

Basic botanical data

Official Latin Name: Pinus strobus Common Name: Pinus maritima, P. pinaster, white pine, French Marine Pine Bark Extract, French Maritime Pine Bark Extract, Leucoanthocyanidins, OPC, Oligomeric Proanthocyanidins, PCO, Pinus maritima, Pinus pinaster, Procyandiols, Procyanodolic Oligomers, Part Used: Bark
Chemistry: 95% Pinus Maritima



Pinus Maritima is a water-soluble flavonoid, or polyphenol, complex with powerful antioxidant properties and effects on reducing blood clotting. Proanthocyanidins are at least 15 to 25 times more powerful than vitamin E in neutralizing the iron and oxygen species free radicals that attack lipids.

Pine trees are evergreen conifers (cone-bearing trees) that originate almost exclusively in the temperate regions of the Northern Hemisphere. Pines are the source of many commercial products. Pine medicinal preparations are made from the essential oil of distilled leaves, from the resin and its derivatives produced from the bark, and from the short (3-5 cm) sprouts collected in the spring.

What Is Pine Bark Extract?

The active ingredients in these products are proanthocyanidins or flavan. These chemicals come from a class of protective compounds that we normally get in fruits and vegetables. Oligomeric proanthocyanidins (OPCs) have a number of properties.



First they appear to help Vitamin C work better in the brain. Vitamin C is needed for the synthesis of the neurotransmitters norepinephrine, dopamine and serotonin, which are involved with ADD. Vitamin C also protects the brain against free-radical damage, so the Vitamin C/OPC combination acts as an antioxidant. Vitamin C also helps the body chelate toxic heavy metals so that they can be flushed from the body. Masquelier termed the active components of the pine bark. This term was used to describe an entire complex of proanthocyanidin complexes found in a variety of plants including pine bark, grape seed, lemon tree bark, peanuts, cranberries and citrus peels.

Beneficial Effects of PCO?

The most celebrated effects of PCOs in the United States are its potent antioxidant and free radical scavenging effects. Antioxidants and free radical scavengers prevent against free radical or "oxidative" damage. Free radical damage has been linked to the aging process and virtually every chronic degenerative disease including heart disease, arthritis and cancer. Fats and cholesterol are particularly susceptible to free radical damage. When damaged, fats and cholesterol form toxic derivatives known as lipid peroxides and cholesterol epoxides respectively. While the therapeutic potential of PCOs is quite broad due to its antioxidant activity, PCOs are used in Europe primarily in the treatment of venous and capillary disorders including venous insufficiency, varicose veins, capillary fragility and vascular disorders of the retina.

A recent study has shed more light on the exact mechanisms underlying these clinical applications of PCOs. The study featured two primary goals: (1) to determine the free radical scavenging activity of PCOs and (2) to determine the inhibitory effects of PCOs on xanthine oxidase and the lysosomal enzyme system which governs the release of enzymes which can damage the connective tissue framework which acts as a protective sheath surrounding capillary walls. The results of some very sophisticated tests provide a detailed explanation on the vascular protective action of PCOs and provide a strong rationale for their use in vascular disease.

In these studies, PCOs demonstrated ability to: Trap hydroxyl free radicals. Trap lipid peroxides and free radicals. Markedly delay the onset of lipid peroxidation. Bind to free iron molecules, thereby preventing iron-induced lipid peroxidation. Inhibit production of free radicals. Inhibit the damaging effects of the enzymes (eg. hyaluronidase, elastase, collagenase etc) which can degrade connective tissue structures. In regards to the antioxidant action of PCO, the activity of PCOs is much greater than that of Vitamin C and Vitamin E. From a cellular perspective, one of the most advantageous features of PCOs free radical scavenging activity is that because of its chemical structure it is incorporated within cell membranes. This physical characteristic along with its ability to protect against both water and fat soluble free radicals provides incredible protection to the cells against free radical damage.

Important differences between grape seed and Pine bark

Antioxidant advantage: In the words of Professor Masquelier, developer and patentee of both OPC products announced: . . ."I underline that in 1986 I discovered that grape seed has an intense free radical scavenging effect (FRSE) on radical oxygen species. These discoveries were laid down in my U.S. Patent (no 4,698,360) of Oct. 6 1987, 'Radical Scavenging Effect of Proanthocyanidins' . . . The tests showed that in this respect OPC from Grape seed has an advantage over OPC from Pine bark. OPC from grape seed contains the gallic esters of proanthocyanidins (in particular: Proanthocyanidin B2-3'-O-gallate). These proanthocyanidins -esters have been recently described as the most active substances in the battle against free radicals.

Strength: (Pine tree) has an OPC strength ranging from 80-85% compared with Grape seed normally marketed at 90-95%. Be careful that the Grape seed is 95%. A slight difference in favor of grape seed. Research points toward the fact that proanthocyanidin 100% purity is non-mutagenic. Thus the range 90-95% for maximum benefit.

Health benefits of Pine bark extracts

OPCs Block Atherosclerosis: The role of oxidation in atherogenesis--development of hardened arteries--is becoming clearer. Oxidized low-density lipoproteins (LDL) damage the cells that line blood vessel walls by provoking numerous responses including inflammation, smooth muscle cell proliferation and clotting mechanisms, all of which lead to atherosclerosis. Proanthocyanidins offer hope. A grape seed extract with 50 percent OPCs and 50 percent phenolic acids prevented such oxidation of pig LDL in vitro. OPCs may also prevent atherosclerosis in other ways. For example, two recent in vitro studies found that a patented pine bark extract modulated the release of nitric oxide, which affected the dilation diameter of blood vessels. Researchers compared the effects of patented pine bark extract OPCs with aspirin on smoking-induced platelet aggregation in three groups of smokers. They found that platelet aggregation was inhibited by both 500 mg aspirin as well as 100-125 mg pine bark extract. Because of the increased bleeding time caused by aspirin, the authors conclude that pine bark offers an "advantageous risk-benefit ratio."

Cancer Protection and body cleaning: In vitro studies suggest OPCs also provide cancer protection. OPCs in Vaccinium-family berries, including blueberry, lingonberry and cranberry, block tumor growth by preventing protein synthesis in tumor cells, which prevents them from multiplying. Betel nut (Areca catechu), a stimulant chewed by millions of Asians, also contains OPCs. In a small study, two people consumed 300 mg each of the nitrosamine precursors sodium nitrate and L-proline. Afterwards, their urine contained 14.7 and 10.9 mcg of N-nitroso-L-proline. In the second experiment, the subjects consumed the nitrosamine precursors and chewed a quarter of a betel nut. Their subsequent urine samples showed no nitrosamines. The researchers note that OPCs may play a major role in natural cancer prevention. Proanthocyanins may also protect against viruses. In in vitro studies, OPCs from hawthorn (*Crataegus oxyacantha*) killed the herpes (HSV-1) and HIV viruses. Proanthocyanidins also protect the body from toxins. Acetaminophen, the active ingredient in Tylenol, is a potent liver toxin, annually causing 75,000 cases of poisoning requiring hospitalization in the United States. Animal experiments showed that a week of pretreatment with 100 mg/kg of a patented grape seed extract prevented liver damage from acetaminophen. Organ damage was assessed by studying liver cells for damage and also by monitoring the animal's health.

Proanthocyanidins and Beauty: Proanthocyanidins may do even more than prevent disease; they may make us more youthful looking. Oxidation damage causes most visible signs of aging in our skin. By preventing this damage, skin will stay younger looking. One way to achieve this is to reduce the damaging effects of ultraviolet (UV) light. Sunscreen products have incorporated a variety of antioxidants with the intent that they will prevent sun injury to the skin. In one study, grape seed OPCs exerted a solo antioxidant effect at a level of potency on a par with vitamin E--protecting different polyunsaturated fatty acids from UV light-induced lipid peroxidation.²⁶ In this same study, the grape OPCs synergistically interacted with vitamin E, recycling the inactivated form of the vitamin into the active form and thus acting as a virtual vitamin E extender. Part of the aging process is the degradation of skin by the enzyme elastase, which is released with the inflammatory response. OPCs specifically block elastase, thus maintaining the integrity of elastin. Protecting us from atherosclerosis, cancer and environmental toxins while helping us maintain a youthful appearance--is there anything more we could ask from a plant compound? What about a sweet taste? Proanthocyanidins deliver here, too. Rhizomes of the Indonesian fern *Selliguea feei* contain the proanthocyanidin selliguaein A, which is about 35 times as sweet as sugar. The health benefits of OPCs have prompted some researchers to suggest they should have an official "recommended optimal intake." Doses used in many animal experiments are 100 mg/kg of body weight, which is equivalent to between 50 and 200 mg for the average adult, according to Bagchi. With the prevalence of refined foods today, our intake is much lower than the amount we likely evolved with, but there has been little attempt to quantify

current OPC intake. One exception is the German National Food Consumption Survey, which found Bavarians consume an average of 3.7 mg/day of OPC. Proanthocyanidins show tremendous promise. However, we still have much research to do before there is a single pill to keep us feeling healthy and looking youthful. Fortunately, consumers don't need to wait for the results of large-scale clinical trials to begin enjoying the benefits of proanthocyanidins. These compounds are available today in food and supplements.

Benefits in brief

Antioxidant: Greater protection against free radicals and DNA damage than is provided by vitamins C, E, and beta-carotene;

Promotes eye health (reduces risk of macular degeneration and cataracts) Selective toxicity to human breast-, lung-, and gastric-cancer cells.

Protection against drug-induced liver and kidney damage, tobacco-induced DNA damage, UV-induced skin damage, and chemotherapy-induced toxicity.

Prevention of heart damage from oxygen deprivation; strengthening blood vessels, repairing varicose veins, reducing leg edema, enhancing microcirculation.

Stimulation of collagen synthesis, protection and restoration of damaged membranes and connective tissue, including the blood-brain barrier.

Prevention, amelioration, or reversal of chronic pancreatitis, asthma, lupus, diabetic retinopathy, and deep vein blood clots.

Extensive research has shown that ingredients found within the Pine Bark Extract (**Pinus Maritima**) have positive results in the following areas of human health:

Allergies, Histamine Response and Inflammation as in Allergic Reaction and Hay Fever.

Capillary Protection both in strengthening weakened capillaries and in minimizing damage occurring during strenuous physical activity.

Inflammation, Edema and Varicosity.

Skin Health, Collagen Reactivation and U.V. Radiation Damage

Heart Disease both in reducing cholesterol deposition on arterial walls and the antioxidant effect of reducing stickiness of platelets and reducing clotting problems.

Cancer prevention and treatment in as far as the antioxidant properties protect the body against the activities of carcinogens and free radical damage to DNA.

Other more recent studies are showing other important ways Pine Bark Extract helps maintain optimal health. These include:

Brain Function in as far as the bio-flavonoids pass through the blood brain barrier and are available to maintain the health of brain cells and facilitate oxygenation to improve memory. Illnesses like Ulcers, Diabetes, Arthritis and protection from Viral Attacks.

Some known scientific support Antioxidant Activity- OPCs protect against free-radical damage, suggested to be a major cause of the ageing process. The antioxidant effect is 50 times greater than that of vitamin C and E. A major advantage of these molecules is that they are taken up into the cell membranes and protect against both water- and fat soluble free-radicals. Venous Support- Good clinical evidence has shown OPCs to be effective in treating venous insufficiency, varicose veins, capillary fragility, and disorders of the retina. OPCs appear to improve blood circulation through collagen support and nitric oxide (NO) production. Cardio damage leading to heart disease. OPCs have also been shown to lower cholesterol levels, shrink the deposits in the arteries, inhibit platelet aggregation, and inhibit angiotensin 1-converting enzyme (ACE) - much the same effect as ACE inhibitor drugs used in blood pressure regulation.

Strengthening the blood vessels by stabilizing the cell membrane structures, particularly collagen - the intracellular "glue" that literally holds our tissues together. Anti-inflammatory: helpful in the treatment of arthritis. Anti-Aging: improves youthful skin tone by improving the integrity of the collagen fibres and attacks free radicals.

Preventing and treating chronic venous insufficiency

Preventing and treating a condition known as chronic venous insufficiency is currently the most common use of pine bark extract. Chronic venous insufficiency occurs when valves in the veins that carry blood back to the heart are weak or damaged and blood collects in the veins of the legs. This collection of blood may cause painful, tired, itchy, or heavy feelings in the legs. Results that are more serious can include varicose veins, swelling, leg sores, or blood clots in the legs. Pine bark extract helps to control chronic venous insufficiency in two ways. First, chemicals called proanthocyanidins (or polyphenols) in pine bark extract help keep veins and other blood vessels from leaking. In addition, pine bark extract has anti-inflammatory effects. Inflammation is often a response to irritation, injury, or infection and it usually includes pain, redness, and swelling in the area of the damage. Inflammation, which can occur within body tissues as well as on the surface of the skin, contributes to chronic venous insufficiency.

Skin disorder treatment

Oral pine bark extract may help to even out the tone of skin that has been darkened by various pigmentation disorders such as melasma. In China, a prescription product containing pine bark extract has been approved for treating skin pigmentation conditions. In the United States, pine bark extract is included in a number of non-prescription face creams that claim to fight aging or restore wrinkled skin, but these claims are not documented by scientific research. Pine bark extract is also being investigated to determine if it can help prevent sunburn and skin damage from sun exposure.

Pine bark extracts -Suggestions and Administration

Potential applications:Skin health / sun protection (reduces inflammation of UV exposed skin), wound healing, economy class syndrome / long car journeys, varicose veins, eye health- cataracts, diabetic retinopathy, capillary fragility, micro-vascular disorders, oedema, allergies, hypertension, atherosclerosis, elevated cholesterol, arthritis, lupus, psoriasis, ADD/ADHD, anti-mutagenic (DNA protective).

Dosage and Administration: It is suggested that 25-100mg OPCs will provide synergy for general antioxidant protection. Therapeutic levels are in the range of 0.5 - 1.0mg per pound of body weight. Best taken in divided doses. Pine bark extract is commonly used in Europe and Asia. Standardized commercial preparations were introduced to the U.S. market in the late 1980s. Standardization by the manufacturer should assure the same amount of active ingredient in every batch of the commercial preparation. Generally, pine bark extract capsules, tablets, or oral liquid forms should contain between 85% and 90% of proanthocyanidins (also known as polyphenols), the active ingredient of pine bark extract. Lotions or creams usually contain between 0.5% and 2% of pine bark extract. Generally, 100 to 200 mg daily for 7 to 10 days, then 60 to 100 mg daily, or as desired. Usage ranges from 30 mg per day (venous-lymphatic insufficiency) to 300 mg per day (eye stress from use of video display terminal) in studies reporting significant results. Dosing varies, but typical doses used in clinical studies include: For chronic venous insufficiency: 45 mg to 360 mg per day -- usually divided into three doses. For retinopathy: 50 mg three times a day For uneven skin tone: 1 mg to 1.7 mg per kilogram of body weight per day (a kilogram is about 2 1/4 pounds) For exercise enhancement: 200 mg three times a day For male infertility caused by low sperm count: 200 mg once a day For coronary heart disease: 150 mg three times a day For high cholesterol: 120 mg three times a day For abdominal pain in women: 30 mg to 60 mg once a day

Toxicity: Proanthocyanidins are almost completely non-toxic both in acute dosage (LD50>4,000mg/kg in rats and mice) and high long-term dosage (no toxic effects at 60 mg/kg/day for 12 months in dogs and 6 months in rats). They have no potential for causing mutations or birth defects, and have no adverse effect on fertility, pregnancy or nursing.

Precautions: Individuals who have autoimmune conditions should not take pine bark extract due to its effects on the immune system. Some autoimmune conditions include: Crohn's disease;Multiple Sclerosis (MS);Psoriasis;Rheumatoid Arthritis (RA);Systemic Lupus Erythematosus (SLE);Type 1 diabetes. Not enough is known about how pine bark extract affects a developing baby to recommend its use in pregnant women. Breast-feeding women should also avoid taking pine bark extract because it may pass to the baby in breast milk. No studies of pine bark extract have been conducted in young children, so its potential effects for them are unknown.

Side Effects: Few side effects have been reported with the use of pine bark extract. The most frequently reported side effects have been mild gastrointestinal complaints such as nausea or upset stomach. **Interactions:** Because it can enhance immune system function, pine bark extract may interfere with the effects of drugs used to suppress the immune system after organ transplants or in other conditions. Taking pine bark extract is not recommended for individuals who take drugs such as: azathioprine (Imuran),CellCept,cyclosporine (Neoral, Sandimmune),Prograf,Rapamune,Zenapak It is best not to take pine bark extract and corticosteroids at the same time. Corticosteroids are used for a variety of inflammatory conditions including arthritis, asthma, cancer, eye conditions, and skin infections. Commonly prescribed corticosteroids include: beclomethasone (Beconase, Vancenase),dexamethasone (Decadron),hydrocortisone,methylprednisolone (Medrol),prednisolone,prednisone,triamicinolone (Azmecort, Nasacort) No interactions have been reported between pine bark extract and non-prescription drugs, other herbal supplements, or foods. However, despite a number of studies that have been conducted in humans, its possible interactions with drugs, foods, and other dietary supplements are not understood completely. Be sure that your doctor and pharmacist are aware of all the prescription and non-prescription medicines you take before you begin to use pine bark extract or any other herbal supplement.

Safety and Acute toxicity: Pine Bark Extract. Acute toxicity (LD50):Pine Bark Extract. OPCs LD50-Lethal dose,50 percent kill. Oral. Rodent-mouse.>4000 mg/kg. LD50-Lethal dose,50 percent kill.Oral.Rodent-rat.>4000 mg/kg.

Chronic toxicity: Pine Bark Extract. OPCs Chronic toxicity test.Oral.Dogs.Dose/Period:60 mg/kg/day.12 Months.No toxic effects. Chronic toxicity test.Oral.Rats.Dose/Period:60 mg/kg/day.6 Months.No toxic effects. Proanthocyanidins are almost completely non-toxic both in acute dosage (LD50>4,000mg/kg in rats and mice) and high long-term dosage (no toxic effects at 60 mg/kg/day for 12 months in dogs and 6 months in rats). They have no potential for causing mutations or birth defects, and have no adverse effect on fertility, pregnancy or nursing.

Toxicology studies done from the 1970s right through to the 1990s have shown no toxicity beyond that found in very large doses of normal food and other human nutrients. The Pine Bark Extract is very concentrated indeed and I advise not exceeding the recommended dose levels. As with most herbal medicines there is absolutely no benefit in very large doses of substances. The body is completely unable to assimilate excessive doses of any substance and over certain levels often the normal benefits are reversed. Toxicology studies suggest that acute toxicity could occur in a 75Kg adult male at a dose level of approximately 336,000mg or more than 250 times my maximum recommended dose.

Pinus strobus Photo. Pinus strobus Pirobox Gallery.