzle with butter and juices from the pan.



5. Bake for 20 minutes, until chicken is cooked through and vegetables are tender.

For the orzo:

1. Warm the broth in a small pot over medium-low heat.
2. Use the skillet from the chicken and add butter and olive oil over medium heat. Add onion, garlic and finely chopped mushrooms. Cook, stirring occasionally, until onions soften, 3-4 minutes.
3. Add orzo and black pepper. Stir and cook the orzo for 2 minutes. Add the white wine and cook until evaporated, about 1 minute.
4. Add broth to the orzo, 2/3 cup at a time, stirring until the liquid is absorbed. Repeat with remaining broth, waiting until the last batch is absorbed before adding the next. Remove from heat and stir in Parmesan.
5. Serve in individual bowls with chicken and roasted vegetables atop mushroom orzo risotto.

CREAMY SPINACH, MUSHROOM & LASAGNA SOUP

Developed by Emily Weeks, RDN, LD

Yield: 4 servings

INGREDIENTS

- 1 tablespoon extra-virgin olive oil
- 2 cloves garlic, minced
- 1 medium onion, small diced
- 8 ounces crimini mushrooms, sliced
- One 24-ounce jar marinara sauce
- One 15-ounce can diced tomatoes
- 2 tablespoons tomato paste
- 2 teaspoons balsamic vinegar
- 1 teaspoon granulated sugar
- 1 tablespoon dried basil
- 1/2 teaspoon salt
- 1 teaspoon oregano
- 1/2 teaspoon black pepper
- 1 bay leaf
- 3 cups vegetable broth
- 6 lasagna noodles, broken into pieces
- 1/2 cup heavy cream
- 5 ounces fresh baby spinach
- 1 cup whole milk ricotta
- 1/2 cup shredded mozzarella for topping



INSTRUCTIONS

1. Heat a large pot over medium heat.
2. Add olive oil, garlic, onion and mushrooms. Cook, stirring occasionally, until onions and mushrooms have softened, 4-5 minutes.
3. Add marinara, diced tomatoes, tomato paste, vinegar, sugar, basil, salt, oregano, pepper, bay leaf and broth. Bring to a boil over high heat, then reduce heat to low and simmer.
4. Add lasagna noodles and cook, stirring often, until softened, about 15 minutes. Remove from heat and remove bay leaf.
5. Stir in the heavy cream and spinach until wilted, 2-3 minutes.
6. Divide between bowls and top with a dollop of ricotta and a sprinkle of mozzarella.

GRILLED PORTABELLA GYROS WITH YOGURT DILL SAUCE

Developed by Emily Weeks, RDN, LD

Yield: 4 servings

INGREDIENTS

- 4 portabella mushrooms
- 1 tablespoon extra-virgin olive oil
- 1/2 teaspoon dried oregano
- 1/4 teaspoon smoked paprika
- 2 yellow bell peppers, sliced
- 4 pita breads or naan
- 2 tomatoes, thinly sliced
- 1/2 red onion, thinly sliced
- 1/2 head green lettuce
- Crumbled feta cheese, optional



For the Yogurt Dill Sauce:

- 1 English cucumber, grated
- 1 cup whole milk Greek yogurt
- 1/2 cup sour cream
- 2 tablespoons extra-virgin olive oil
- Juice from 1/2 small lemon
- 2 cloves garlic, minced
- 1 teaspoon salt
- 1 tablespoon minced fresh dill

INSTRUCTIONS

1. Remove the stems from the mushrooms and brush caps with a wet towel. Carefully scrape out the gills with a spoon. Slice mushroom into 1/4-inch pieces and place in a medium bowl along with the olive oil, oregano and smoked paprika.
2. Preheat an indoor grill pan over medium-high heat. Add mushrooms and peppers and grill, tossing occasionally, until tender, 5-7 minutes.
3. To make the Yogurt Dill Sauce, squeeze the grated cucumber in a clean towel to remove excess liquid. Add to a large bowl with yogurt, sour cream, olive oil, lemon, garlic, salt and dill. Stir to combine.
4. To serve, place mushrooms and peppers in the middle of the pita bread. Top with tomatoes, onion, lettuce, feta (optional) and a big dollop of yogurt sauce.

CRISPY MUSHROOM, WHITE BEAN, QUINOA AND KALE SALAD

Developed by Katherine Laine

Yield: 4 servings

INGREDIENTS

- 5 crimini mushrooms, sliced
- Olive oil
- 6-7 leaves fresh kale
- 2 cloves garlic, roughly chopped
- 5-6 circles of red onion
- 1/4 cup cannellini beans, cooked
- 1/4 cup quinoa, cooked



Dressing

- 1/4 cup olive oil
- 3 tablespoons balsamic vinegar
- 2 teaspoons lime juice
- 2 dashes coriander
- Salt, pepper

INSTRUCTIONS

Mushrooms

1. Toss in mushrooms with olive oil and place in air fryer for 10 minutes, shake halfway through. If you don't have an air fryer, simply toss the olive oil mushrooms in 1/4 cup almond flour with a dash of salt, pepper, garlic powder and cook in a skillet until slightly brown.

Dressing

1. In a bowl, mix together all ingredients.

Salad

1. Heat 1 tablespoon of olive oil in a skillet. Add kale and cook until slightly wilted. Remove from heat.
2. In another skillet, heat 1 tablespoon of olive oil. Add garlic cloves and onions until garlic is brown and onions are soft.
3. Top wilted kale with mushrooms, garlic, onions, cooked cannellini beans, cooked quinoa and dressing.

SHEET PAN MUSHROOM FAJITAS

Developed by Chelsey Amer, MS, RD

Yield: 6 servings

INGREDIENTS

- 2 medium yellow and/or red onions, sliced into 1/4-inch strips
- 2 large bell peppers, sliced into 1/4-inch strips
- 2 large portobello mushroom caps, sliced into 1/4-inch strips
- 2 tablespoons avocado oil
- 1/2 teaspoon chili powder
- 1/2 teaspoon cumin
- 1/4 teaspoon garlic powder
- 1/2 teaspoon smoked paprika
- 1/4 teaspoon salt
- 1/4 teaspoon black pepper
- Six 6-inch whole wheat or corn tortillas*
- 1/4 cup cilantro, roughly chopped
- Optional toppings: avocado, salsa, hot sauce, shredded lettuce and/or cabbage, chopped tomatoes



INSTRUCTIONS

1. Preheat the oven to 400 degrees F. Line a large 18- x 13-inch baking sheet with parchment paper. Set aside.
2. In a large bowl toss together onions, peppers, and mushrooms with oil and spices. Distribute on the large baking sheet. Roast for 25 minutes, tossing halfway through, until veggies are soft to fork and slightly browned at the edges.
3. Heat tortillas in a pan over medium heat, if desired. Divide the portobello mushroom fajita mixture into 6 tortillas. Garnish with cilantro. Serve with salsa, avocado, shredded cheese, shredded cabbage, and a squeeze of lime. Enjoy!

GRILLED PORTABELLA MUSHROOM EGG SCRAMBLE

Developed by Hannah Christina

Yield: 2 servings

INGREDIENTS

- 1/4 of a bell pepper, diced
- 2 tablespoons onion, diced
- 2 portabella mushrooms, sliced
- 1 tablespoon coconut oil
- Dash of steak seasoning
- 3 eggs



INSTRUCTIONS

1. In a small bowl, add chopped onion and bell pepper and mix. Set aside and slice mushrooms.
2. On medium heat add one tablespoon of coconut oil and lay mushrooms flat in skillet, season with a bit of steak seasoning. Flip after each side as fully cooked.
3. Set aside and pour blended eggs into skillet and scramble!

BRAISED MUSHROOM, GREENS AND BEANS

Developed by Kaitly Farrell

Yield: 4 to 6 servings

INGREDIENTS

- 2 tablespoons extra-virgin olive oil
- 1 large, sweet onion, diced
- 4 cloves garlic, minced
- Few sprigs of thyme
- 2 bay leaves
- 1 teaspoon dried oregano
- 1 pound mushrooms, sliced
- 1 cup of dried white beans, soaked in water overnight and drained
- 1 bunch of hearty winter greens (about 12 oz.) such as kale or collards, veins removed, chopped
- 1 plum or small tomato, quartered
- 1-1/2 teaspoon kosher salt
- 1/2 teaspoon black pepper
- Hot pepper (optional, to taste)
- 4-6 cups water or stock
- 1/4 cup chopped parsley



INSTRUCTIONS

1. Heat a large, deep sided skillet over medium heat.
2. Add oil and sauté onions for 2 minutes. Then add garlic, thyme, bay leaves, oregano, mushrooms and sauté for 5 minutes until mushrooms start to brown.
3. Add the soaked beans, greens, tomato, salt, black pepper and 4 cups of water. Optionally add hot pepper now. Stir and bring to a boil. Then reduce to a simmer and cover. Cook for about 1 hour until the beans are cooked and creamy, stirring periodically. Add more water as needed.
4. Taste for salt and add more by the pinch as needed. Stir in chopped parsley and serve.

BLENDING TACO PIZZA

Developed by Elaine Magee, MPH, RD aka @therecipedoctor on Instagram

Yield: 5 servings (2 slices/each)

INGREDIENTS

- 8 ounces sliced mushrooms
- 1/2-pound lean 92/8 ground beef
- 1/2 teaspoon black pepper
- 1 1/2 tablespoons taco seasoning blend of your choice
- 1 large pizza crust of your choice – whole wheat, cauliflower, gluten free, etc.
- 3/4 cup pizza sauce or marinara sauce
- 2 cups shredded part skim mozzarella
- 1 cup shredded lettuce
- 1/2 cup chopped tomato
- 1/2 cup crushed tortilla chips, optional
- 1/4 cup plain Greek yogurt or light sour cream, optional



INSTRUCTIONS

1. Preheat oven to 400 F.
2. Add sliced mushrooms to a food processor and pulse briefly until finely chopped with a similar texture to ground beef. In a large, nonstick skillet over medium heat, cook ground beef with mushrooms, breaking the ground beef up into small pieces as it cooks. When halfway cooked, stir in the black pepper and taco seasoning. Add a couple tablespoons of water if needed for moisture. When fully cooked, remove from the heat.
3. Place pizza dough or prepared pizza crust on a parchment paper lined baking sheet. Bake for 10 minutes. Remove from the oven and spread pizza sauce over the pizza dough/crust, then top with the cheese and dot the top generously with the taco mixture. Bake for 5 to 10 minutes or until cheese is bubbly. Garnish the top with shredded lettuce, diced tomato and crushed tortilla chips. Add a swirl of yogurt or light sour cream if desired.

MUSHROOM FREEZER BREAKFAST BURRITOS

Developed by Natalie Rizzo, MS, RD

Yield: 4 servings

INGREDIENTS

- 2 tablespoons neutral oil (canola, vegetable, grapeseed)
- 1/2 white onion, diced
- 2 garlic cloves, minced
- 2 cups crimini mushrooms, chopped
- 4 cups loosely packed spinach, chopped
- 1/4 teaspoon salt
- 8 large eggs
- 3 tablespoons milk
- Salt and pepper to taste
- Cooking spray
- 4 large whole wheat tortillas
- 1/4 cup + 2 tablespoons goat cheese



INSTRUCTIONS

1. Heat a large skillet over medium-high heat and add oil to pan. Add the onion, garlic and cook for 2-3 minutes or until translucent.
2. Add the mushrooms and cook until they are golden brown, about 3-4 minutes. Flip the mushrooms, so the other side can cook. Place the spinach in the pan and cook until it's wilted, about 3-4 minutes. Season with salt and stir all the veggies together. Remove from heat and set aside.
3. In a large bowl, whisk together eggs and milk. Season with salt and pepper to taste.
4. Heat another large skillet over medium heat. Spray the skillet with cooking spray and add egg mixture. Cook for 4-5 minutes, stirring frequently, until the eggs have set. Remove from heat.
5. Heat the tortillas in the microwave for 10 seconds. They are easier to roll when warm. Lay out the tortillas on four separate pieces of aluminum foil and spread 1 1/2 tablespoon of goat cheese on each tortilla. Evenly distribute the roasted vegetables and scrambled eggs among the four tortillas. Roll each one up in the foil and place in a freezer bag. Freeze.
6. When ready to eat from the freezer, microwave on high for 1-2 minutes or until heated through.

MUSHROOM LARB

Developed by Regan Miller Jones, MS, RD

Yield: 4-6 servings

INGREDIENTS

- 1/2 of an orange, zested and juiced
- 1/2 of a lime, zested and juiced
- 2 tablespoons olive oil
- 2 tablespoons tamari or soy sauce
- 1 teaspoon grated fresh ginger
- 1 tablespoon olive oil
- Two 8-ounce packages white button or crimini mushrooms, cleaned and chopped (I pulsed in my food processor)
- 1/4 cup chopped fresh cilantro
- 1/4 cup chopped fresh mint
- 1/4 teaspoon crushed red pepper flakes
- 1/4 teaspoon salt
- Cabbage leaves, shredded carrots and additional chopped fresh cilantro and mint
- 2 tablespoons natural peanut butter (optional)



INSTRUCTIONS

1. Combine orange zest and juice, lime zest and juice, oil, tamari and ginger; set aside.
2. Heat olive oil over medium-high heat in a large skillet. Add mushrooms and sauté 5 to 7 minutes or until caramelized. Add 2 to 3 tablespoons of reserved juice mixture to pan, scraping to loosen browned bits from bottom of pan. Season with cilantro, mint, red pepper and salt.
3. Serve mushrooms warm with cabbage leaves and additional toppings for wrapping and scooping. If desired, combine peanut butter with remaining juice mixture to serve as a thicker dressing/dipping sauce or serve sauce as is.

MUSHROOM PÂTÉ ON CRUSTY ARTISAN BREAD

Developed by Ashley from The Fresh Beet

Yield: 1 1/2 cups

INGREDIENTS

For the Pâté

- 2 tablespoons butter
- 4 ounces crimini mushrooms, diced
- 4 ounces shiitake mushrooms, diced
- 1 shallot, diced
- 3 cloves garlic, diced
- 1/8 teaspoon salt + 1/4 tsp pepper
- 3 tablespoons white wine vinegar
- 1/4 cup milk, low fat/fat free



For the Sandwich

- Slices of bread from any fresh artisan loaf
- Mixed greens (baby kale and spinach)
- Roasted red peppers, jarred
- Thinly sliced onion

INSTRUCTIONS

1. Heat a medium sauté pan to medium heat and add butter. Sauté mushrooms, shallot and garlic, seasoning with salt and pepper. Add vinegar and cook until soft, until all liquid has evaporated.
2. Add mushroom mixture to blender or food processor. Add milk and blend until puréed. Set aside. Using the same pan you used to cook the mushrooms, toast both sides of bread slices.
3. Assemble your sandwich. Spread the inside of each slice of bread with mushroom pâté. Layer greens, peppers and onions and top with remaining bread slice.

ZESTY CRIMINI “CHICKEN” NUGGETS

Developed by Stephanie Wilson, RDN

Yield: 4 servings (8 “chicken” nuggets/each)

INGREDIENTS

- 2 cups crimini mushrooms, chopped
- 1 cup low-sodium black beans
- 1/2 cup sweet corn
- 1/2 jalapeno, chopped
- 3 cloves garlic, chopped
- 1 tablespoon cilantro
- 1/3 cup green onions, chopped
- 1 egg
- 1 tablespoon cumin
- 1 tablespoon Cholula Chile Lime Hot Sauce
- Salt to taste
- 1/3 cup whole wheat flour
- 1/2 cup oats
- 1 cup panko breadcrumbs

INSTRUCTIONS

1. Preheat oven to 350 degrees F. Place mushrooms, black beans, corn, jalapeno, garlic, cilantro, and green onions into food processor. Blend until the consistency of ground beef.
2. Whip egg, cumin, hot sauce and salt together in medium size bowl. Add mushroom mixture, whole wheat flour and oats to egg mixture. Mix to blend.
3. Place panko in shallow baking dish. Coat 1 tablespoon mushroom mixture with panko and place on lightly greased baking sheet. Cook for 14 minutes, flipping halfway through.
4. Enjoy with your favorite dipping sauce.



MUSHROOM LENTIL MEATBALLS

Developed by Amari from Eat Chic Chicago

Yield: 6 servings (4 meatballs/each)

INGREDIENTS

- 1/2 cup dried brown or green lentils
- 1 bay leaf
- 1 cup vegetable broth
- 2 tablespoons ground flaxseed
- 8 ounces crimini mushroom
- 1 cup rolled oats
- 1/2 cup cannellini beans or other white beans
- 1/2 cup parsley
- 1 teaspoon dried oregano
- 1/2 teaspoon red pepper flakes
- 1/2 teaspoon dried thyme
- 1/2 teaspoon dried rosemary
- 1 tablespoon olive oil
- 1 small white onion, finely chopped
- 1/8 teaspoon salt
- 1/8 teaspoon ground pepper
- 3 garlic cloves, minced
- 1/4 cup red wine vinegar
- 1 tablespoon coconut aminos or tamari or soy sauce



INSTRUCTIONS

1. Preheat oven to 400 degrees F.
2. In a medium saucepan, combine lentils, bay leaf and vegetable broth. Bring to a boil, reduce heat and let simmer for 10-12 minutes or until nearly all the liquid is absorbed. Remove bay leaf and set aside to cool for a few minutes.
3. In a small bowl, combine ground flaxseed and 1/4 cup warm water. Stir and set aside to gel and form 2 flax eggs.
4. In a food processor, combine mushrooms, oats, beans, parsley, oregano, red pepper flakes, thyme and rosemary. Add lentils and flax eggs and pulse until mixture is combined and well chopped.
5. In empty saucepan, combine olive oil, onions, salt and pepper. Cook on medium-high heat until translucent and beginning to caramelize, about 8-10 minutes. Add garlic and cook for another 1-2 minutes. Add vinegar and coconut aminos and cook until most of the liquid has evaporated.

6. In a large bowl, combine lentil mixture and onions. Let cool for a few minutes before handling.
7. Roll mixture into golf ball sized meatballs and place them on a baking sheet lined with parchment paper. Continue until all mixture is used up. Recipe makes 2 dozen meatballs.
8. Bake for 25-30 minutes or until meatballs are a deep golden brown and the inside is cooked through.



FOR MORE INFORMATION, PLEASE CONTACT:

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The Mushroom Council is composed of fresh market producers and 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.

This content has been reviewed and approved by the U.S. Department of Agriculture.