

# This Super Berry Helps Stop the Flu Virus

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## STORY AT-A-GLANCE

- › Elderberry contains zinc and antioxidants, including vitamin C and anthocyanin (a flavonoid found in blue and purple fruits and berries), known for their ability to boost immune function and inhibit cold and flu
- › A 2004 study found taking 15 milliliters (1 tablespoon) of elderberry syrup four times a day for five days eased symptoms of influenza four days quicker than a placebo
- › A 2019 study found elderberry protects against influenza and other viral attacks by preventing the virus from entering and replicating in human cells
- › Elderberry also promotes the release of certain cytokines (chemical messengers), which allow your immune system to mount a more efficient response
- › Research also shows elderberry supplementation shortens duration of cold symptoms after intercontinental flights. Symptoms were also milder in those who contracted a cold after flying

**This article was previously published October 21, 2019, and has been updated with new information.**

Even though flu season doesn't last all year, many are looking for ways all year long to boost their immune function without drugs. One of the natural alternatives making headlines for its ability to fight influenza and other viruses such as SARS-CoV-2<sup>1</sup> is the elderberry (*Sambucus nigra*).

According to a 2019 Herb Market report,<sup>2</sup> sales of elderberry grew by 138.4% between 2017 and 2018 alone. The report theorizes that "Rising sales of elderberry, which is commonly found in products marketed for immune health, may have been related to the unusually severe flu activity reported for the 2017-2018 season in the United States."

With sales on the rise, elderberry is also becoming more popular as a cash crop among farmers. As reported by the Agricultural Sustainability Institute in an October 1, 2019, article:<sup>3</sup>

*"Native California elderberries can be found at the intersection of sustainable farming, super nutrition and economic viability. Naturally drought tolerant, flavorful and packed with nutrients, they are capturing the interest of farmers, health-conscious consumers and scientists ..."*

*Elderberries occur naturally around the world. In California, Native Americans used the tree's stems for making flutes, berries for food and purple dye, and bark, leaves and flowers for their purported anti-inflammatory, diuretic and laxative properties ..."*

For farmers, elderberry has additional benefits: The plant is drought-tolerant, and attracts both pollinators and beneficial insects that prey on pests like aphids and spider mites.

According to one expert cited by the Agricultural Sustainability Institute,<sup>4</sup> growing elderberry plants in hedgerows around the edges of farmland can lower a farmer's pesticide costs by \$300 per acre per year.

## **Elderberry Is a Powerful Antiviral**

Elderberry contains zinc<sup>5</sup> and antioxidants, including vitamin C<sup>6</sup> and anthocyanin<sup>7</sup> (a flavonoid found in blue and purple fruits and berries), known for their ability to boost immune function and inhibit cold and flu.

One 2004 study<sup>8</sup> found taking 15 milliliters (just under 1 tablespoon) of elderberry syrup four times a day for five days eased symptoms of influenza four days quicker than a placebo. According to the authors,<sup>9</sup> "Elderberry extract seems to offer an efficient, safe and cost-effective treatment for influenza."

Research<sup>10</sup> published in the March 2019 issue of the Journal of Functional Foods details the actual mechanism by which elderberry protects against influenza and other viral attacks. As reported by Science Daily:<sup>11</sup>

*"Conducted by Professor Fariba Deghani, Dr. Golnoosh Torabian and Dr. Peter Valtchev ... the study showed that compounds from elderberries can directly inhibit the virus's entry and replication in human cells, and can help strengthen a person's immune response to the virus.*

*Although elderberry's flu-fighting properties have long been observed, the group performed a comprehensive examination of the mechanism by which phytochemicals from elderberries combat influenza infections.*

*'What our study has shown is that the common elderberry has a potent direct antiviral effect against the flu virus,' said ... Torabian. 'It inhibits the early stages of an infection by blocking key viral proteins responsible for both the viral attachment and entry into the host cells.'*

Interestingly, the elderberry juice not only was able to prevent the virus from entering and infecting the cells in the first place, but it also inhibited late-stage propagation of the virus in cells that had already been infected. What's more, this late-stage inhibition was even stronger than its action during the initial infection stage.

According to Valtchev,<sup>12</sup> "This observation was quite surprising and rather significant because blocking the viral cycle at several stages has a higher chance of inhibiting the viral infection."

## **Elderberry Promotes a More Efficient Immune Response**

The elderberry also promoted the release of certain cytokines (chemical messengers), which allow your immune system to mount a more efficient response. All of these antiviral activities were attributed to the anthocyanidin compounds in the berries, a compound known as cyanidin 3-glucoside in particular.

Other studies have reported a similar rise in cytokines. In one, TNF-alpha rose eightfold.<sup>13</sup> As reported by The Ethno Herbalist, a website hosted by Kevin Curran, a biology professor at the University of San Diego:<sup>14</sup>

*"... Barak et al. reported<sup>15</sup> elderberry treatment initiated a significant increase in the inflammatory cytokines (IL-1, IL-6, IL-8 and TNF- $\alpha$ ) ... TNF- $\alpha$ , a tumor necrosis factor, is a cytokine produced by activated macrophages in response to infection from microbes, such as bacteria.*

*Macrophages are a critical cell in our immune system. Macrophages act like scavengers, scanning our body for dangerous debris or dangerous bacteria. It's encouraging to see that elderberry boosts TNF- $\alpha$  levels, as it suggests this plant can enhance macrophage activity."*

## **More Evidence for Elderberry as Cold and Flu Support**

Similarly, a 2019 meta-analysis<sup>16</sup> of four randomized, controlled clinical trials concluded that:

*"Supplementation with elderberry was found to substantially reduce upper respiratory symptoms. The quantitative synthesis of the effects yielded a large mean effect size. These findings present an alternative to antibiotic misuse for upper respiratory symptoms due to viral infections, and a potentially safer alternative to prescription drugs for routine cases of the common cold and influenza."*

The risk of contracting a cold or flu tends to be heightened when flying, and research published in 2016 found elderberry supplementation can offer air travelers much-

needed support as well. The study,<sup>17</sup> published in the journal *Nutrients*, included 312 economy class passengers on intercontinental flights.

While the difference in the occurrence of cold symptoms was found to be negligible (17 in the placebo group compared to 12 in the treatment group), those taking elderberry were sick for a considerably shorter duration. The severity of their symptoms was also significantly milder.

## Another Mechanism of Action

Another mechanism of action is related to gut bacteria. A 2017 study<sup>18</sup> published in the journal *Science* found desaminotyrosine (DAT) – a metabolite of the gut microbe *Clostridium orbiscindens* – protects against influenza by augmenting Type 1 interferon signaling and diminishing immunopathology in the lungs. Type 1 interferons are polypeptides secreted by infected cells.<sup>19</sup> As reported by [Nutraingredients-usa.com](http://Nutraingredients-usa.com):<sup>20</sup>

*"The presence of DAT ... a compound identified as being a metabolite in the gut after the consumption of key flavonoids present in elderberry ... protects against damage from influenza. Therefore, a healthy balance of gut microbiota as well as flavonoid-rich foods/supplements like elderberry appear to be the magic cocktail for positively impacting immune health."*

## Other Elderberry Benefits

Elderberry has also been shown to provide a number of other health benefits. For example, studies have found elderberry – taken either internally or applied topically in the form of an ointment – can:

- Promote detoxification<sup>21</sup> (oral)
- Reduce your risk of diseases rooted in inflammation, such as Type 2 diabetes and cardiovascular disease, thanks to its anti-inflammatory activity<sup>22</sup> (oral)
- Soften skin and treat acne<sup>23</sup> (oral and/or topical)

- Soothe sunburn<sup>24</sup> (topical)
- Promote healing of sprains and bruises<sup>25</sup> (topical)

## How to Grow Elderberry

While many varieties of elderberry supplements are commercially available, you can also take advantage of elderberry's many health benefits by growing your own.<sup>26</sup>

Elderberry plants can be grown in USDA zones 3 through 10, particularly in moist or wet locations. American elderberry plants can be propagated using germinated seeds, large plants that have been divided, root cuttings, or hardwood or soft-wood cuttings.<sup>27,28</sup> You can buy the last two options from a reputable nursery.

The Utah State University Extension<sup>29</sup> recommends planting hardwood cuttings in February or March before bud break, while soft-wood cuttings must be planted before July. If you have elderberry container plants, propagate them before summer heat sets in and after the threat of hard frost is gone.

When planting, provide at least 4 feet of space between plants in all directions, If you're growing elderberries in multiple rows, make sure there is a 6- to 8-foot allowance between rows.

Elderberry plants grow best in fertile soil containing high amounts of organic matter and nutrients, with a neutral pH level. You can also add compost or other organic matter to boost the soil's nutrient levels and capacity to hold water.

The plants need proper drainage to prevent root rots, so if you have heavy clay soils, consider forming raised beds to enhance drainage.<sup>30</sup> Elderberry plants thrive best when they receive full sun, but provide shade when temperatures rise.<sup>31</sup>

While elderberry plants are drought-tolerant (provided that roots are able to anchor themselves<sup>32</sup>), they must be irrigated regularly to produce high-quality fruits. Elderberry plants need at least 1 to 2 inches of water weekly during the summertime. Mulching will help retain moisture and discourage weed growth.

Refrain from fertilizing elderberry plants at the time of planting. Instead, wait two months and then lightly apply some nitrogen (one-fourth cup ammonium sulfate per plant). Once the plants are actively producing fruits, give them 1 cup of ammonium sulfate per plant annually as fertilizer.

Pruning must be done annually, during February or March while the plant is dormant. Remove dead, damaged or diseased canes, and discard all 3-year-old and older canes to promote new growth and encourage younger canes to produce better fruits.

Elderberry plants are known to produce suckers – vertical growths arising from a plant's roots or lower main stem.<sup>33</sup> While suckers can be helpful when growing a native garden, they can become invasive. To prevent it from spreading too far, remove any suckers you find.

## Harvesting and Storage

You can harvest elderberries once a cluster of flowers has opened. Elderberries that are ready for harvest have a rich and blue, dark purple or black hue, are slightly soft and are found in large bunches called umbrellas.<sup>34</sup>

According to the Oklahoma Cooperative Extension Service,<sup>35</sup> the elderberry tree can yield a small crop after one year. The yield will typically increase after the third year.

Elderberry harvesting must be done from mid-August to mid-September, depending on your location and cultivar of the plant.<sup>36</sup> To harvest elderberries, cut flowers and stems using pruners, right below the ripe berries.<sup>37</sup>

Avoid cutting the stems too short as they can be helpful when handling and preparing the berries. Discard immature berries<sup>38</sup> and use fresh elderberries as soon as possible.

Wash the berries to eliminate insects or debris, then spread them on a dishtowel to dry for a few minutes. You can keep berries with stems intact in a container. Try to store the berries loosely so they won't be crushed. Once done, seal containers tightly and freeze berries for future use.

You can also de-stem the berries before freezing. For best results, lay the elderberry stems on a cookie sheet and freeze uncovered for one to two hours. Once frozen solid, the berries can easily be removed from the stems using your hands. The berries can either be used immediately or frozen in a tightly sealed container.

For recipes and ideas for how to use the elderberry flowers for skin tonics and creams, see Grow Forage Cook Ferment's elderberry article.<sup>39</sup> In large amounts, the leaves have toxic effects, but like the flowers, can be used topically to quell inflammation.<sup>40</sup> Also, while the delicate white flowers can be eaten raw, never eat the berries, seeds, leaves or bark without cooking them first, as they are quite toxic raw.<sup>41</sup>

## Sources and References

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