

# ELDERBERRY

## *(Sambucus Nigra)*

Plant Description, History and Use: Elderberry is a deciduous shrub found in many regions but most commonly in North America and Europe. Most recent scientific studies of the medicinal benefits of the plant have been with the European species. The plant produces creamy white, sweetly scented flowers which are harvested in late spring, primarily for medicinal and flavoring use. Its blue-black juicy berries are picked in early autumn. The berries are tart with a distinctive, strong green note. Elderberry's use as a natural remedy in many European and Middle Eastern cultures dates back to the Romans. The berries are used for rheumatism and various skin disorders. The berries, leaves and bark are also used as both a mild laxative and a diuretic. Elderberry wine and other hot decoctions are taken at night for sore throat, fevers, chills, cold and cough. Elderflower tea is widely used against the advance of influenza as well as to treat bronchitis and asthma. In food, both the berries and the flowers are used to make beverages and add flavor to various sauces, fillings, etc. The berries are commonly used as a natural red food color. Fun Fact: The flip side of Elton John's single "Bennie and the Jets" is "Elderberry Wine."

Phytonutrient Composition: Elderberry fruit is a rich source of vitamins A and C as well as phenolic compounds, including:

- ❖ Phenolic acids (malic, benzoic, cinnamic, chlorogenic, caffeic, palmitic acid)
- ❖ Flavonoids (rutin, isoquercitrin, quercitrin, hyperoside, astagalgin, nicotoflorin,)
- ❖ Tannins
- ❖ Epicatechin, catechin
- ❖ Anthocyanins (cyanidin-3-glucoside, cyanidin-3,5-diglucoside, cyanidin-3 sambubioside-5-glycoside, cyaniding-3-rhamnoglucoside, cyanidin-3-xyloglucoside))
- ❖ Proanthocyanidins

Elderberry Research: Elderberry's extensive use in traditional medicine has interested researchers studying the clinical power naturally occurring in certain fruits. Much of the research has been focused around the effects related to elderberry's high content of anthocyanins and other flavonoids.

Cardiovascular and Diabetes Studies: Researchers in Austria evaluated the potential effects of elderberry extract on fasting and postprandial risk profiles. Murkovic et al.,(2000) found that anthocyanins from elderberry showed a total cholesterol lowering effect in a 2-week study. They also found that higher, but nutritionally relevant doses were able to significantly reduce postprandial serum lipids. Abuja et al., (1998) experimented with Artemis' elderberry extract and their oxidation rates of low-density lipoprotein (LDL- known as the bad cholesterol as it generates free radicals when oxidation occurs). In vitro studies have clearly shown that Artemis' elderberry extract reduces the rate at which LDL is oxidized. Moreover, studies by Youdim et al., (2000), revealed that anthocyanins derived from Artemis' elderberry extracts play an important role in oxidative stress. Further studies showed anthocyanin role in nitric oxide and endothelium. Vascular endothelium, which lies at the interface between the circulating blood cells and vascular smooth muscle cells, plays a crucial role in blood flow regulation and vascular tone. In vascular pathologies, such as hypertension, diabetes, and atherosclerosis endothelium-dependent vasorelaxation in response to different vasodilator



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agonists is reduced. Bell et al.,(2002) found that incorporation of anthocyanins by the endothelial cells significantly enhanced their resistance to the damaging effects of oxidative insult. Tsuda et al., (1999) have reported that in mice models, oxidative stress was suppressed in liver ischemia due to elderberry anthocyanins. Elderberry's role in diabetes was discovered by Gray et al., (2000). It is suggested that the anthocyanin stimulated insulin production, which in turn increased glucose utilization by muscle.

**Stress and Performance:** Using a model for monitoring critical care patients, researchers in Austria showed elderberry extracts reduced stress by mediating changes in blood parameters. Going on to expand the model to athletes and highly trained, highly stressed emergency responders, these researchers showed elderberry had a positive impact on the stress responses and exercise regimes for these people. In effect, elderberry reduced production of stress hormones, delayed and reduced lactic acid production, and kept the body in a state of oxidative phosphorylation longer for longer and harder workouts.

**Immune Enhancement, Anti-Cancer and Anti-Viral Roles:** Elderberry's historical role in treatment of colds and flu has stimulated much research interest. Artemis' Standardized Elderberry extracts have been shown, in vitro, to possess anti-viral activity, most notably HSV-1 (cause cold sores), HSV-2 (genital infection and cold sores) and HCMV (cause organ transplant rejection, retinitis, prostate, cervical cancers and Kaposi's sarcoma). These extracts appear to contain one or more entities that prevent virus replication. A clinical trial conducted by Israeli scientists (Zakay-Rones et al., 1995) administered elderberry to influenza infected patients. Their data reflects in vivo effect of decreasing the flu severity. De Benito et al., (1998) isolated ribosome-inactivating proteins (RIP) in *Sambucus nigra* berries. In vitro studies have shown that RIP inhibit protein synthesis. Hence, RIP may serve as a potential immunotoxin and can be used both as an anti-viral and an anti-tumor agent. Blumenthal et al., (pending publication) have done extensive research comparing specific Artemis' elderberry extracts. In mice models it was shown that elderberry enhances the immune system through increased levels of T cells, B cells, interferon and interleukin-2 suggesting an increased resistance to viral infection that was even more pronounced in older animals. This work also suggested that elderberry's effect in enhancing the immune response may involve activation of genes that produce IL-2 and IFN and can act directly on viruses to inhibit their ability to replicate. In related studies, elderberry extracts added to prostate cancer cell lines suppressed cell proliferation.



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