

Black Pepper Essential Oil Health and Beauty Benefits

Black pepper is one of the most widely used spices on the planet. It's valued not only as a flavoring agent in our meals, but also for a variety of other purposes, such as medicinal uses, as a preservative and in perfumery.

In recent decades, scientific research has explored the many possible benefits of black pepper essential oil's health and beauty benefits, such as relief from aches and pains, lowering cholesterol, detoxifying the body and enhancing circulation. It is considered a digestive, diaphoretic, carminative, aperient, antispasmodic, antirheumatic, antiarthritic, antibacterial, and antioxidant substance.

Black pepper's major active phytochemical compound, *piperine*, has been shown to have many beneficial health attributes including possible anticancer properties, which is why researchers have looked into it for inclusion in [diet therapy for cancer treatment as well as cancer prevention](#).

Check out our post recipes using black pepper essential oil for recipes incorporating this beneficial oil. Before using black pepper essential oil in any form, first read through all the precautions, since this ingredient can cause adverse reactions in some people.

Plant Origin of Black Peppercorns

Black pepper essential oil is derived from the dried fruit of the pepper plant, *Piper nigrum*, a condiment or a spice that is commonly used in culinary applications throughout the world. Black pepper essential oil has a spicy, warm, peppery and musky aroma.

Black pepper (*Piper nigrum*) is a flowering (angiosperm) vine (a plant with trailing stems) in the family Piperaceae. Piperaceae is a large family of flowering plants that can be found within the two main genera: *Piper* and *Peperomia*, cultivated for its fruit (the peppercorn), which is usually dried and used as a spice and seasoning.

The fruit is a drupe (an indehiscent type of fruit in which an outer fleshy part surrounds a single shell of hardened endocarp with a seed "kernel" inside) which is about 5 mm (0.20 in) in diameter (fresh and fully mature), dark red, and contains a stone (a *pyrena* or *pyrene*, produced by the ossification of the endocarp or lining of the fruit) which encloses a single pepper seed.

Peppercorns and the ground pepper derived from them may be described simply as *pepper*, or more precisely as *black pepper* (cooked and dried unripe fruit), *green pepper* (dried unripe fruit), or *white pepper* (ripe fruit seeds).

Ground, dried, and cooked peppercorns have been used since antiquity, both for flavor and as a traditional medicine. Black pepper is the world's most traded spice, and is one of the most common spices added to cuisines around the world.

Its spiciness is due to the chemical compound *piperine*, which is different from the spiciness of the *capsaicin* characteristic of chili peppers. It is ubiquitous in the Western world as a seasoning, and is often paired with salt and available on dining tables in shakers or mills.

The Etymology of Pepper

The word *pepper* derives from Old English (the earliest recorded form of the English language) *pipor*, Latin *piper*, and Greek: *πέπερι*. The Greek likely derives from Dravidian (a family of languages spoken mainly in southern India, north-east Sri Lanka, and south-west Pakistan) *pippali*, meaning "long pepper".

Sanskrit (a classical language belonging to the Indo–Aryan branch of the Indo–European languages) *pippali* shares the same meaning.

In the 16th century, people began using *pepper* to also mean the New World chili pepper (from Nahuatl *chilli*, are varieties of the berry–fruit of plants from the genus *Capsicum*, native to the Americas which are members of the nightshade family Solanaceae), which is not closely related.

Peppercorn Varieties

Processed peppercorns come in a variety of colors, any one of which may be used in food preparation, especially the common peppercorn sauce (*steak au poivre*), a culinary cream sauce prepared with a variety of peppercorns, which is prepared as a reduction of the cream in the cooking process.

Black Peppercorns

Black pepper is produced from the still–green, unripe drupe of the pepper plant. The drupes are cooked briefly in hot water, both to clean them and to prepare them for drying.

The heat ruptures cell walls (structural layers surrounding some types of cells, just outside the cell membrane) in the pepper, speeding the work of browning enzymes, proteins that act as biological catalysts by accelerating chemical reactions during drying.

The drupes dry in the sun or by machine for several days, during which the pepper skin around the seed shrinks and darkens into a thin, wrinkled black layer. Once dry, the spice is called black peppercorn. On some estates, the berries are separated from the stem by hand and then sun–dried without boiling.

After the peppercorns are dried, pepper “spirit” (tincture) and essential oil can be extracted from the berries by crushing them. Pepper spirit is used in many medicinal and beauty products. Pepper essential oil is also used as an Ayurvedic massage oil and in certain beauty and herbal treatments.

White Peppercorns

White pepper consists solely of the seed of the ripe fruit of the pepper plant, with the thin darker–colored skin (flesh) of the fruit removed. This is usually accomplished by a process known as “retting”, a process employing the action of micro–organisms and moisture on plants to dissolve or rot away much of the cellular tissues and pectins surrounding bast–fiber bundles, facilitating the separation of the fiber from the stem.

Where fully ripe red pepper berries are soaked in water for about a week so the flesh of the peppercorn softens and decomposes; rubbing then removes what remains of the fruit, and the naked seed is dried. Sometimes the outer layer is removed from the seed through other mechanical, chemical, or biological methods.

Ground white pepper is commonly used in Chinese, Thai, and Portuguese cuisines. It finds occasional use in other cuisines in salads, light–colored sauces, and mashed potatoes as a substitute for black pepper, because black pepper would visibly stand out. However, white pepper lacks certain compounds present in the outer layer of the drupe, resulting in a different overall flavor.

Green Peppercorns

Green pepper, like black pepper, is made from unripe drupes. Dried green peppercorns are treated in a way that retains the green color, such as with sulfur dioxide (SO₂), canning, or freeze–drying. Pickled peppercorns, also green, are unripe drupes preserved in brine or vinegar.

Fresh, unpreserved green pepper drupes are used in some cuisines like Thai cuisine and Tamil cuisine. Their flavor has been described as "spicy and fresh", with a "bright aroma." They decay quickly if not dried or preserved, making them unsuitable for international shipping.

Red Peppercorns

Red peppercorns usually consist of ripe peppercorn drupes preserved in brine and vinegar. Ripe red peppercorns can also be dried using the same color-preserving techniques used to produce green pepper.

Pink Peppercorns

Pink peppercorns are dried berries referring to three different species; the traditional Baies rose plant *Euonymus phellomanus*, are the fruits of the Peruvian pepper tree, *Schinus molle*, or its relative, the Brazilian pepper tree, *Schinus terebinthifolius*, plants from a different family, Anacardiaceae.

The Anacardiaceae family, flowering plants that bear fruits that are drupes and in some cases produce *urushiol*, an irritant. As they are members of the cashew family, they may cause allergic reactions, including anaphylaxis, for persons with a tree nut allergy.

Other (Unrelated) Plants

The bark of *Drimys winteri* ("canelo" or "winter's bark", a tree in the family Winteraceae) is used as a substitute for pepper in cold and temperate regions of Chile and Argentina, where it is easily found and readily available.

In New Zealand, the seeds of the endemic kawakawa (*Piper excelsum*), a relative of black pepper, are sometimes used as pepper; the leaves of endemic *Pseudowintera colorata* ("mountain horopito", woody evergreen flowering trees and shrubs, part of the family Winteraceae) are another replacement for pepper.

Several plants in the U.S. are also used as pepper substitutes, such as field pepperwort (*Lepidium campestre*), a biennial with some form of annual plant in the Brassicaceae family, native to Europe, but found in North America as an invasive weed.

Least pepperwort (*Lepidium virginicum*), an herbaceous plant in the family Brassicaceae native to North America, shepherd's purse (*Capsella bursa-pastoris*), a small annual and ruderal flowering plant in the family Brassicaceae native to eastern Europe and Asia minor, but a common weed in many in colder climates, in the British Isles it is regarded as an *archaeophyte*.

Horseradish, a cultivated root vegetable, probably native to southeastern Europe and western Asia, and field pennycress (*Thlaspi arvense*), a flowering plant in the cabbage family Brassicaceae, native to Eurasia, a common weed throughout North America.

Description of Pepper Plants

The pepper plant is a perennial (a plant that lives more than two years) woody vine growing up to 13 feet (4 meters) in height on supporting trees, poles, or trellises. It is a spreading vine, rooting readily where trailing stems touch the ground.

The leaves are alternate, entire, 2.0–3.9 inches (5–10 cm) long and 1.2–2.4 inches (3–6 cm) across. The flowers are small, produced on pendulous spikes 1.6–3.1 inches (4–8 cm) long at the leaf nodes, the spikes lengthening up to 2.8–5.9 inches (7–15 cm) as the fruit matures.

Pepper can be grown in soil that is neither too dry nor susceptible to flooding, moist, well-drained, and rich in organic matter. The vines do not do well over an altitude of 3,000 feet (900 meters) above sea

level. The plants are propagated by cuttings about 16–20 inches (40–50 cm) long, tied up to neighboring trees or climbing frames at distances of about 6 feet 7 inches (2 meters) apart.

Trees with rough bark are favored over those with smooth bark, as the pepper plants climb rough bark more readily. Competing plants are cleared away, leaving only sufficient trees to provide shade and permit free ventilation.

The roots are covered in leaf mulch (a layer of material applied to the surface of soil) and manure (organic matter that is used as organic fertilizer consisting of animal feces, compost and “green” manure), and the shoots are trimmed twice a year.

On dry soils, the young plants require watering every other day during the dry season for the first three years. The plants bear fruit from the fourth or fifth year, and then typically for seven years. The cuttings are usually cultivars (a plant people have selected for desired traits), selected both for yield and quality of fruit.

A single stem bears anywhere between 20–30 fruiting spikes. The harvest begins as soon as one or two fruits at the base of the spikes begin to turn red, and before the fruit is fully mature, and still hard; if allowed to ripen completely, the fruits lose pungency, and ultimately fall off and are lost. The spikes are collected and spread out to dry in the sun, then the peppercorns are stripped off the spikes.

Black pepper is native to either Southeast or South Asia. Within the genus *Piper*, the pepper plants or pepper vines, is a genus in the family Piperaceae. It is most closely related to other Asian species such as *P. caninum*.

Wild pepper grows in the Western Ghats (a mountain range that covers an area parallel to the western coast) region of India. Into the 19th century, the forests contained expansive wild pepper vines, as recorded by the Scottish physician Francis Buchanan (a Scottish surgeon, surveyor and botanist) in his book, *A Journey from Madras through the Countries of Mysore, Canara and Malabar* (Volume III).

However, deforestation resulted in wild pepper growing in more limited forest patches from Goa (a state on the southwestern coast of India within the Konkan region) to Kerala (a state on the Malabar Coast of India), with the wild source gradually decreasing as the quality and yield of the cultivated variety improved. No successful grafting of commercial pepper on wild pepper has been achieved to date.

The Production and Trade of Pepper

Black Pepper Production, 2020	
Country	Production (in tonnes)
Vietnam	270,192
Brazil	114,749
Indonesia	89,041
India	66,000
Sri Lanka	43,557
China	33,348
Malaysia	30,804
World	747,644

Source: The [Food and Agriculture Organization Corporate Statistical Database](#) (FAOSTAT) of the [United Nations](#) (UN)

In 2020, Vietnam was the world's largest producer and exporter of black peppercorns, producing 270,192 tonnes (metric tons) or 36% of the world total. Other major producers were Brazil, Indonesia, India, Sri Lanka, China, and Malaysia.

Global pepper production varies annually according to crop management, disease, and weather. Peppercorns are among the most widely traded spice in the world, accounting for 20% of all spice imports.

The History of Pepper

Black pepper is native to South or Southeast Asia, and has been used in Indian cooking since at least 2000 BCE. J. Innes Miller notes that while pepper was grown in southern Thailand and in Malaysia, its most important source was India, particularly the Malabar Coast, the southwestern region of the Indian subcontinent.

The lost ancient port city of Muziris in Kerala, famous for exporting black pepper and various other spices, gets mentioned in a number of classical historical sources for its trade with Roman Empire, Egypt, Mesopotamia (a historical region of West Asia situated within the Tigris–Euphrates river system, in the northern part of the Fertile Crescent), Levant (a historical geographical term referring to a large area in the Eastern Mediterranean region of West Asia), and Yemen.

Peppercorns were a much–prized trade good, often referred to as "black gold" and used as a form of commodity money. The legacy of this trade remains in some Western legal systems that recognize the term "peppercorn rent" as a token payment for something that is, essentially, a gift.

The ancient history of black pepper is often interlinked with (and confused with) that of long pepper (or *pippali*), the dried fruit of closely related *Piper longum*, also a flowering vine in the family Piperaceae. The Romans knew of both and often referred to either as just *piper*. In fact, the popularity of long pepper did not entirely decline until the discovery of the New World and of the American chili peppers.

Chili peppers—some of which, when dried, are similar in shape and taste to long pepper—were easier to grow in a variety of locations more convenient to Europe. Before the 16th century, pepper was being grown in a group of islands in the Malay Archipelago in western Indonesia, known as the Sunda Islands.

These consist of Java, Sunda and Sumatra (the largest island). As well as Madagascar (an island country off the southeastern coast of Africa), Malaysia, and everywhere in Southeast Asia. These areas traded mainly with China, or used the pepper locally. Ports in the Malabar area also served as a stop–off point for much of the trade in other spices from farther east in the Indian Ocean.

Ancient Egypt

Black peppercorns were found stuffed in the nostrils of Ramesses II (the third Egyptian pharaoh ruler of the Nineteenth Dynasty), placed there as part of the mummification rituals shortly after his death in 1213 BCE. Little else is known about the use of pepper in ancient Egypt and how it reached the Nile from the Malabar Coast of South Asia.

Ancient Greece

Pepper (both long and black) was known in Greece at least as early as the fourth century BCE, though it was probably an uncommon and expensive item that only the very rich could afford. By the time of the early Roman Empire, especially after Rome's conquest of Egypt in 30 BCE, open–ocean crossing of the Arabian Sea direct to Chera dynasty southern India's Malabar Coast was near routine.

Details of this trading across the Indian Ocean have been passed down in the *Periplus of the Erythraean Sea*, a Greco–Roman *periplus* written in Koine Greek that describes navigation and trading opportunities from Roman Egyptian ports along the coast of the Red Sea, and others along Horn of Africa, the Persian Gulf, Arabian Sea and the Indian Ocean.

According to the Greek geographer Strabo, the early empire sent a fleet of around 120 ships on an annual trip to India and back. The fleet timed its travel across the Arabian Sea to take advantage of the predictable monsoon winds.

Returning from India, the ships travelled up the Red Sea, from where the cargo was carried overland or via the Nile–Red Sea canal (the forerunner of the Suez Canal) to the Nile River, barged to Alexandria (the second largest city in Egypt, and the largest city on the Mediterranean coast), and shipped from there to Italy and Rome.

The rough geographical outlines of this same trade route would dominate the pepper trade into Europe for a millennium and a half to come. With ships sailing directly to the Malabar Coast, Malabar black pepper (a variety of black pepper that originated in the region of the same name) now travelled a shorter trade route than long pepper, reflected in its price.

Ancient Rome

Black pepper was a well–known and widespread, if expensive, seasoning in the Roman Empire. Pliny the Elder (Gaius Plinius Secundus, a Roman author, naturalist, philosopher, and naval & army commander), authored *Natural History* (the largest single Roman work to have survived).

In it he wrote about the price of peppercorns in Rome around 77 CE: "...is 15 *denarii* (the standard Roman silver coin) per pound, while that of white pepper is seven, and of black, four." Pliny further complained, "There is no year in which India does not drain the Roman Empire of 50 million *sesterces* (a small, silver coin issued only on rare occasions)."

Apicius' De re coquinaria, a third–century collection of Roman cookery recipes probably based at least partly on one recipe from the first century CE, includes pepper in a majority of its recipes. Edward Gibbon (an English essayist, historian, and politician) wrote, in his six–volume work, *The History of the Decline and Fall of the Roman Empire*, that pepper was "a favorite ingredient of the most expensive Roman cookery."

Post Classical Europe

Pepper was so valuable that it was often used as collateral or even currency. The taste for pepper (and the appreciation of its monetary value) was passed on to those who would see Rome fall. Alaric I, the first king (395–410 AD) of the Visigoths (a Germanic people living within the Roman Empire), included 3,000 pounds of pepper as part of the ransom he demanded from Rome when he besieged the city in the fifth century.

After the fall of Rome, others took over the middle legs of the spice trade, first the Persians (the First Persian Empire was the ancient Iranian empire founded by Cyrus the Great of the Achaemenid dynasty in 550 BC) and then the Arabs.

J. Innes Miller cites the account of Cosmas Indicopleustes, a sixth–century merchant from Alexandria in Egypt who travelled east to India, as proof that "pepper was still being exported from India in the sixth century".

By the end of the Early Middle Ages (sometimes referred to as the Dark Ages, from the late fifth or early sixth century through the 10th century), the central portions of the spice trade were firmly under Islamic

control. Once into the Mediterranean, the trade was largely monopolized by Italian powers, especially Venice and Genoa. The rise of these city-states was funded in large part by the spice trade.

A riddle authored by Saint Aldhelm, Abbot of Malmesbury Abbey, Bishop of Sherborne (an episcopal title taking its name from the market town of Sherborne in Dorset, England), and a writer and scholar of Latin poetry, born before the middle of the seventh-century, sheds some light on black pepper's role in England at that time.

It is commonly believed that during the Middle Ages (approximately from the late fifth to the late 15th centuries), pepper was often used to conceal the taste of partially rotten meat. No evidence supports this claim. Historians view it as highly unlikely since, at the time pepper was a luxury item, affordable only to the wealthy who could afford to purchase unspoiled meat.

In addition, by that time, people knew that eating spoiled food would make them sick. Similarly, the belief that pepper was widely used as a preservative is questionable. It is true that *piperine*, the compound that gives pepper its spiciness, has some antimicrobial properties. But the concentration of *piperine* when pepper is used as a spice produces a very small effect.

Salt is a much more effective preservative, and salt-cured meats were common fare, especially in winter. However, pepper and other spices certainly played a role in improving the taste of long-preserved meats.

Its exorbitant price during the Middle Ages—and the monopoly on the trade held by Venice—was one of the inducements that led the Portuguese to seek a sea route to India. In 1498, Vasco da Gama (a Portuguese explorer and the 1st Count of Vidigueira) became the first person to reach India by sailing around Africa.

When asked by Arabs in Calicut (or Kozhikode), a city along the Malabar Coast (who spoke Spanish and Italian) why they had come, his representative reportedly replied, "We seek Christians and spices." Though this first trip to India by way of the southern tip of Africa was only a modest success, the Portuguese quickly returned in greater numbers and eventually gained much greater control of trade on the Arabian Sea.

In the 1494 *Treaty of Tordesillas* (wherein the new lands were divided between the Portuguese and the Spanish Empires), the Spanish granted Portugal exclusive rights to the half where black pepper originated.

However, the Portuguese proved unable to monopolize the spice trade. Older Arab and Venetian trade networks successfully imported enormous quantities of spices, and pepper once again flowed through Alexandria and Italy, as well as Africa.

In the 17th century, the Portuguese lost almost all of their valuable Indian Ocean trade to the Dutch and the English, who, taking advantage of the Spanish rule over Portugal during the Iberian Union (the dynastic union of Spain and Portugal that existed between 1580 and 1640), occupied by force almost all Portuguese interests in the area.

The pepper ports of Malabar began to trade increasingly with the Dutch in the period 1661–1663. As pepper supplies into Europe increased, the price of pepper declined (though the total value of the import trade generally did not).

Pepper, which in the early Middle Ages had been exclusively used by the rich, became an everyday seasoning among the masses. Today, pepper accounts for one-fifth of the world's spice trade.

China

It is possible that black pepper was known in China in the second century BCE, according to poetic reports by explorer Tang Meng. Sent by Emperor Wu (the seventh emperor of the Han dynasty 141–87 BC) to what is now Southwest China.

Tang Meng is said to have come across something called *jujiang* or "sauce–betel". He was told it came from the markets of Shu, an ancient kingdom in what is now the Sichuan Province in Southwest China. Traditionally, historians believed that "sauce–betel" was a sauce made from betel leaves, but some arguments to the contrary assert that it actually refers to pepper, either long or black.

The first definite appearance of black pepper in Chinese texts, as *hujiao* or "foreign pepper" was in the third century CE. It does not appear to have been widely known at the time, as it does not appear in a fourth–century work describing a wide variety of spices from beyond China's southern border, including long pepper.

By the 12th century, however, black pepper had become a popular ingredient in the cuisine of the wealthy and powerful, sometimes taking the place of China's native Sichuan pepper (the tongue–numbing dried fruit of an unrelated plant).

Marco Polo, the Venetian merchant, explorer and writer who travelled through Asia along the Silk Road between 1271 and 1295, testifies to pepper's popularity in 13th–century China, when he wrote of reports of black pepper consumption in the city of Kinsay (Hangzhou, the capital and most populous city of Zhejiang, China).

During the course of the Ming “treasure voyages”, the seven maritime expeditions undertaken by Ming China's treasure fleet in the early 15th century (1405–1433), Fleet Admiral Zheng He, a Chinese mariner, explorer, diplomat, and court eunuch during China's early Ming dynasty returned with such a large amount of black pepper that the once–costly luxury became a common commodity.

Black Pepper in Traditional Medicine

Like many eastern spices, pepper was historically both a seasoning and a traditional medicine. Pepper appears in the Buddhist *Samaññaphala Sutta*, Chapter V (the second discourse of the *Digha Nikaya*), as one of the few medicines a monk is allowed to carry. Long pepper, being stronger, was often the preferred medication, but both were used.

Black pepper (or perhaps long pepper) was believed to cure several illnesses, such as constipation, insomnia, oral abscesses, sunburn and toothaches, among others. Various sources from the fifth century onward recommended pepper to treat eye problems by applying salves or poultices made with pepper directly to the eye. Though current medical research has yet to confirm any treatment benefit to humans, several benefits have been shown in animal modeling experiments.

Black pepper contains phytochemical compounds, including *amides*, *piperidines*, *pyrrolidines* (also known as *tetrahydropyrrole*), and trace amounts of *safrrole* (found in sassafras plants), which may be carcinogenic in laboratory rodents.

Black pepper essential oil is rich in vitamin A (beta–carotene), which has great antioxidant activity. Contains Vitamin K, which is essential for maintaining proper circulatory and [metabolic functions](#). It also contains calcium, potassium and selenium. Calcium makes for healthy bones and potassium is needed for regulating blood pressure.

Selenium is required for the proper formation of bones, nails, hair follicles and teeth, as well as for proper brain function. *Piperine* is under study for its potential to increase absorption of selenium, vitamin B₁₂, beta–carotene and curcumin (the main phytochemical compound in turmeric), as well as other compounds. *Piperine* is also under study for a variety of possible physiological effects.

Pepper is known to cause sneezing, said to be caused by *piperine*, its main chemical compound, irritating the nostrils. Few, if any, controlled studies have been carried out to prove this hypothesis.

The Nutritional Value of the Black Pepper

Nutritional value per 1 Tbsp. (6 grams) of ground black pepper.

Nutrient	Recommended Daily Values (DV)
Vitamin K	13%
Iron	10%
Manganese	18%
And trace amounts of other essential nutrients, protein and dietary fiber.	

The Phytochemistry of Black Pepper Essential Oil

Pepper gets its spicy heat mainly from *piperine*, which is derived from both the outer fruit and the seed. Black pepper contains about 4.6%–9.7% *piperine* by mass, and white pepper slightly more than that. Refined *piperine*, by weight, is only about one percent as hot as the *capsaicin* found in chili peppers.

The outer fruit layer left on black pepper also contains [aroma-contributing terpenes](#), including *germacrene* (11%), *limonene* (10%), *pinene* (10%), *alpha-phellandrene* (9%), and *beta-caryophyllene* (7%), which add citrusy, woody, and floral notes.

Other [components of black pepper essential oil](#) are *myrcene*, *beta-bisabolene*, *sabinene*, *linalool*, *pinocarveol*, *alpha-termineol*, *camphene* and *alpha-terpenene*. Black pepper is also rich in minerals and vitamins like calcium, manganese, iron, vitamin K, beta-carotene, phosphorus, potassium, and selenium.

These scents are missing in white pepper, as the fermentation and other processing removes the fruit layer, which contains most of the spicy *piperine*. Other flavors also commonly develop in this process, some of which are described as off-flavors when in excess.

These off-flavors are primarily *3-methylindole* (or *skatole*, an organic compound in the *indole* family that occurs naturally in the feces of mammals and birds), *4-methylphenol* (or *para-Cresol*, a *phenol* derivative), *3-methylphenol* (or *meta-Cresol*, a *phenol* derivative) and *butyric acid* (a straight-chain *alkyl carboxylic acid* known for its unpleasant odor).

The aroma of pepper is attributed to *rotundone* (*3,4,5,6,7,8-Hexahydro-3 α ,8 α -dimethyl-5 α -(1-methylethenyl)azulene-1(2H)-one*), a *sesquiterpene* originally discovered in the tubers of *Cyperus rotundus* (known as Java grass), a species of sedge in the family *Cyperaceae* native to Africa, southern and central Europe, and southern Asia. *Azulene* is a dark blue organic compound and an isomer of *naphthalene*. The compound is named after its color, "azul", which is Spanish for blue.

Rotundone can be detected in concentrations of 0.4 nanograms per liter in water and in wine.

Rotundone is also present in marjoram, oregano, rosemary, basil, thyme and geranium, as well as in some Shiraz wines.

Shiraz wine refers to two different wines: the historical name refers to wine produced in the city of Shiraz in present-day Iran. The other is an alternative name for the Syrah grape, mostly used in Australia and South Africa.

Pepper [loses flavor and aroma through evaporation](#), airtight storage helps preserve its pungency longer. Pepper can also lose flavor when exposed to light, which can transform (through isomerization) *piperine*

into nearly tasteless *isochavicine*. Once ground, pepper's aromatics can evaporate quickly; for this reason most culinary sources recommend grinding whole peppercorns immediately before use.

Handheld pepper mills or grinders, which mechanically grind or crush whole peppercorns, are used as an alternative to pepper shakers that dispense already ground pepper. Spice mills such as pepper mills were found in European kitchens as early as the 14th century, but the mortar & pestle, used for crushing and grinding whole peppercorns, which preceded these mills remained a popular method for centuries.

Enhancing the flavor profile of peppercorns (including *piperine* and essential oils), prior to processing, has been attempted through the postharvest application of ultraviolet-C (UV-C) light.

The Health Benefits of Black Pepper Essential Oil

Black pepper essential oil is obtained either through CO₂ extraction or steam distillation. The essential oil has a spicy, warm, peppery and musky aroma. It's commonly used to aid the digestive and nervous systems—stimulating circulation and promoting emotional balance.

Black pepper possesses a unique versatility that's both energizing and warming. In addition to invigorating the senses, it can be used to enhance mental clarity. For these qualities, it is a favorite among athletes and those with active lifestyles.

Black pepper essential oil is also an important food due to its antioxidant, antimicrobial potential and gastro-protective modules. Its active ingredient, *piperine*, [gives black pepper a rich phytochemistry that also includes volatile oils, oleoresins and alkaloids](#).

1. Relieves Aches and Pains

Because of its warming, anti-inflammatory and antispasmodic properties, black pepper essential oil stimulates and improves circulation, and helps break down lactic acid build up to reduce muscle injuries, tendonitis, and symptoms of arthritis and rheumatism.

A [2014 study published in the *Journal of Alternative and Complementary Medicine*](#) assessed the efficacy of aromatic essential oils on neck pain. Patients used a 3% concentration cream containing black pepper, marjoram, lavender and peppermint essential oils. They applied 2 g of this cream to their necks daily after showering or bathing for a four-week period. The group reported improved pain tolerance and significant improvement of neck pain.

2. Aids Digestion

Black pepper essential oil may help ease the discomfort of constipation, diarrhea and gas. In vitro and in vivo animal research has shown that depending on the dosage, black pepper's *piperine* exhibits antidiarrheal and antispasmodic activities or it can actually have a spasmodic effect, which is helpful for constipation relief.

Black pepper essential oil is [beneficial for digestion](#) because it stimulates the whole digestive system, from the salivary glands to the large intestine, and promotes the secretion of digestive juices like bile that facilitate digestion.

Overall, black pepper and *piperine* appear to have [possible medicinal uses for gastrointestinal motility disorders](#) such as irritable bowel syndrome (IBS). A [study published in 2013](#) looked at the effects of *piperine* on animal subjects with IBS as well as depression-like behavior.

The researchers found that the animal subjects who were given *piperine* showed improvements in behavior as well as an overall improvement in serotonin regulation and balance in both their brains and colons. How does this apply to IBS? There is evidence that abnormalities in brain-gut signaling and [serotonin metabolism play a role in IBS](#).

3. Lowers Cholesterol

A [2002 animal study in the *Journal of Clinical Biochemistry and Nutrition*](#) on the *hypolipidemic* (lipid-lowering) effect of black pepper in rats fed a high-fat diet showed a decrease in the levels of cholesterol, free fatty acids, phospholipids and triglycerides.

Researchers found that supplementation with black pepper elevated the concentration of HDL (good) cholesterol and reduced the concentration of LDL (bad) cholesterol and VLDL (very low-density lipoprotein) cholesterol in the plasma of rats fed high-fat foods. This is just some of the research that points toward using black pepper essential oil internally to reduce high triglycerides and improve total cholesterol levels.

4. Has Anti-Virulence Properties

The long-term use of antibiotics has resulted in the evolution of multidrug-resistant bacteria. Research published in [Applied Microbiology and Biotechnology](#) found that black pepper extract contains anti-virulence properties, meaning it targets bacterial virulence without affecting cell viability, making drug resistance less likely.

The study showed that after screening 83 essential oils, black pepper, cananga and myrrh oil inhibited *Staphylococcus aureus* (staph) biofilm formation and “almost abolished” the hemolytic (destruction of red blood cells) activity of *S. aureus* bacteria.

5. Lowers Blood Pressure

When black pepper essential oil is taken internally, it may promote healthy circulation and even lower high blood pressure. An [animal study published in the *Journal of Cardiovascular Pharmacology*](#) demonstrates how black pepper’s active component, *piperine*, possesses a blood pressure-lowering effect.

Black pepper is known in Ayurvedic medicine for its warming properties that can be helpful to circulation and heart health when used internally or applied topically. Mixing black pepper essential oil with cinnamon (cassia) or turmeric essential oils can enhance these warming properties.

6. Exhibits Anticancer Activity

According to a [2010 study conducted at Michigan State University](#), black pepper extract and its phytochemical compounds exhibit anti-inflammatory, antioxidant and anticancer activities. The researchers found that the *piperine* and *alkyl amides* found in black pepper both had dose-dependent abilities to inhibit human cancer cell proliferation.

Animal research has demonstrated how *piperine* assists in cognitive brain functioning, boosts nutrient absorption and improves gastrointestinal functionality. Animal research has also found that the free-scavenging activity of black pepper and its active ingredients may make it helpful to regulate tumor progression and also act as a general chemoprevention substance.

7. Antioxidant-Free Radical Fighter

Black pepper essential oil offers protection from the adverse health effects caused by free radicals. It can also help reverse existing damage. Adding black pepper essential oil to face creams and serums and using these beauty products consistently, may decrease the appearance of fine lines.

8. Eases Feelings of Anxiety

Many people use aromatherapy to relax and unwind. Aromatherapy can also be used in the morning to jumpstart your day. Diffusing black pepper essential oil can help you remain sharp, focused, and alert, and also improve memory.

9. Eases Cigarette Cravings

A [2013 study found that inhaling black pepper essential oil](#) significantly helped reduce cravings for cigarettes and symptoms of anxiety in smokers deprived from smoking. Another [2013 study at a community college in rural East Texas](#) tested both angelica and black pepper essential oils and found that both reduced cravings—black pepper essential oil performed better at reducing cravings but angelica essential oil produced longer lasting effects.

A [clinical study published in *Drug and Alcohol Dependence*](#) found that black pepper essential oil can suppress certain smoking withdrawal symptoms, including cravings for cigarettes. Forty–eight cigarette smokers participated in a three–hour session conducted after overnight deprivation from smoking.

The participants were divided into three groups: one group of smokers puffed on a device that delivered a vapor from black pepper essential oil; a second group puffed on a device with a mint/menthol cartridge; and a third group used a device containing an empty cartridge.

After puffing and inhaling from the devices throughout the session, reported cravings for cigarettes were significantly reduced in the black pepper group relative to each of the two control groups. In addition, negative effects and symptoms of anxiety were alleviated in the black pepper group, and participants reported that the intensity of sensations in the chest were much greater with the black pepper cartridge.

The results of this study suggest that respiratory tract sensations are a key aspect of mitigating smoking withdrawal symptoms. The researchers also conclude that cigarette substitutes delivering black pepper constituents may prove useful in the treatment of smoking cessation.

In her book *Aromatherapy Science*, Maria Lis–Balchin mentions a small study that may indicate that cigarette cravings may be decreased by inhaling black pepper essential oil.

10. Helps Detoxify the Body

When ingested, black pepper essential oil increases sweating and urination. Both of these functions aid in the removal of toxins from the body and purging the pores of the skin. Sweating and urinating also help eliminate water retention and excess fats.

Black pepper (*Piper nigrum*) essential oil and *piperine* has been shown to have “biotransformative effects” including [detoxification and enhanced absorption and bioavailability of herbal and conventional drugs](#). This is why you may see *piperine* as an ingredient in your supplements.

A [2013 animal study published in *Cell Biochemistry and Biophysics*](#) found that *piperine* supplementation helped normalize blood pressure, improve glucose tolerance, decrease inflammation and boost liver function in rats fed a high–fat diet.

These positive results suggest that *piperine* may be able to help reduce symptoms of human metabolic syndrome by helping the body remove toxins and reduce inflammation, benefiting people suffering [from chronic rheumatism, arthritis, and gout](#).

11. Serves as an Appetite Stimulant

Research shows that olfactory stimulation using black pepper essential oil, which is a strong appetite stimulant, can facilitate swallowing in people with neurological disorders. Inhalation and ingestion of

black pepper essential oil activates the insular or orbitofrontal cortex, resulting in improvement of the reflexive swallowing movement.

In 2008, the effects of olfactory stimulation with black pepper essential oil were investigated in [pediatric patients receiving long-term enteral nutrition](#) (feeding with liquid supplements or tube feeding) due to neurological disorders.

In eight out of 10 patients, black pepper essential oil intervention was continued for three months, and five patients showed increases in the amount of oral intake—plus black pepper treatment helped facilitate swallowing movement.

12. Can Be Used as Food Preservative

Black and green pepper essential oils were used in a [2015 in vitro study](#) in order to figure out the antimicrobial activity against microorganisms that cause food spoilage. Researchers found that both pepper oils displayed antimicrobial, antifungal and [antibacterial activity](#).

Both oils successfully inhibited the growth of *Staphylococcus aureus* bacteria in chicken soup. The results of this study demonstrate how [both green pepper and black pepper essential oils](#) are efficient in controlling the growth of known food-spoilage microorganisms.

Therapeutic Uses of Black Pepper Essential Oil

There are so many ways to use black pepper essential oil, and its uses go far beyond flavoring your food. Black pepper essential oil blends well with bergamot, cedarwood, cinnamon, clary sage, clove, copaiba, coriander, fennel, frankincense, ginger, geranium, grapefruit, juniper, lavender, lemon, lime, mandarin, orange, rose, rosemary, sage, sandalwood, vetiver and ylang-ylang oils.

Lavender Essential Oil

Lavender oil is one of the most popular essential oils used in aromatherapy due to its calming and relaxing properties. When blended with black pepper essential oil, it enhances its calming effects, making it an excellent choice for reducing stress and anxiety. A simple recipe for a lavender and black pepper blend could include 3 drops of black pepper essential oil, 3 drops of lavender essential oil, and 1 Tbsp. of carrier oil.

Peppermint Essential Oil

When blended with black pepper essential oil, peppermint essential oil creates a powerful analgesic blend that can be used topically or inhaled through a diffuser. A simple recipe for a peppermint and black pepper blend consists of 3 drops of black pepper essential oil, 3 drops of peppermint essential oil, and 1 Tbsp. of carrier oil.

Black pepper essential oil won't irritate eyes or cause you to sneeze like ground peppercorns can. That is because it does not contain *piperine*, although *piperine* is a major component of the peppercorn itself. It can be used as a substitute for pink pepper essential oil. Here are some easy ways to use black pepper essential oil at home:

- To increase circulation and blood flow to the muscles and nerves, add 3–5 drops of black pepper essential oil to a warm compress and apply to the abdomen or areas of concern.
- To ease the discomfort of constipation, diarrhea and gas, take 1–2 drops of black pepper essential oil internally by adding it to a smoothie, soup or savory dish. It can also be applied topically to the abdomen.
- To help alleviate nausea, add 1–2 a drops of black pepper essential oil to a tissue or handkerchief and slowly inhale.

- To relieve muscle injuries and tendonitis, apply black pepper essential oil topically to the area of concern.
- To aid respiratory conditions, take internally or inhale the oil directly from the bottle.
- To relieve congested airways, apply 2–3 drops topically to the chest.
- To reduce cigarette cravings, add black pepper essential oil to a diffuser, or add into a pot of hot water to use it as a steam, or inhale it directly from the bottle when having a craving.
- To use it as a natural treatment for arthritis and rheumatism, apply 2–3 drops topically to the area of concern.
- To help detoxify the body, take 1–2 drops internally or apply 2–3 drops topically to the bottoms of the feet.
- To add flavor to soups, stews, baked vegetables, salads and entrees, add 1–2 drops of black pepper essential oil. Consuming too much black pepper essential oil can cause nausea, so use sparingly. Or sprinkle the dish with about ¼ teaspoon of freshly ground black pepper.

Black Pepper Essential Oil Precautions

Black pepper essential oil is available as a 100% pure essential oil in some health food stores and online. Black pepper essential oil can be inhaled directly from the bottle, diffused at home for a warming aroma, taken internally in small doses (always read product direction labels carefully) and applied topically.

When buying black pepper essential oil, especially for internal use, be sure to purchase a high-quality, 100 percent pure-grade product that's made by a trustworthy and reputable company. Because of its potent medicinal properties, you want to use the best product you can find.

You should also look for an oil that is CO₂-extracted rather than steam distilled. CO₂ extraction means that chemicals like hexane or ethanol were left out of the process, which is a healthier method.

When applied topically, black pepper essential oil creates a warming sensation, so use in small doses. It can be a strong irritant in high doses and should not be applied to skin before it is diluted into an ointment, gel or cream, or a carrier oil (like sweet almond or jojoba). Coconut oil is also a good choice, either fractionated coconut oil or virgin coconut oil.

A safe dilution ratio for black pepper essential oil is 1–2 drops per teaspoon of carrier oil, especially when applying the oil to sensitive skin. In any form, black pepper essential oil should never be used on broken or damaged skin. Do not apply directly to open wounds.

Black pepper essential oil should only be used for topical application. Never use black pepper essential oil in eyes or in mucous membranes. Never ingest essential oils. Avoid prolonged use, prolonged use may cause skin irritation or an allergic reaction.

Drug Interactions

If you are currently taking any medications or have any ongoing health issues, speak with your doctor before using black pepper essential oil. Also speak with your doctor first before using this oil topically or internally if you are pregnant or nursing.

Contraindications

Topical use of black pepper essential oil may not safe for people with hypersensitive skin, or women who are pregnant or breastfeeding due to a lack of safety information. Black pepper essential oil may be used safely by pregnant or breastfeeding women strictly for aromatherapy in a diffuser, with a recommended dose of no more than 4 drops with a little water and only for 15 minutes at a time with very long breaks in between.

Use essential oils with extreme caution on children, do not use black pepper essential oil on children. Some brands clearly label their essential oils “KidSafe” on the bottle if it can be used on children ages 2–10.

When applying black pepper essential oil topically (on your skin), always perform a 24–hour skin patch test first using 1–2 drops, [read how for further details](#). Wear gloves if handling this essential oil in its pure form as direct contact may cause allergic dermatitis (an allergic reaction of the skin). Only use black pepper essential oil in diluted form.

Black pepper essential oil can have a long shelf life if stored properly in tightly–sealed dark glass containers. Keep in a cool and dry place, such as a dresser drawer or kitchen cabinet. Keep away from extreme heat and cold temperatures. Keep out of the reach of children and pets.