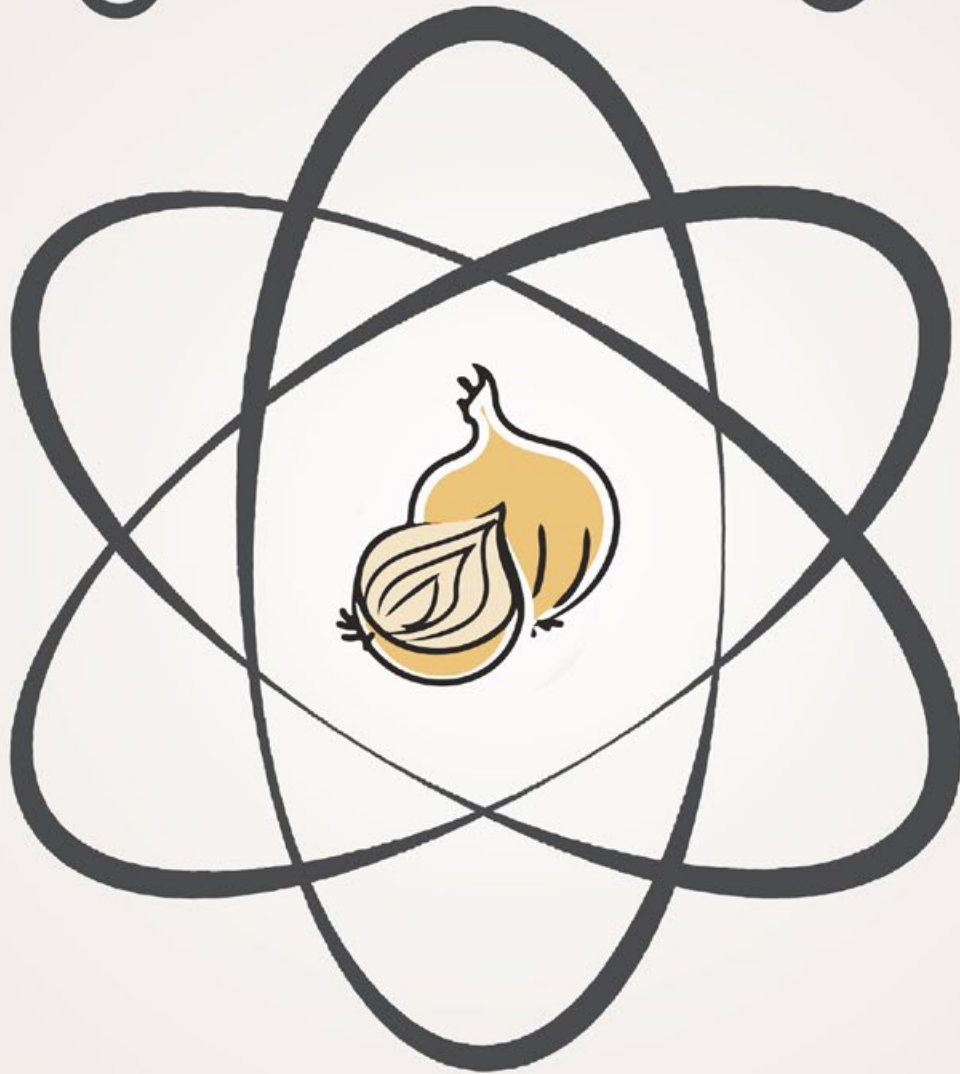


Nutrivore

GUIDE TO



Alliums

BY THE TEAM AT NUTRIVORE

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Introduction to Alliums

Alliums, also called the onion family, are a group of plant foods known for their distinctive taste and powerful health properties. The word "allium" is believed to derive from the Greek *ἀλέω* (or aleo), which means "avoid," and refers to the potent odor of these vegetables! Along with their role as modern culinary staples (virtually every global cuisine includes them!), alliums have been cultivated since prehistoric times for use as food, medicine, ornamental purposes, and religious practices.



In fact, these foods were among the first cultivated crops in ancient civilizations! Each member played a fascinating and important part in human history:

- **GARLIC** was used in ancient Greece to kill parasites, treat medical conditions, honor gods, and increase resiliency (the original Olympic athletes consumed garlic as a "performance enhancer"!), while the ancient Egyptians fed garlic cloves to the builders of the pyramids in order to improve their strength and vigor.
- **ONIONS** have been a part of the human diet since the Bronze Age! The ancient Greeks used to eat pounds of onions in preparation for Olympic competitions, and ancient Egyptians considered onions to symbolize eternity, due to their concentric rings and spherical shape. (King Ramses IV was even entombed with onions in his eye sockets!)
- Humans have been cultivating **LEEKS** since at least the ancient Egyptian times, but there is some evidence that they were grown in Mesopotamia as well.
- **CHIVES** (the only allium variety that are true herbs!) are native to both the Old World and New World, with cultivation dating back 5000 years.
- **SCALLIONS** (also called green onions) have been used in Asian cultures for at least 2000 years as both a vegetable and medicinal herb.

Pretty cool, huh? It gets even better! On top of their historical significance, culinary diversity, widespread cultivation, and ability to totally transform the flavor of a meal, alliums are packed with health benefits. In fact, allium consumption is consistently linked to lower risk of many chronic diseases, including lower risk of cancer, improved cardiovascular health, and more. Let's take a look at what this delicious food group has to offer!

What Are Alliums?

The allium family includes over 900 different species belonging to the genus *Allium*. Most members of this family grow from bulbs or rhizomes (AKA underground plant structures that store nutrients and energy), which give rise to the plants' leaves, stems, and flowers. In most cases, all parts of the plant are edible!

Although members of the allium family number in the hundreds, only about 30 have ever been cultivated by humans. Among those, even fewer are widely used today. The ones you're most likely to see on your dinner plate are:

- CHIVES
- GARLIC
- GREEN ONION
- LEEK
- ONION
- RAMPS
- SCALLION
- SHALLOTS
- SPRING ONION
- WILD GARLIC

FUN FACT: beyond their use as food, some *Allium* species are grown for their aesthetic and ornamental appeal. Species like *Allium giganteum* ("giant onion") and *Allium aflatunense* ("Persian onion") produce striking globe-shaped flower clusters in various colors, making them popular choices in garden landscapes!

What Makes Alliums So Great?

Most of the health benefits attributed to allium vegetables are driven by their unique phytonutrient content, but they also contain some important micronutrients and prebiotic fiber. Here are some highlights!

Phenomenal Phytonutrients

Alliums owe many of their outstanding health properties to their phytonutrients. Most notably, they're rich sources of thiosulfinates—a class of sulfur-containing compounds totally unique to the allium family!

Thiosulfinates are formed when allium vegetables are damaged (such as from chewing, chopping, or crushing), which releases an enzyme called alliinase from its compartments within the plant cells. When

alliinase reacts with the sulfoxides also present in allium vegetables, the result is the formation of biologically active thiosulfinates.

Thiosulfinates are what give alliums their pungent aroma and flavor. But, that's not all that they do: thiosulfinates also possess a huge range of biological activities that make them incredibly disease-protective! As a group, these phytonutrients exhibit powerful anticancer properties, as well as antioxidant, anti-inflammatory, and anti-clotting effects. Thiosulfinates exert their effects by modulating important enzymes (like the cytochrome P450 superfamily and glutathione S-transferases) that help detoxify carcinogens and prevent DNA mutations.

While at least 19 beneficial thiosulfinates have been identified in various alliums, the most famous is **allicin**, formed from the precursor *alliin*. Allicin has well-established anti-cancer and anti-tumor effects, while also being strongly cardioprotective (such as by reducing elevated blood pressure and blood lipids, and improving circulation) and possessing antibacterial, antifungal, and anti-parasitic activities! It's extremely concentrated in garlic, but also found in onions, leeks, ramps, shallots, and scallions.

Additional thiosulfinate precursors in alliums include **methiin** (found in garlic, onions, leeks, and shallots), **propiin** (abundant in onions and shallots), and **isoalliinin** (found in onions and shallots). As with allicin, these precursors transform into active thiosulfinates with important health properties—including anti-microbial, anti-inflammatory, and gut microbiota-modulating activities!



After their initial formation, thiosulfinates can further decompose other beneficial sulfur-containing compounds, including *diallyl disulfide*, *diallyl trisulfide*, *ajoene*, and *S-allyl cysteine*. These compounds feature their own biological activities, adding to the wide-ranging health protection conferred by alliums!

For example:

- **DIALLYL SULFIDE** can boost the detoxification functions of the liver, increase production of the antioxidant enzyme glutathione S-transferase, and has liver-protective, cardioprotective, and anti-cancer effects.
- **DIALLYL DISULFIDE** (a major component of garlic) exhibits anti-cancer, anti-inflammatory, antioxidant, antimicrobial, cardioprotective, and neuroprotective activities.
- **DIALLYL TRISULFIDE** can inhibit cell proliferation, alter enzyme activities, and modulate immune function in ways that protect against cancer. It also has cardioprotective properties, may help reduce the risk of metabolic syndrome, and can boost immune activity against viruses.
- **AJOENE** is a powerful antioxidant with antithrombotic, anticancer, antiviral, antibacterial, and antifungal properties.
- And, **S-ALLYL CYSTEINE** has antioxidant, anti-inflammatory, neuroprotective, and anti-cancer properties—including the ability to suppress cancer cell proliferation, adhesion, and invasion!

Whew! Believe it or not, it doesn't end there: alliums also contain at least 52 different flavonols—a class of phytonutrients within the flavonoid group.

For example, alliums are excellent sources of the flavonol **quercetin**, which has powerful antioxidant, antimicrobial, anti-inflammatory, anti-aging, and immune-modulating properties! A variety of mechanistic and human studies have shown this phytonutrient can inhibit the early stages of viral infections (including influenza and coronaviruses), improve insulin sensitivity (making it beneficial for diabetes), lower blood pressure and blood lipid levels (making it beneficial for cardiovascular health), reduce fat accumulation in the liver (helping protect against non-alcoholic fatty liver disease), regulate the gut microbiota (making it great for supporting gut health), reduce neuroinflammation (helping lower the risk and progression of neurodegenerative diseases like Parkinson's and Alzheimer's), and reduce allergy symptoms. Quercetin has also shown anti-cancer activity against a number of cancer cell types, including prostate cancer, liver cancer, colon cancer, ovarian cancer, breast cancer, and melanoma. Onions are the richest source of this phytonutrient, with red onions boasting the highest amounts of all! Leeks, green onions, and shallots also contain quercetin.

Alliums are also good sources of the flavonol **kaempferol**, which can reduce inflammation, regulate the immune system, protect against cancer, act as an antimicrobial, prevent diabetes, reduce cardiovascular disease risk factors, prevent neurodegenerative diseases (like Alzheimer's disease), improve bone health, and aid weight loss. Chives, leeks, scallions, are the best allium sources of this phytonutrient!

Additionally, allium vegetables (especially onions) contain the flavonol **myricetin**, which can help protect against neurodegenerative diseases (like Parkinson's and Alzheimer's), glaucoma, diabetes, inflammation, liver damage, cardiovascular disease, photoaging, thrombosis, allergies, and hypertension. They're also sources of the flavonol **isorhamnetin**—a compound that protects heart and artery cells from damage and inflammation, while also helping reduce blood pressure. Sweet onions are particularly high in this phytonutrient!

Beyond their flavonol content, green-colored alliums (think: leeks, chives, and scallions) are good sources of **chlorophyll**—the pigment that traps light for photosynthesis and gives plants their green color. In humans, chlorophyll can help counteract some of the harmful compounds formed when meat gets cooked, and also has significant anti-inflammatory and antioxidant properties. Some research even shows it can beneficially modulate the gut microbiota, including in ways that contribute to healthy body composition!

Lastly, some alliums are high in **carotenoids**—phytonutrients that bestow yellow, orange, red, and purple pigmentation. Carotenoids play major roles in maintaining eye health due to their high concentration in the retina and their ability to filter harmful blue-light rays (in turn protecting critical parts of the eye from light-induced oxidative damage). As a result, these phytochemicals can help reduce the risk of age-related macular degeneration and cataracts. Leeks, chives, and green onions, and scallions are particularly high in carotenoids!

It's worth noting that the phytonutrient content of alliums varies not only based on species and cultivars, but also on the growing environment, post-harvest practices, and season! For example, the flavonol content of onions has been shown to increase during storage (especially after three or six months), and light exposure induces flavonol synthesis in fresh cut onions! Organic onions have also been shown to have higher flavonol content (especially quercetin) than conventionally grown onions.

Magnificent Micronutrients

Nutritionally, alliums don't provide much in the way of macronutrients (at least not in the quantities we typically consume them!), but they do deliver some important micronutrients. The top ones include:

- **MANGANESE**, a mineral that serves as a cofactor and component of numerous enzymes—giving it roles in carbohydrate metabolism, amino acid synthesis, gluconeogenesis, detoxification, lipid processing, free radical defense, bone and collagen formation, and wound healing. Leeks are particularly high in this nutrient, delivering 19% of the DV per 1 cup serving.
- **VITAMIN B₉ (FOLATE)**, an essential B vitamin that plays roles in blood cell production, the formation of genetic material (including DNA), cell growth, cardiovascular health, cancer protection, and cognitive and neurological health.
- **VITAMIN C**, a water-soluble vitamin with powerful antioxidant properties, with important roles in the immune system and collagen production. Per cup serving, strawberries contain nearly the entire DV for this nutrient!

- **VITAMIN K**, which plays a vital role in coagulation, bone metabolism, cellular function, and the prevention of soft tissue calcification.

Fabulous Fructans

Alliums are rich in a special type of carbohydrate called *fructans*, made up of strings of fructose molecules. For plants, fructans serve as a storage carbohydrate alternative to starch; for humans, fructans have prebiotic properties that can benefit gut health (and beyond)!

In general, fructans have important functions in regulating the gut microbiota and immunity. [A 2018 systematic review](#) and meta-analysis of 64 different fiber studies found that compared to other fiber types, fructan consumption was associated with significantly greater abundance of *Bifidobacterium* and *Lactobacillus*—two important probiotic bacteria that help protect against pathogenic infections (including *E. coli*), boost immunity, reduce gut inflammation, produce vitamins, combat yeast overgrowths, improve the gut barrier function, and even exhibit anti-cancer and anti-diabetic effects. **Fructans** have also been shown to interact with immune cells within the intestinal lumen, in turn modulating immune responses throughout the body. These carbohydrates are even being studied as potential reactive oxygen species scavengers—decreasing inflammation and improving the redox environment of the intestine!

The main fructan in alliums, inulin, has been particularly well-studied. Research shows that that inulin significantly increases levels of SCFA-producing bacteria, including those producing the highly beneficial butyrate (which feeds epithelial cells and may help protect against colorectal cancer!). It's also been shown to influence lipid metabolism, help regulate glucose and insulin levels, and even enhance mineral absorption.

[A randomized controlled trial from 2017](#) found that among adults with mild constipation, inulin consumption suppressed the abundance of *Bilophila*—a gut microbe associated with impaired gut barrier function and inflammatory bowel disease. [A 2019 clinical trial](#) found that consuming a diet based on inulin-rich vegetables (providing a total of 15 g of inulin-type fructans per day, for a period of two weeks) led to greater satiety, as well as reduced cravings for sweet, salty, and fatty foods!

The underground bulbs of allium plants are among the richest food sources of fructans. Per 100 g, alliums have the following fructan content:

- **GARLIC**: 17.4 g
- **SHALLOTS**: 8.9 g
- **SPRING ONION BULB**: 6.3 g
- **ONION**: 1.8 g
- **LEEK, WHOLE**: 0.5 g

Health Benefits of Alliums

Science has confirmed what many ancient cultures discovered about these amazing foods: they truly are medicinal! Here's a tour of what the most up-to-date research shows.



Reduced risk of cancer:

Perhaps more than any other health condition, alliums have been studied in relation to cancer risk—with research suggesting benefits for a number of different cancer types!

Here's a snapshot of what the studies show:

- **BREAST CANCER:** [A 2022 meta-analysis](#) found that for the highest versus lowest categories of total allium intake, breast cancer risk was reduced by 30%! For garlic specifically, the risk reduction was 23%, and for onions, it was 25%.
- **COLORECTAL CANCER:** [A 2014 meta-analysis](#) of observational studies found a 22% reduced risk of colorectal cancer and a 12% reduced risk of colorectal adenomatous polyps for the highest versus lowest intake of total allium vegetables; the risk reduction was 15% for garlic or onion, specifically! And, [a case-control study from 2016](#) found a staggering 79% reduction in colorectal cancer risk with higher versus low total allium intake. In this study, garlic, garlic stalks, leek, onion, and spring onion intake were all individually protective as well. Additionally, [a 2020 meta-analysis](#) found that among case-control studies, there was a 29% reduction in colorectal cancer risk for the highest versus lowest categories of garlic intake!
- **ENDOMETRIAL CANCER:** [A 2005 case-control study](#) found a 24% reduced risk of endometrial cancer in the highest (at least 9.6 g daily) versus lowest (less than 1 g daily) quartile of allium intake. In premenopausal women, the results were even more pronounced with a 59% reduced risk!
- **GASTRIC (STOMACH) CANCER:** [A 2011 meta-analysis](#) found that for every 20 g daily increase in allium consumption (approximately the weight of one garlic bulb), gastric cancer risk dropped by 9%! This same analysis showed a 46% reduced risk of gastric cancer for the highest versus lowest consumption of allium vegetables. Similarly, [a 2015 case-control study](#) found a 41% lower risk of gastric cancer with consumption of at least two portions of onions per week, a 31% lower risk with high garlic intake, and a 30% lower risk with frequent use of both garlic and onion. And most recently, [a 2023 follow-up of a randomized intervention trial](#) found that over the course of 22.3 years, every 2.2 lb increase in garlic intake per year was associated with a 17% lower risk of developing gastric cancer; total allium intake was also protective! (Along with their known anti-cancer effects, both in vitro and in vivo studies have shown that allium vegetables have an antibacterial effect against *H. pylori*, a key risk factor for gastric cancer.)

- **LUNG CANCER:** [A 2016 case-control study](#) found that consuming raw garlic at least twice per week (compared to never) was associated with a 50% lower risk of lung cancer! Similarly, [a 2013 case-control study](#) found that higher garlic consumption was associated with a 21% lower risk of developing lung cancer.
- **OVARIAN CANCER:** A 2021 systematic review and meta-analysis, encompassing 97 cohort studies, found a 21% reduced risk of ovarian cancer with consumption of allium vegetables.
- **PROSTATE CANCER:** [A 2002 case-control study](#) found that men consuming over 10 g of total allium vegetables per day were 49% less likely to develop prostate cancer than men consuming under 2.2 g daily. For the highest versus lowest intake of garlic, the risk reduction was 53%, and for scallions, it was 70%! Likewise, [a 2013 meta-analysis](#) found an 18% lower risk of prostate cancer for the highest versus lowest intake of allium vegetables.
- **UPPER AERODIGESTIVE TRACT CANCERS (ORAL CAVITY, PHARYNX, LARYNX, NECK, AND ESOPHAGUS):** [A 2016 meta-analysis](#) found that total allium consumption (comparing highest versus lowest intakes) was associated with a 21% lower risk of squamous cell carcinoma of the upper aerodigestive tract; for garlic or onion, the risk reduction was 26% and 28%, respectively. This protective effect was strongest in case-control studies—a whopping 44% reduction in risk for the highest allium consumption!
- **NON-DIGESTIVE TRACT CANCERS:** [A 2022 meta-analysis](#) of case-control and cohort studies found that the highest versus lowest consumption of allium vegetables was associated with a 14% lower risk of non-digestive tract cancers (collectively encompassing lung cancer, breast cancer, prostate cancer, ovarian cancer, head and neck cancer, endometrial cancer, cervix cancer, and liver cancer).



Reduced risk of cardiovascular disease:

A 2020 systematic review and meta-analysis (including 81 cohort studies and over 4 million subjects!) found that the highest versus lowest consumption of alliums was associated with a 67% lower risk of cardiovascular disease mortality, a 33% lower risk of coronary heart disease mortality, and an 11% lower risk of stroke!

Specific alliums have also been linked to reduced cardiovascular risk factors. For example, [a 2014 meta-analysis](#) of randomized controlled trials found that garlic powder (in doses ranging from 300 mg to 1400 mg daily, for a period of seven days to one year) lowered triglyceride levels by 15.83 mg/dL, LDL cholesterol levels by 8.11 mg/dL, fasting blood glucose levels by 17.30 mg/dL, and systolic and diastolic blood pressure levels by 4.34 mmHg and 2.36 mmHg, respectively. A [2019 umbrella review of meta-analyses](#) likewise found that garlic consumption had a powerful cholesterol-lowering effect—with eight weeks of garlic consumption leading to a 17.2 mg/dL drop in total cholesterol levels. And, [a 2021 meta-analysis](#) encompassing 10 randomized controlled trials found that onion supplementation significantly improved HDL and LDL cholesterol levels.



Protection against non-alcoholic fatty liver disease (NAFLD):

[A 2020 controlled clinical trial](#) found that 12 weeks of consuming four 400 mg tablets of garlic powder per day significantly improved multiple risk factors for NAFLD—including insulin resistance, fasting blood sugar, waist circumference, body fat percent, skeletal muscle mass, total antioxidant capacity, and serum concentration of superoxide dismutase.



Healthy weight regulation:

[A 2023 systematic review and meta-analysis](#) found that among people with obesity, onion intake resulted in significant reductions in body weight, BMI, and waist circumference.

[A 2019 randomized controlled trial](#) found that consumption of 9 g of onion powder daily, for a period of 12 weeks, led to a significant reduction in abdominal fat among participants with low baseline HDL levels. And [a 2020 randomized controlled trial](#) found that 12 weeks of steamed onion consumption significantly reduced body fat percentage and fat mass (particularly visceral abdominal fat) without impacting lean body mass!

[A 2020 controlled clinical trial](#) found that 12 weeks of 1600 mg of garlic powder a day (spread into four tablets) led to significant reductions in body fat percent and waist circumference, relative to the placebo group. And, [a 2023 randomized controlled trial](#) found that among patients with PCOS, eight weeks of garlic supplementation (800 g daily) led to significant reductions in BMI and waist circumference, as well as reducing markers of oxidative stress!



Improved blood sugar control:

Some evidence suggests alliums could help regulate blood sugar, particularly in diabetics. [A 2017 meta-analysis](#) of nine randomized controlled trials concluded that garlic consumption effectively lowers fasting blood sugar levels and HbA1c among type 2 diabetics, with improvements increasing with longer duration of garlic consumption. [A 2010 trial](#) of patients with type 1 and type 2 diabetes likewise found that consuming 100 g of raw red onion significantly reduced blood sugar levels four hours after eating!



Better bone density:

Alliums show potential for helping improve bone health! [A 2016 trial](#) of middle-aged and post-menopausal adults found that consuming 100 mL of onion juice daily for eight weeks improved bone mineral density and antioxidant activity; additional in vitro experiments by the researchers found that onion helped protect against bone breakdown. [A 2009 study](#) similarly showed that for peri-menopausal and post-menopausal women over the age of 50, consuming onions at least once per day was associated with 5% greater bone density than those who consumed onions once per month or less. And, [a 2017 double-blind](#)

[randomized trial](#) of post-menopausal women with osteoporosis found that consumption of two garlic tablets daily, for a period of 30 days, reduced markers of oxidative stress associated with osteoporosis!



Improved cognitive health:

Although the research is limited, some evidence suggests a beneficial effect of allium intake on cognitive health—including improved cognitive performance and protection against depression. [A 2015 placebo-controlled trial](#) of healthy adults found that five weeks of consuming 400 mg of garlic daily (in the form of dried powder) led to significant improvements in visual memory and attention! Likewise, a [randomized controlled trial](#) from 2021 found that among healthy elderly adults, 24 weeks of daily onion powder supplementation helped prevent cognitive decline—largely by improving depressive symptoms and elevating motivation. What’s more, where depression is concerned, [a 2023 analysis of two cohort studies](#) found that compared to the lowest onion intake, higher onion intakes were associated with up to a 27% reduced risk of depressive symptoms.



Protection against drug-resistant infections:

Some evidence suggests alliums could help protect against drug-resistant infections! [A 2012 study](#) found that garlic extract had a strong inhibitory effect against drug resistant *Escherichia coli*, *Pseudomonas aeruginosa*, *Bacillus subtilis*, *Staphylococcus aureus*, *Klebsiella pneumoniae*, *Shigella sonnei*, *Staphylococcus epidermidis*, and *Salmonella typhi*! Likewise, [a 2021 study](#) found that allium extracts were active against multidrug resistant *Candida* species.



Improved sleep:

Although more research is needed, some evidence suggests allium consumption could support better sleep! [A 2020 randomized controlled crossover trial](#) found that among adults who were dissatisfied with their sleep, five days of consuming onion extract tablets reduced the amount of time it took to fall asleep, significantly improved sleep quality (including entering deep sleep), and reduced markers of stress.



Reduced risk of all-cause mortality:

[A 2017 meta-analysis of prospective studies](#) found that for every 100 g increase in daily allium intake, risk of all-cause mortality dropped by 24%! Likewise, high versus low allium intake was associated with a 15% decrease in death from all causes.

Individual alliums vegetables have been associated with a reduction in death from all causes, too: for example, [a 2019 cohort study](#) of elderly adults found that those who consumed garlic at least once a week lived longer than participants who ate garlic less frequently. For those who ate garlic at least five times per week, there was an 11% lower risk of death from all causes compared to those who ate garlic less than once per week! (The risk reduction was 8% for people who ate garlic between one time and four times per week.)

Allium Nutrivore Scores

The average Nutrivore Score of alliums is a whopping 2142! And, when it comes to individual allium veggies:

Chives	3531
Garlic	5622
Green onion (tops only)	2097
Leek	1128
Onion, raw	380
Onion, sweet, raw	170
Onion, welsh, raw	1704
Scallion	1932
Shallots, raw	740
Spring onion	1932

Scallion vs. Green Onion vs. Spring Onion

When it comes to telling similar-looking alliums apart, three are known to cause some confusion: scallions, green onions, and spring onions! While these veggies resemble each other in appearance (and tend to be used interchangeably in the kitchen), they're technically different from each other.

For starters, scallions are younger than green onions (that is, harvested at an earlier stage of their growth). But, there's another technical difference too: scallions (*Allium fistulosum*) come from a species of onion that

does not form bulbs, while green onions either come from onion varieties that do not form bulbs, or are harvested very young from regular onions that would eventually form bulbs if left to grow!

Meanwhile, spring onions are older than both scallions and green onions. They possess a small, round, white bulb at their base that's larger than that of scallions or green onions, and have a slightly stronger flavor due to their maturity. Now you know!



Some Practical Pointers

Getting the most out of your alliums is a matter of proper selection and storage! Here are some pointers.

Selection:

- Choose onions and garlic bulbs that are firm and free of soft spots, sprouting, or mold.
- For leeks and shallots, select ones with crisp green tops and firm, unblemished bulbs.
- Avoid alliums with signs of bruising, cuts, or excessive moisture.



Storage and Cleaning:

- **ONIONS:** Store in a cool, dry, and well-ventilated place (such as a ventilated basket or bowl). Don't store them near potatoes or apples, as they can release moisture and ethylene gases that cause each other to spoil!
- **GARLIC:** Keep garlic bulbs in a cool, dry place, preferably in a well-ventilated container or a garlic keeper. Avoid storing them in the refrigerator—this can cause them to sprout!
- **LEEKS:** Store leeks in the refrigerator. They can be kept in a plastic bag or wrapped in a damp paper towel to prevent dehydration.
- **SHALLOTS:** Keep shallots in a cool, dark, and dry location. They can also be stored in the refrigerator for longer shelf life.
- For **LEEKS AND GREEN ONIONS**, trim any wilted or discolored green tops before storing. This can help extend their freshness.
- Ensure that different allium vegetables are stored separately, as they can impart their strong flavors to each other.
- Periodically check stored alliums for signs of sprouting, mold, or rot. Remove any affected ones to prevent spoilage from spreading.

Onion Tears No More!

If you've ever cut open a raw onion, you've probably encountered the painful, tear-inducing sting these alliums are known for! It's not because onions are mean: it's because they produce a chemical irritant called syn-Propanethial-S-oxide, which stimulates the eye's lachrymal (tear) glands. Specifically, upon getting cut, onions release lachrymatory-factor synthase into the air, which converts the onion sulf-oxides into sulfenic acid—an unstable molecule that then re-arranges itself into syn-Propanethial-S-oxide. Syn-Propanethial-S-oxide then forms a cloud around the onion, makes contact with our eyes, and reacts with the thin layer of water covering our eyes to create sulfuric acid (among other irritating substances)!



Luckily, there are some tear-free ways to cut up onions:

- **COOL YOUR ONIONS OFF BEFORE CUTTING THEM!** This helps slow down the enzymatic process that leads to onion tears. You can let your onions chill in the refrigerator, dunk them in ice water right before cutting, or stick them in the freezer for 15 minutes to rapidly cool them.
- **SHARPEN YOUR KNIFE!** Using a well-sharpened blade to cut onions helps minimize the amount of damage and bruising the onion endures, resulting in a lower release of the chemicals that lead to syn-Propanethial-S-oxide production.
- **CUT YOUR ONIONS NEXT TO A FAN OR UNDER A KITCHEN VENT.** Helping disperse the gas-producing chemicals released by onions can prevent some of them from reaching your eyes.
- **WEAR GOGGLES (AND A NOSE PLUG)!** If all else fails, wearing well-sealed goggles can help protect your eyes while cutting onions. The addition of a nose plug offers further protection, preventing the lachrymatory factor from traveling up your nose and to your eyes!

Recipes



ENTRÉES

Chicken with Forty Cloves of Garlic

PREP TIME

15 minutes

COOK TIME

45 minutes

YIELD

4 servings

8 bone-in, skin-on chicken thighs

1 teaspoon sea salt, plus more to taste

 $\frac{1}{4}$ teaspoon cracked black pepper,
plus more to taste

3 tablespoons olive oil, or oil of choice

3 heads of garlic, cloves separated
and peeled $\frac{1}{2}$ cup white wine

1 cup chicken stock

2 tablespoons fresh thyme, or 2 tea-
spoons dried thyme2 tablespoons arrowroot powder or
cornstarch

2 tablespoons cold water

1. Pat chicken dry with paper towels and season with salt and pepper.
2. Heat olive oil in a large skillet or Dutch oven over medium-high heat. Add chicken pieces, skin-side down, and sear until golden brown, about 2 to 3 minutes. Flip chicken pieces and sear the other side, another 2 to 3 minutes. Work in batches if needed to maintain about an inch space between each chicken thigh as its searing.
3. Remove the chicken from the pan and set aside.
4. Add garlic to the skillet and cook, stirring frequently, until golden brown, about 5 to 6 minutes.
5. Add wine to the pan and scrape the bottom to deglaze. Add chicken stock and thyme, and return chicken thighs to the pan (it's okay to crowd them together now). Cover and reduce heat to maintain a simmer. Cook for 25 to 30 minutes, until chicken is cooked through and internal temperature reaches 160°F.
6. Remove chicken from pan and place in a serving dish.
7. Mix arrowroot powder and cold water. Then while whisking the juices in the skillet, add arrowroot mixture to the skillet. Whisk constantly until sauce has thickened, about 2 minutes. Taste and add additional salt and pepper, if needed. Pour over chicken and serve.



Chicken Fajitas

PREP TIME

30 minutes

COOK TIME

45 minutes

YIELD

4-6 servings

2 tablespoons olive oil, or oil of choice
 2 teaspoons ground coriander seed
 2 teaspoons ground cumin
 2 teaspoons dried oregano
 1½ teaspoons smoked sea salt
 1 teaspoon chili powder
 1 teaspoon paprika
 1 teaspoon cane sugar, or granulated sugar of choice
 1 teaspoon granulated onion
 1 teaspoon granulated garlic

½ teaspoon black pepper
 1½ pounds chicken breast or thigh, thinly sliced
 1 onion, thinly sliced
 2 bell peppers, any color, seeds and pith discarded and thinly sliced
 ½ cup chicken stock, divided
 1 tablespoon arrowroot powder or cornstarch
 Tortillas and other toppings, as desired, for serving

1. In a small bowl, combine coriander, cumin, oregano, smoked sea salt, chili powder, paprika, sugar, granulated onion, granulated garlic, and pepper. Set aside.
2. In a large skillet, heat olive oil over medium-high heat. Add chicken and cook, stirring constantly, until fully cooked and starting to brown. If a lot of liquid is released in your pan, increase the cooking temperature.
3. Add onion, bell pepper, all but one tablespoon of the chicken stock and seasoning mix. Cook, stirring frequently, until vegetables are cooked but still hold their shape, about 6 to 8 minutes.
4. Mix arrowroot powder with remaining tablespoon of chicken stock. Add to the skillet, stirring constantly until the sauce thickens, about 1 minute.
5. Serve with tortillas and favorite fajita toppings, such as chopped cilantro, diced tomato, grated mozzarella, and shredded lettuce.



Cabbage Rolls

PREP TIME

30 minutes

COOK TIME

1 hour 20 minutes

YIELD

4-6 servings

½ cup rice

1 cup chicken or beef stock

1 medium head green cabbage
(about 3 pounds)

2 tablespoons olive oil, or oil of choice

2 medium onions, diced

1 28-ounce can diced tomatoes

1 pound ground pork

¼ cup fresh dill, or 2 tablespoons dried dill

¼ teaspoon nutmeg

½ teaspoon sea salt, divided

¼ teaspoon black pepper

1. In a small saucepot, cook rice in stock, as label directs. Set aside to cool.
2. In a large stockpot, bring 10 cups (enough to fill at least 6 inches) water to a rolling boil. Cut the core out of the cabbage. Add the cabbage to the boiling water, cut-side-up, and using tongs, gently separate and remove outer leaves as they soften enough to peel away from the cabbage. Once you have 16 leaves, remove the rest of the cabbage, drain and save for another day. Spread the separated leaves out on a work surface, carefully slicing away any thick ribs to about the thickness of the leaf, so they roll more easily.
3. In a skillet, heat olive oil over medium-high heat. Add onions and cook until starting to brown, about 8 minutes. Remove half of the diced onions and aside to cool.
4. Add tomatoes, with their juice, and ¼ teaspoon salt to the skillet. Bring to a boil and then remove from heat and set aside.
5. Preheat oven to 375°F.
6. In a large bowl, mix to combine cooled rice, the remaining half of the onions, ground pork, dill, nutmeg, remaining ¼ teaspoon salt and pepper.
7. Place about ¼ cup of filling in the center of each cabbage leaf. Fold the left and right sides of the cabbage leaf over the filling, and then roll up the leaf perpendicular to the folded edges. Place in a casserole or lasagna dish, leaf edge down. Pour tomatoes over the top of the cabbage rolls.
8. Cover the casserole dish with an oven-proof lid or tin foil and bake for 1 hour.



Lamb Kabobs

PREP TIME

15 minutes + marinating

COOK TIME

10 minutes

YIELD

4 servings

12 to 16 large shallots, or 2 heads elephant garlic, separated into cloves and unpeeled

3 tablespoons fresh lemon juice

1 tablespoon chopped fresh rosemary or 1 teaspoon dried rosemary

2 tablespoons olive oil or oil of choice

1 teaspoon salt

1 teaspoon cracked black pepper

1½ pounds lamb cubes (1½-inches)

2 small zucchini, cut into 1-inch thick slices

1. Place shallots and water to cover in a saucepan. Bring to a boil and then cover and reduce to low. Simmer for 5 minutes (15 minutes if using elephant garlic). Drain and rinse with cold water. Peel and set aside.
2. In a large bowl, mix lemon juice, rosemary, oil, salt and pepper. Add lamb, zucchini and shallots. Toss to coat. Cover and marinate in the fridge, tossing occasionally, for 2 hours (and up to overnight).
3. Soak bamboo skewers in water for at least 30 minutes. Prepare outdoor grill for medium heat according to manufacturer's instructions. Thread lamb, zucchini and shallots on skewers.
4. Grill kabobs over medium heat, turning occasionally, for 8 to 10 minutes for medium-rare.



SOUPS

French Onion Soup

PREP TIME

20 minutes

COOK TIME

2 hours, 10 minutes

YIELD

6 - 8 servings

¼ cup olive oil, or oil of choice
8 cups half-moon thinly sliced onion (about 2½ pounds)
1 teaspoon cane sugar, or granulated sugar of choice
1 teaspoon salt
1 cup dry white wine
10 cups beef stock

1. In a Dutch oven, heat olive oil over medium-high heat. Add onions, sugar and salt. Cook, stirring frequently, until onions have caramelized to a deep brown color, about 40 minutes.
2. Add wine and scrape the bottom of the pot to deglaze. Add beef stock. Bring to a boil and then reduce heat to maintain a slow simmer.
3. Simmer uncovered for 1½ hours, or until the liquid has reduced by about half.



TIP: If you'd like to gratinée this soup, pour the soup into oven-safe serving bowls arranged on a rimmed baking sheet. Place a thick slice of your favorite bread on top of the soup, ideally cut to the exact size and shape of your serving bowls. Sprinkle the top with grated mozzarella cheese then bake at 400°F until cheese is bubbly and starting to brown, about 10 minutes.



Vichyssoise

PREP TIME

20 minutes

COOK TIME

40 minutes

YIELD

5 - 6 servings

3 thick slices bacon, chopped
2 pounds yellow potatoes, cut into $\frac{3}{4}$ -inch cubes
(about 5 to 6 cups)
1 bunch leeks, sliced (about 5 to 6 cups)
4 cups chicken stock
1 cup heavy cream or coconut cream
 $\frac{1}{4}$ cup chopped fresh parsley leaves
(optional)
 $\frac{1}{2}$ teaspoon sea salt or truffle salt
4 chives, chopped (optional)

1. Add the bacon to a large saucepan or small stockpot and heat over medium-high heat. Cook, stirring occasionally, until bacon has browned, about 10 minutes. Remove from pan and set aside.
2. Add the potato cubes, leeks, and chicken stock. Bring to a boil and then reduce heat to maintain a rapid simmer. Simmer for 15 to 20 minutes, stirring occasionally, until potato is fully cooked.
3. Stir in the cream and parsley. Cook 2 to 3 minutes. Taste and add more salt, if needed.
4. Puree the soup with an immersion blender or in batches in a countertop blender.
5. Sprinkle with fresh chives and serve chilled.



SIDES

Roasted Garlic

PREP TIME

5 minutes

COOK TIME

35-40 minutes

YIELD

1 head of garlic

1 head of garlic

Olive oil or oil of choice

1. Preheat oven to 400°F.
2. Cut the about ¼ inch off the top of the head of garlic to expose the individual cloves.
3. Place the head of garlic in a piece of aluminum foil and drizzle with olive oil.
4. Wrap it up and place it on a baking sheet.
5. Roast the garlic for 35-40 minutes until slightly browned.
6. Let the garlic cool to the touch before removing the skins. You can do this by cutting the skin with a knife and then using a small fork to remove the clove, or simply squeeze the clove out of the skin gently using your fingers.

HOW TO USE ROASTED GARLIC:

1. Mash it with a fork and spread it on toast or use it to make garlic bread
2. Add to your favorite mashed potatoes recipe
3. Add to pasta
4. Add it to butter to make roasted garlic butter
5. Combine with mayonnaise and use as a sandwich spread
6. Top your roasted vegetables with it
7. Top your grilled steak or chicken with it
8. Add it to your favorite salad dressing recipe
9. Use it in pesto in place of raw garlic
10. Rub it on corn on the cob



Pickled Shallots

PREP TIME

20 minutes

COOK TIME

8 hours

YIELD

2 cups shallots

2 cups shallots

 $\frac{3}{4}$ cup apple cider vinegar

2 tablespoons lime juice

2 teaspoons salt

1. Slice shallots into $\frac{1}{8}$ inch or $\frac{1}{4}$ inch half moons and place into a pint jar.
2. Mix vinegar and lime juice. Add salt and stir to dissolve.
3. Pour vinegar mixture over shallots. Top up the jar with water (up to the very brim). Place lid on jar and shake well.
4. Leave on counter top for at least 8 hours, 24 is better. Refrigerate for long-term storage.



Braised Cauliflower, Leeks and Artichoke Hearts

PREP TIME

5 minutes

COOK TIME

20 minutes

YIELD

4 servings

2 tablespoons olive oil or oil of choice

1 ½ cups cauliflower flowerets

1 ½ cups chopped leeks

1 ½ cups artichoke hearts

2 garlic cloves, minced

1. Heat oil in a skillet over medium-high heat.
2. Add veggies and garlic and cook, stirring occasionally, until veggies are cooked (about 15 minutes). There should be enough water from the veggies to keep them from sticking, but if they do start to stick, add 1 tablespoon of water to the pan.



Garlic Chive Compound Butter

PREP TIME

20 minutes

COOK TIME

none

YIELD

1 cup

1 cup unsalted butter, softened
¼ cup chopped fresh chives
⅓ cup chopped fresh parsley
4 cloves garlic, minced
Finely grated zest of 1 lemon
½ teaspoon salt
¼ teaspoon black pepper

1. Place all the ingredients in a bowl and mix with a fork until thoroughly combined. Store in the refrigerator for up to a month or in the freezer for up to 6 months.



TIP: This pairs well with fish, shellfish and red meat.



Traditional Pesto (or Ramp Pesto)

PREP TIME

10 minutes

COOK TIME

10 minutes

YIELD

1 cup

6 cloves garlic, unpeeled
4 cups fresh basil leaves
¼ cup roasted pine nuts
⅓ cup parmesan cheese
2 teaspoons lemon juice
½ teaspoon salt
¼ cup olive oil or oil of choice

1. Heat a skillet over medium heat. Add garlic to the pan, still in its peel. Stir or shake the pan frequently so the garlic rotates and cooks on all sides. Cook until garlic is starting to brown and is feeling soft to the touch, about 7-8 minutes.
2. Let the garlic cool, then peel. Place in a blender or food processor with the basil, pine nuts, parmesan cheese, lemon juice and salt. Pulse until combined.
3. While the blender or food processor is running, slowly drizzle in the olive oil. Blend until desired consistency is reached.



TIP: if you can find ramps, you can replace the garlic and fresh basil with one bunch of ramp leaves, or about 2 cups. Save the bulbs of the ramps for another use. Skip step one and just add all the ingredients to your blender or food processor and blend until smooth, adding more or less oil to achieve the desired consistency.



Chimichurri

PREP TIME

10 minutes

COOK TIME

none

YIELD

1 cup

$\frac{2}{3}$ cup chopped fresh cilantro
 $\frac{2}{3}$ cup chopped fresh parsley
3-4 scallions, white and green parts, sliced
 $\frac{1}{2}$ cup olive oil, or oil of choice
 $\frac{1}{3}$ cup red wine vinegar
2 cloves garlic
 $\frac{1}{4}$ teaspoon ground cumin
 $\frac{1}{4}$ teaspoon salt
 $\frac{1}{2}$ teaspoon red pepper flakes (optional)

1. Place all the ingredients in a blender or food processor and blend until smooth. Store in the refrigerator for up to 2 weeks.



TIP: Pairs well with red meat and poultry, especially grilled, as well as fried eggs.



About the Creators of this Book

Dr. Sarah Ballantyne, PhD

FOUNDER OF NUTRIVORE

Award-winning public speaker, New York Times bestselling author and world-renowned health expert, Dr. Sarah Ballantyne, PhD believes the key to improving public health is scientific literacy. She creates educational resources to help people improve their day-to-day diet and lifestyle choices, empowered and informed by the most current evidenced-based scientific research.



Charissa Joy, AOS

CHIEF OPERATIONS OFFICER

Charissa Joy has over 15 years of experience working in the wellness space. Charissa has many roles on the team. She is Dr. Sarah's right hand woman and touches every part of Dr. Sarah's businesses. She manages all communications for Nutrivore, both external and internal. She is the project and team manager. She handles all marketing internal and external marketing, as well as all brand/affiliate partnerships.



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On Nutrivore.com she is a researcher, writer, and content creator and is responsible for developing and maintaining the expanded Nutrivore Score database of over 7,500 foods (plus many of the nerdy puns sprinkled throughout the website!).

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