

# Tasty and Healthy Bright Green Drink With No Powdery Aftertaste

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## STORY AT-A-GLANCE

- › Celery isn't just a pretty, green vegetable perfectly formed to hold cheese or peanut butter. Instead, it's a nutrient-packed piece of produce that you may want to ensure is part of your weekly dietary plan
- › Celery is packed with vitamins and phytonutrients that can help lower your blood pressure and aid in gut regularity. It has antidiabetic properties, limits the risk of endothelial cell injury, has cardioprotective effects, and improves learning and memory in animals with beta-amyloid peptide-induced amnesia
- › The compound apigenin found in celery enhances brain neurons, promoting stronger and more sophisticated connections in the lab, and offering an alternative treatment for neurodegenerative diseases
- › Researchers are also interested in two compounds in celery – apigenin and luteolin – for potential cancer-fighting properties, both as adjuvant chemotherapeutic agents and in cancer prevention by inducing apoptosis and autophagy
- › Note that celery has previously made the Dirty Dozen for high pesticide content, but in 2023 dropped to No. 15. Choose organically grown celery and don't use celery extract or celery seed if you are pregnant or have active kidney inflammation

Celery isn't just a pretty, green vegetable perfectly formed to hold cheese or peanut butter. Instead, it's a nutrient-packed piece of produce that you may want to ensure is

part of your weekly dietary plan. Forbes Health<sup>1</sup> touches on three of the benefits of celery juice, but there are even more, especially when you include celery seeds.

Celery (*Apium graveolens*) is part of the parsley family (*Apiaceae*) and is typically added in small amounts to soups and stews or can be found on vegetable trays or in salads. Wild celery is native to the Mediterranean,<sup>2</sup> and while we use it as food today, people in ancient Egypt, Rome and China likely used it medicinally and wove the leaves into victory crowns for athletes.

Celery may have gotten its big culinary break in the 1600s in France and Italy when it was used to help extend meals to feed families, and likely made its way to the U.S. in the 1800s where Dutch immigrants grew it grown in Michigan. Most people either like it or can take it or leave it, but the flavor isn't strong enough to develop true detractors.

## **Celery Juice May Influence Your Blood Pressure and Gut Health**

Celery has long been considered a "diet" food, containing roughly 12 calories in every two medium-sized stalks.<sup>3</sup> Yet, while it's also high in fiber and low in sugar, there are several other health benefits to eating celery or drinking the juice. Celery is a rich source of antioxidants, phytosterols, flavones and flavanols and:<sup>4</sup>

|           |                       |               |
|-----------|-----------------------|---------------|
| Calcium   | Phosphorus            | Potassium     |
| Vitamin C | Folate                | Beta-carotene |
| Vitamin A | Lutein and zeaxanthin | Vitamin K     |

In 2019, the celery juice movement was growing, having picked up a large audience on Instagram, thanks to Anthony Williams, the self-proclaimed "Medical Medium" and self-described originator of the "Global Celery Juice Movement."

In 2019, The Guardian<sup>5</sup> reported that sales had jumped 454% in the U.S. According to Verified Market Reports,<sup>6</sup> sales in 2020 were just under \$5 million and Future Market

Insights<sup>7</sup> reports in 2023 the market size was \$14.6 million and anticipated to grow to \$27 million by 2033.

While the origin of the celery movement is somewhat murky, celery does offer several health benefits and a couple of cautions. Let's start with the benefits. When celery is consumed in juice form, it may or may not provide digestive and gut health benefits, depending on whether the pulp has been removed. Celery fiber is a good source of nutrition for beneficial bacteria in your gut and helps regulate bowel movements.

If you're making celery juice at home, consider keeping the fiber in the juice to help aid in regularity and support your gut microbiome.<sup>8</sup> Another health benefit attributed to celery juice is the reduction of high blood pressure, which affects 48.1% of all adults in the U.S.<sup>9</sup> One of the nutritional components in celery that appears to affect blood pressure are phthalides, which is a phytochemical known to relax the arterial walls and improve blood flow.<sup>10</sup>

Two papers report the blood pressure-lowering effect of celery, including a case study<sup>11</sup> on a 74-year-old man who didn't respond well to antihypertensive medications but whose pressure dropped from 150/80 to 118/82 after drinking celery juice for six months and receiving chiropractic care for neck pain.

The second 2020 paper<sup>12</sup> included 24 participants, which after measuring the data, the writers concluded that "there is a significant effect of celery juice on blood pressure reduction in hypertension patients ..."

## **Apigenin: A Flavonoid That Enhances Neuronal and Arterial Health**

Apigenin is a flavone, which is a biologically active class of flavonoids. Parsley is highest in apigenin, having 215.5 mg per 100 grams (roughly 3.5 ounces).<sup>13</sup> The vegetable with the next highest amount is celery hearts, with 19.1 mg per 100 grams of celery. A 2019 paper<sup>14</sup> explored the potential of flavonoids, including apigenin, and reported key findings in lab, animal, and human studies.

The team noted that there have been a high number of studies that indicated apigenin has several interesting pharmacological and nutraceutical activities, including antioxidant properties and a low intrinsic toxicity compared with other structurally similar flavonoids.<sup>15</sup> Interest in apigenin has increased over the years, and with it, studies into the potential benefits it has in the human body.

Apigenin has demonstrated antidiabetic properties which may be attributed to inhibition of alpha-glucosidase activity, increased insulin secretion and the ability to neutralize reactive oxygen species in the cell. Apigenin can also supply moderate amounts of nitric oxide to endothelial cells, which researchers believe reduces arterial and venous dysfunction from hyperglycemia and limits the risk of endothelial cell injury.<sup>16</sup>

Animal studies have demonstrated a cardioprotective effect in diabetic cardiomyopathy-induced mice and protected against myocardial injury in rats by mitigating myonecrosis, cell death and oxidative stress. Data suggest that the antioxidant, anti-inflammatory, anti-amyloidogenic, neuroprotective and cognitive enhancing properties present an interesting potential in the prevention and treatment of Alzheimer's disease.<sup>17</sup>

The writers reported on several animal studies that indicated apigenin improved spatial learning and memory and provided neurovascular protection in an animal model with beta-amyloid peptide-induced amnesia.

Another reason apigenin is significant to health is because it enhances brain neurons. One study<sup>18</sup> demonstrated that when it was applied to human stem cells in a petri dish, the stem cells turned into neurons 25 days later. The researchers found that the synapses connecting the neurons were "stronger and more sophisticated," something that did not happen without apigenin. Stronger neuron synopsis bolsters several aspects of brain function.

The researchers noted that the flavone binds to estrogen receptors, which in turn affects the development, function and plasticity of the nervous system. In the past, estrogen-based therapies have been limited because of the increased risk of tumors and cardiovascular problems, but researchers believed that apigenin may be an alternative

for the treatment of neurodegenerative diseases, such as schizophrenia, Alzheimer's, Parkinson's and depression.

"We show a new path for new studies with this substance," points out Stevens Rehen, lead author of the paper. "Moreover, flavonoids are present at high amounts in some foods, and we can speculate that a diet rich in flavonoids may influence the formation of neurons and the way they communicate within the brain."<sup>19</sup>

## **Seeds and Stalks Are Nutrient-Rich Sources of Phytonutrients**

In addition to neuronal and arterial effects, researchers are interested in apigenin for potential cancer-fighting properties, both as an adjuvant chemotherapeutic agent<sup>20</sup> and in cancer prevention by inducing apoptosis and autophagy.<sup>21</sup> Specifically, preclinical findings<sup>22</sup> published in 2012 suggested it has potential in the treatment of progestin-dependent breast disease.

Research<sup>23</sup> has also found that apigenin inhibits the growth of pancreatic cancer cells in the lab, which may suggest a potential as an adjuvant treatment in pancreatic cancer, which has a 12% five-year relative survival rate in the U.S.<sup>24</sup> A high intake of flavonoids, including apigenin, luteolin and quercetin, are associated with cancer prevention and specifically lung cancer.<sup>25</sup>

Another compound found in celery – luteolin – is also linked to chemoprotective properties. Researchers wrote that "Luteolin's anticancer property is associated with the induction of apoptosis, and inhibition of cell proliferation, metastasis and angiogenesis."<sup>26</sup> It also sensitizes cancer cells to chemotherapy and suppresses cell survival.

Celery has been used as a natural remedy for several types of acute and chronic conditions. Many of the biological and chemical properties have a variety of activities. A 2015 paper<sup>27</sup> reported that a fully standardized preparation called Celery Seed Extract, using plants sourced from Northern India, was at least as effective as common anti-inflammatory medications aspirin, ibuprofen and Naproxen in suppressing arthritis.

The extract also reduced existing inflammation in an animal model and protected the gastric lining against irritation normally triggered by nonsteroidal anti-inflammatory drugs (NSAIDs). Unlike other dietary supplements, the available data suggested that the Celery Seed Extract was less likely to alter the metabolism of prescription medications and thus may be a potential natural option for use in the treatment of arthritis and other inflammatory diseases.

## **Take Care When Adding Celery Juice to Your Diet**

Celery is a wonderfully refreshing and crunchy snack. While the high fiber may make it difficult to get too much of the whole veggie in your diet, you may be able to drink enough celery juice to trigger one or two health concerns. Celery has been on the Environmental Working Group's Dirty Dozen, which lists the top 12 fruits and vegetables that are most contaminated with pesticides.

In 2013, celery was No. 2 on the Dirty Dozen list;<sup>28</sup> in 2023, it had dropped to No. 15,<sup>29</sup> which continues to make the case for purchasing organically grown celery. This is especially important when you are juicing the light green stalks, as you'll be chugging more celery than you can normally eat, thus increasing your exposure to toxins. Another thing to note is that if you cook it, the technique you use affects the nutritional content.

When boiled or blanched, celery loses more of the antioxidants than when it's steamed for 10 minutes.<sup>30</sup> Consistent consumption of celery seed, juice or extract can increase thyroid hormone output and potentially produce hyperthyroidism, as demonstrated in a case report in 2019.<sup>31</sup> In 2018, SFGate also noted:<sup>32</sup>

*"Substances that interfere with the uptake of iodine into the thyroid, called goitrogens, can cause goiter, or enlargement of the thyroid. Celery can act as a goitrogen if eaten in very large quantities, especially if it's not cooked."*

Celery also contains a compound called psoralens that can increase sensitivity to ultraviolet light when it contacts your skin.<sup>33</sup> The area where the celery juice contacts

your skin will develop a rash in 12 to 36 hours after exposure to the sun, which can last three to five days but may remain hyperpigmented for months.

Women who are pregnant should avoid celery seeds since they can induce uterine contractions and people with active kidney inflammation should avoid celery seed.<sup>34</sup>

Finally, it's important to remember that no one food is a magic bullet. Instead, it's important to consume a varied and balanced diet of raw, organic food groups to attain optimal health.

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