

Black Pepper: So Much More Than a Spice

Black pepper can be found in nearly every kitchen. Science has discovered multiple health benefits, confirming the ancient name 'black gold.'



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STORY AT-A-GLANCE

- Pepper comes in several colors, but the most common are black and white. Both come from the same plant and the color difference is related to when the fruit is picked and how it's processed
- The major bioactive compound in pepper is piperine, which is responsible for many diverse health benefits. Peppercorns are high in antioxidant properties,

which may play a role in cancer, liver disease, atherosclerosis and the aging process

- Piperine increases the absorption and bioavailability of other nutrients, and has cardioprotective, neuroprotective and hepatoprotective properties
- Black pepper improves digestion, aids weight management, promotes skin and hair health, and aids in blood sugar control. Lab studies show the antiviral properties of black pepper are effective against Ebola, Dengue and SARS-CoV-2
- For best results, grind whole peppercorns just before using them to retain the flavor and potency of the health benefits



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Pepper is so common that it's easy to take for granted. Not only does this savory and spicy seasoning add a powerful kick to your meals, but it also adds an impressive boost to your health regimen. Black pepper (*Piper Nigrum* L.) was originally grown in the Western Ghats, a stretch of land along the west coast of India. ¹

The plants can be easily grown at home in a pot and by choosing when you harvest the fruit, you can get black, white, green and red peppercorns from the same plant. ² The global market is expanding and expected to grow from \$3.9 billion in 2020 to \$5.99 billion by 2028. ³

According to a market study by Fior Markets, ⁴ the growth is driven in part by using black pepper as a natural preservative in food products and the addition to the cosmetic industry where it's used for its antibacterial and antioxidant properties. ⁵ However, supply has not met demand primarily because of crop losses that resulted from climate change and sudden rains.

Black pepper has been prized since ancient times, once known as the “king of spices” and “black gold.” ⁶ Pepper was so highly profitable that traders set their own prices,

which led to the spice becoming a luxury item. Even today, the Dutch term “peperduur,” which means as expensive as pepper, is used to describe anything extremely expensive. [7](#)

Pepper has played a role in the traditional medicines of India and China, [8](#) and is a key component in Ayurvedic medicine. It is believed that pepper was first brought from India to China for medicinal purposes and went on to be used in traditional medicine in Greece and Rome.

Black Pepper or White Pepper?

● All About White Pepper & Black Pepper



There are two main pepper choices — black or white pepper. While black pepper is a mainstay in many households, white pepper is equally appealing, if not quite as widely used, at least in the U.S. Color is the most obvious distinction between the two.

Some recipes use white pepper instead of black because the appearance of the final dish is lighter. However, beyond the appearance, there are other important differences, beginning with how they are processed. As for which is better, that's a personal choice since both have great value.

As described in the short video above, white and black peppercorns are made from the fruit of the piper nigrum plant. Black peppercorns are made using unripe berries, which are then cooked and dried. The drying process gives the black peppercorn a dark appearance, wrinkled texture and pungent flavor.

White peppercorns are picked fully ripe when the fruit is red. The fruit is soaked, the outer skin is removed, and the seed is dried, which results in white peppercorns. There are subtle differences in flavor, as the black peppercorns are more pungent, and the white has an earthy flavor.

Both types of peppercorns contain similar amounts of piperine, which is the substance responsible for the pungency, heat and health benefits. Overall, white and black peppercorns contain between 6.3% and 7% of the alkaloid piperine,⁹ which has been shown to be beneficial for arthritis, even in small doses.¹⁰

Diverse Health Benefits of Black Pepper

1. **Antioxidant Properties** — Black pepper contains powerful antioxidants and black pepper essential oil is also rich in flavonoids, proanthocyanidins and phenolics, which also have strong antioxidant activity.¹¹ Piperine, which is the main active ingredient, is an anti-inflammatory and helps protect against lipid peroxidation,¹² which may play a role in chronic diseases like cancer, liver disease, atherosclerosis and the aging process.

A comparative analysis of the antioxidant activity between black pepper and white pepper revealed that black pepper extracts were most effective.¹³ There are two commonly used pepper extracts — essential oil and oleoresins.¹⁴

Pepper essential oil is commercially extracted from the berries using steam distillation, while pepper oleoresin is an extract using solvents and contains a blend of essential oil, compounds like piperine and resinous matter. An analysis of the antioxidant activity of essential oil and oleoresins shows both extracts have strong antioxidant activity.¹⁵

2. **Maximizes the Health Benefits of Curcumin** — Black pepper has a unique ability to interact with other nutrients and increase their absorption.¹⁶ For

example, when EGCG from green tea is administered with piperine, the absorption of EGCG increases. [17](#)

When piperine is administered with curcumin, it can raise the bioavailability of curcumin by up to 2,000%. [18](#) [19](#) The health benefits of curcumin include pain reduction, [20](#) improving cognitive function and mood in older adults [21](#) and a beneficial effect on irritable bowel syndrome symptoms. [22](#)

3. **Cardioprotective Properties** — Cardiovascular diseases continue to be among the leading causes of death. [23](#) A systematic review [24](#) in December 2020 found black pepper and piperine have protective effects on cardiovascular diseases.

Key findings included regulation of lipid metabolism, inflammation and oxidation status, all of which affect heart health. Piperine specifically targeted processes associated with atherosclerosis. Other beneficial effects included attenuating high blood pressure, heart injury and fibrosis. Piperine could prevent lipid peroxidation and prevent inflammatory cells from adhering to the endothelial monolayer and has an antithrombosis effect.

Additionally, one 2022 review [25](#) summarized the cardioprotective benefits of black pepper against the chemotherapeutic drug-induced cardiotoxicity that occurs with the administration of chemotherapeutic drugs in those with cancer.

4. **Immunomodulatory and Anticancer Activities** — Piperine is packed with flavonoids, carotenes, vitamins and antioxidants that have shown a beneficial effect in the prevention of cancer. [26](#) Lab studies have found that black pepper has an immunomodulatory effect, and it augments the production of nitric oxide while enhancing the cytotoxic activity of natural killer cells. [27](#)
- These findings suggest that black pepper plays a role in anti-tumor activities and may potentially be used to help regulate inflammatory responses and prevent carcinogenesis. Piperine also has antimutagenic and cancer-preventive effects in lab studies and animal research. [28](#) [29](#) [30](#)
5. **Neuroprotective Properties** — Animal studies have found that piperine may be beneficial for cognitive function. [31](#) Black pepper extract significantly improved the memory in rats with Alzheimer's-like disease, [32](#) [33](#) reduced damage from

cerebral ischemic injury [34](#) and had a protective effect on Parkinson-like disease. [35](#)

6. **Aids in Digestion** — Black pepper is believed to improve digestion by stimulating the production of hydrochloric acid in the stomach. [36](#) A lack of hydrochloric acid can lead to heartburn or indigestion. Piperine also stimulates digestive enzymes in the pancreas which enhances digestion and reduces food transit time. [37](#) Black pepper is also a potential prebiotic as it modulates fecal bacteria communities. [38](#)
7. **Weight Management** — Piperine has displayed several pharmacological effects, including anti-obesity properties in lab and animal models. [39](#) Lab models have demonstrated that black pepper extract and piperine could strongly inhibit adipogenic activity and piperine plays a role in regulating genes associated with fat metabolism. [40](#)

When a nutritional supplement containing black pepper was tested, it burned as many calories as would a 20-minute walk. [41](#) A small study with 16 healthy individuals showed a black pepper-based beverage could modulate the appetite by lowering their feelings of hunger and increasing satiety. [42](#)

8. **Promotes Healthy Skin** — According to Stylecraze, [43](#) black pepper can be used on your skin and hair. They recommend mixing a teaspoon of black pepper with equal amounts of honey or turmeric. Water can be added to make a smoother consistency and then apply it as a mask to your face twice a day.

A teaspoon of crushed pepper and a bowl of curd can be used to help treat dandruff. Leave it on the scalp for about 30 minutes and wash it off with water without shampoo. Combining a teaspoon of lemon and ground black pepper seeds can help revitalize the hair and leave it shiny, according to Stylecraze. Leave it on for 10 to 15 minutes and rinse it off with cold water.

Adding powdered black pepper with equal amounts of honey may help strengthen the hair roots. Clinical trials have also tested black pepper in the treatment of vitiligo, a disease in which the skin loses its pigment.

Black pepper has been used in ayurvedic medicine for vitiligo [44](#) and a paper [45](#) published in 2018 demonstrated that combining topical piperine with narrow-

band ultraviolet B light had better results than just the ultraviolet light alone in treating vitiligo.

9. **Antimicrobial Properties** — Plants have been used in traditional medicine for centuries, and black pepper is known for its anti-inflammatory, antiviral and antipyretic properties. [46](#) One lab study in 2020 demonstrated that an aqueous seed extract of black pepper had significant antiviral, antibacterial and antifungal activity. [47](#)

A molecular docking study demonstrated that piperine may be effective against Ebola and Dengue, both RNA viruses that are endemic in tropical areas. [48](#) As you might expect, black pepper was also tested against SARS-CoV-2, the virus that causes COVID-19. The study suggested that piperine was a potential inhibitor at the RNA binding site and could be a candidate to inhibit viral proliferation. [49](#)

10. **Hepatoprotective Properties** — The pharmacological actions of piperine include liver protection [50](#) against damage induced by tertiary butyl hydroperoxide and the chemical carbon tetrachloride by reducing lipid peroxidation. Black pepper extract can also stimulate liver regeneration [51](#) and one animal study [52](#) showed black pepper essential oil improved liver health after chemical injury.

The prevalence of liver fibrosis in the general population can reach up to 25.7% [53](#) and can lead to significant liver disease. One animal study [54](#) demonstrated that supplementation with piperine in rats fed a high-carbohydrate, high-fat diet could reduce liver fibrosis, improve cardiac and hepatic inflammatory cell infiltration and improve liver function.

11. **Blood Sugar Control** — Up to 11.3% of the U.S. population have diabetes and 38% have prediabetes. [55](#) The consequences of diabetes are significant, leading to heart disease, stroke and kidney disease. Adding black pepper routinely to your diet may help improve blood sugar metabolism. [56](#)

One eight-week study [57](#) of 86 overweight individuals found those who consumed a combination of piperine and other bioactive food ingredients had a significant decrease in insulin resistance. This suggested that the ingredients, which

included EGCG, capsaicin and L-Carnitine, “might be useful for the treatment of obesity-related inflammatory metabolic dysfunctions.” [58](#)

Grind Peppercorns Fresh for Best Results

For the best results, choose to use whole peppercorns and grind them fresh as you need them. Dried whole peppercorns can stay fresh for three to four years when they're stored in a cool, dark place away from direct sunlight or heat. [59](#)

However, once peppercorns are ground, they gradually lose some flavor and potency. Additionally, purchasing ground pepper increases the risk that the product is adulterated with something other than black pepper. Peppercorns are versatile, so you can grind them to a coarseness you enjoy or crush them to pepper coat your beef before cooking.

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Today I sprinkled very liberally black pepper on my avocado, which I will continue doing.

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