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Can Aged Black Garlic Lower Blood Pressure?

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STORY AT-A-GLANCE

- Aged black garlic (ABG) with dietary changes lowered diastolic blood pressure in male participants who had moderate hypercholesterolemia
- Garlic is also known to have a positive impact on cardiovascular and metabolic diseases, including atherosclerosis, thrombosis and diabetes. Two grams of fresh garlic could raise plasma levels of nitric oxide, required for normal endothelial function
- Up to 80% of insulin is removed on the first pass through the liver, which affects blood glucose control. Garlic can help increase the amount of insulin available by preventing some first-pass metabolism
- Organosulfur compounds in garlic contribute to the benefits it has on your gut microbiota, brain and memory. Garlic has antiviral and antibacterial properties and helps reduce the risk of some cancers, such as breast cancer

A study has found that aged black garlic (ABG) in addition to dietary changes can lower diastolic blood pressure in male participants.[1,2] This is not the first study to show that garlic has health benefits. Garlic has been recognized for centuries, including references in Sumerian clay tablets that date 2600 B.C.[3] In ancient Egypt, garlic was given to the working class to support heavy labor and in the first Olympic Games, athletes used garlic to increase their stamina.

Garlic has also been used in traditional Chinese medicine for digestion and to treat diarrhea and worm infestations. In India, garlic was used to promote general healing and treat fatigue, digestive issues, heart disease and arthritis. Researchers writing in the

Journal of Nutrition[4] observed that several cultures came to the same conclusion about the role that garlic plays in health and disease. They went on to write:[5]

> *"With the onset of the Renaissance, increasing attention was paid in Europe to the medical uses of plants. A leading physician of the 16th Century, Pietro Mattioli of Siena, wrote widely, and his work was translated into several other languages. He prescribed garlic for digestive disorders, infestations with worms and renal disorders, as well as to help mothers during difficult childbirth.*
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> *In England, however, garlic remained the food of the working classes, a view that did not prevent the wealthier English from enjoying the therapeutic properties of garlic, i.e., it was recommended for constipation, toothache, dropsy, animal bites and the plague."*

According to the Centers for Disease Control and Prevention,[6] 47% of U.S. adults have high blood pressure. This is currently defined as systolic pressure greater than 130 milligrams of mercury (mmHg) or diastolic pressure greater than 80 mmHg. Data show that consuming ABG may have an impact on people with high blood pressure.[7]

Aged Black Garlic Helps Lower Diastolic Blood Pressure

According to the researchers,[8] eating aged garlic has demonstrated improvement in different cardiovascular disease risk factors. The extent of the benefits is related to the aging process and the chemical compounds found in garlic.

The objective of the study was to analyze how daily intake of ABG extract with standardized S-allyl-L-cysteine (SAC) impacted cardiovascular risk factors in people who had moderate hypercholesterolemia and followed dietary recommendations.

The researchers engaged 67 people in a double-blind, crossover, sustained and controlled intervention study. The participants all consumed 250 mg per day of a combination of SAC/AGE or a placebo for six weeks. They underwent a three-week washout period and continued for the next six weeks with the opposite intervention.

At the end of the study, the researchers found that certain cardiovascular disease risk biomarkers were reduced in those taking the ABG extract. This included a reduction in diastolic blood pressure of 5.85 mmHg as compared to those taking the placebo, especially in men with diastolic blood pressure over 75 mmHg.[9]

Rosa M. Valls, Ph.D., from the Universitat Rovira i Virgili, Reus, Spain, and one of the researchers, commented in an article in Medscape, "The observed reduction in DBP (diastolic blood pressure) by ABG extract was similar to the effects of dietary approaches, including the effects of the Dietary Approaches to Stop Hypertension (DASH) diet on BP."[10]

The authors noted that past research studies had not focused on ABG, but rather on other types of aged garlic and had a method or design weaknesses. During the study, researchers found that 96.5% of the group adhered to the protocol and there were no adverse events reported. The differences in diastolic blood pressure were not found at three weeks, but were statistically significant at six weeks.

According to Medscape, the scientists wrote that systolic blood pressure elevation also influences cardiovascular risk outcomes and both systolic and diastolic blood pressure independently influence heart disease events. From the data, they concluded:[11]

> *"Thus, reducing DBP by 5 mm Hg results in a 40% lower risk of death from stroke and a 30% lower risk of death from ischemic heart disease or other vascular death."*

Garlic Has Heart and Blood Sugar Benefits

Garlic not only affects blood pressure but has been known to have a positive impact on cardiovascular and metabolic diseases, which include atherosclerosis, thrombosis and diabetes.[12] Garlic exerts an antimicrobial effect[13] and has strong antioxidant properties[14] that support health and stimulate the immune function. Research also demonstrates that aged garlic is a more potent antioxidant than fresh cloves.[15]

Additionally, garlic powder has demonstrated a protective effect on the elastic properties of the aorta in elderly adults. The aorta is the largest artery in the body, which exits directly from the heart. Aortic stiffness is commonly found in aging and is associated with an increased risk of heart attack, heart failure, stroke and heart disease.[16] However, one study[17] found that elderly patients who took garlic powder had an attenuated response in aortic stiffness.

A second study[18] showed those taking 2 grams of fresh garlic increased plasma concentrations of nitric oxide (NO). This is a soluble gas your body makes from the amino acid L-arginine. Although it's a free radical, it's also an important biological signaling molecule required for normal endothelial function[19] and to protect your mitochondria.[20]

NO is also a potent vasodilator[21] that promotes healthy blood flow for efficient oxygenation of your tissues and organs and aids in the removal of waste and carbon dioxide. Additionally, it improves brain neuroplasticity[22] by improving oxygenation in the somatomotor complex, an area of the brain often affected in the early stages of dementia.

According to the Centers for Disease Control and Prevention,[23] more than 37 million people living in the U.S. have diabetes. Type 2 diabetes tends to develop more frequently in people over age 45 and can present with few symptoms. One of those symptoms is elevated blood sugar.

As your cells are exposed to higher amounts of glucose, they become insulin resistant. However, insulin is required to move glucose from the blood into the cells. One way to help control blood sugar levels is to retain more insulin in the bloodstream. Yet, up to 80% is removed on the first pass through the liver,[24] which reduces the amount of insulin available for use.

Research has found that compounds in garlic prevent this metabolism of insulin, and thus free up more of it for your body.[25] Animal studies have been used to evaluate the effect of one garlic compound, alliin, on blood sugar. In one study,[26] mice were given drinking water with and without alliin for eight weeks.

There was no change in body weight, energy or fat deposits, but those drinking water with alliin demonstrated increased insulin sensitivity and a better lipid profile. Researchers believe this may also be attributed to the compound's ability to modulate intestinal gut microbiota.

Organosulfur Compounds Contribute to the Power of Garlic

Organosulfides are phytochemicals commonly found in garlic and onion. Epidemiological studies have found these compounds have an anti-carcinogenic effect in an experimental model.[27] These are a subclass of sulfur that is found throughout the environment and a necessary component of enzymes, proteins and vitamins.[28]

The exact mechanism organosulfur compounds use in protecting cells is not clear. It is known that they modulate activity to inhibit the formation of DNA adducts,[29] or segments of DNA bound to potentially cancer-causing chemicals.[30] Organosulfur compounds have also demonstrated activity against cellular proliferation in tumors that may be mediated by starting apoptosis.[31]

The sulfur compounds also have anti-inflammatory, antioxidant and antimicrobial properties.[32] They are linked to a decrease in the synthesis of cholesterol in the liver,[33] which reduces the total cholesterol level. In a test tube, they inhibit platelet aggregation,[34] which potentially can reduce the risk of thrombotic events including stroke and pulmonary embolism, and protect your cardiovascular system.

Garlic Benefits Gut, Brain and Memory

One study,[35] presented at the American Physiological Society's 2019 annual meeting by researchers at the University of Louisville, added credence to garlic’s status as a superfood and powerful medicinal properties. The study involved 24-month-old mice, which is the equivalent of 56 and 69 years in humans.

Some mice received an allyl sulfide, which led to improved long and short-term memory and healthier gut bacteria, as compared to control mice that didn't receive the

supplement. Mice taking the garlic compound also had higher gene expression of neuronal derived natriuretic factor (NDNF),[36] which is a gene required for memory consolidation.

Reduced expression of NDNF may be linked to cognitive decline. One study author commented in a press release, "Our findings suggest that dietary administration of garlic containing allyl sulfide could help maintain healthy gut microorganisms and improve cognitive health in the elderly."[37]

The link between gut bacteria and neurological health is not new. Data show people with dementia have a different makeup of gut microbiota as compared to those without. Research in the journal Protein & Cell explained that:[38]

> *"… gastrointestinal tract microbiota are directly linked to dementia pathogenesis through triggering metabolic diseases and low-grade inflammation progress. A novel strategy is proposed for the management of these disorders and as an adjuvant for psychiatric treatment of dementia and other related diseases through modulation of the microbiota (e.g. with the use of probiotics)."*

Research data also supports the use of aged garlic extract (AGE) to improve short-term recognition memory and relieve neuroinflammation in animals with Alzheimer's-like disease.[39] This study used fresh garlic that was aged to create the extract and produce SAC, which is found in far greater quantities in aged garlic and black fermented garlic than in raw garlic. AGE may also protect the brain in other ways, including:[40]

- Protect against neurodegenerative conditions
- Prevent brain injury following ischemia
- Protect neuronal cells against apoptosis
- Preventing β-amyloid-induced oxidative death

Researchers in the journal Nutrients also explained that treatment with AGE or S-allyl cysteine "has been shown to prevent the degeneration of the brain's frontal lobe,

improve learning and memory retention, and extend life span."[41] The same extract may increase gut microbial richness and diversity after just three months.[42] Fresh garlic has also shown a promise to improve memory function, including one animal study where garlic increased memory retention.[43]

Garlic Fights Infections and Cancer

As mentioned above, garlic and onions contain phytochemicals that have demonstrated anticarcinogenic effects. One population-based study in Puerto Rico[44] was conceived when it was noted that there was a lower rate of breast cancer on the island as compared to the mainland.

Researchers from the University at Buffalo were looking for evidence to associate eating onions and garlic with the prevention of breast cancer. They found an inverse relationship between intake and the risk of lung, prostate and stomach cancers that had previously been established.

The lead researcher, Gauri Desai, said in a press release,[45] "We found that among Puerto Rican women, the combined intake of onion and garlic, as well as sofrito, was associated with a reduced risk of breast cancer." Sofrito is a foundational tomato-based sauce commonly used in Puerto Rican dishes.

The final data revealed that “those who consumed sofrito more than once a day had a 67% decrease in risk as compared to women who never ate it.” Desai[46] pointed out that it was the total amount of onions and garlic the women ate that provided the protective effect and not the sofrito alone.

Data have also shown that garlic is a natural antiviral and antibacterial, and food researchers have suggested that extracts could be used when preparing hamburgers to reduce the growth of staphylococcus aureus in the burgers.[47] While it can be used as flavoring, it also has antibacterial properties against some gram-positive and gram-negative bacteria.

Antiviral Properties of Garlic Supplements

Garlic also has a long history of being tested against viruses. One study in 1985[48] demonstrated that garlic had activity against influenza B and herpes simplex. A human trial with 146 participants carried out during flu season showed those using garlic supplements were less likely to get sick and if they did get sick, recovered faster. Those using a placebo were more likely to get sick more than once in a 12-week period.

In a historical review of the literature, it was found garlic is active against several viruses, including flu, the common cold, HIV, herpes types I and II and rhinovirus.[49] Early in the COVID-19 pandemic, Vietnamese scientists[50] validated the antiviral properties of garlic and showed two of the most common organosulfur compounds found in garlic essential oil had activity against SARS-CoV-2.

The researchers wrote that the results of the lab study "suggest that the garlic essential oil is a valuable natural antivirus source, which contributes to preventing the invasion of coronavirus into the human body."[51]

One Turkish study[52] published later in the pandemic wrote that garlic influences the release of leptin from adipose tissue, which helps regulate satiety and plays a role in boosting inflammatory cytokines. They concluded that garlic may help "repress the production and secretion of proinflammatory cytokines as well as an adipose tissue-derived hormone leptin having the pro-inflammatory nature."[53]

It is difficult to go wrong when eating garlic. But, if you're not fond of the pungent flavor or want a further boost to the health effects, consider black garlic, which is produced by fermenting whole bulbs of fresh garlic in climate-controlled conditions. Even garlic haters may like the taste of ABG. Writing in the journal Molecules, researchers noted that ABG is a garlic preparation "with a sweet and sour taste and no strong odor."[54]

When you choose fresh garlic, be aware the cloves must be crushed or chopped to stimulate the release of an enzyme, which in turn catalyzes the formation of allicin. To activate the medicinal properties, compress the clove with a spoon or finely chop it before swallowing.

Tests show you can reduce the following unpleasant breath odor by chewing a raw apple, mint leaves or lettuce.[55] Now you can eat garlic to your heart's content without worrying about offending others.

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