

# Cinnamon Extract May Modulate Immune System in Severe COVID

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✓ Fact Checked

## STORY AT-A-GLANCE

- › A recent examination of the literature reviewed the benefits of Ceylon cinnamon and concluded the properties demonstrated in scientific studies may mitigate complications from severe COVID-19
- › The anti-inflammatory properties also help reduce the symptoms of migraine headaches and depression. The results in the treatment of depression may in part be due to the increase in neurotrophic factors with the administration of cinnamon
- › Cinnamon has also demonstrated the ability to enhance cognitive function, keep you alert while driving, maintain structural health of your brain and lower blood sugar
- › There are two types of cinnamon: cassia and Ceylon. Cassia is less expensive, darker and has a deeper flavor profile. Ceylon is delicate, more expensive and has much lower levels of coumarin, a substance that poses a significant risk for liver damage when used in large amounts over time

Cinnamon is a popular spice used in desserts and savory dishes from the Middle East and is often paired with apples. But did you know it also has several health benefits, one of which may help modulate the cytokine storm associated with severe COVID-19?<sup>1</sup>

The spice is made from the cinnamon tree when strips from the inner bark are dried. The strips curl as they dry into what you know as cinnamon sticks.<sup>2</sup> Later, the small pieces can be ground into powder or made into an extract. The unique properties of the

spice are from the essential oils and chemical compounds found in cinnamon, and particularly cinnamaldehyde, which gives the spice its unique flavor.<sup>3</sup>

The most common type of cinnamon found on grocery store shelves is cassia cinnamon, which originated in South and Southeast Asia and China.<sup>4</sup> The second type is called true cinnamon or Ceylon cinnamon (*Cinnamomum zeylanicum*) and has a distinctively lighter color and delicate taste.<sup>5</sup> Ceylon cinnamon is native to Sri Lanka, formerly known as Ceylon.<sup>6</sup>

Other varieties of cinnamon include Saigon cinnamon, camphor laurel and Indonesian cinnamon. There is an important difference between cassia and Ceylon cinnamon. This is the level of coumarin found in the spice.<sup>7</sup> Levels in cassia are much higher than those in Ceylon and can present a health risk if eaten on a regular basis.

As reported in one study,<sup>8</sup> according to the German Federal Institute for Risk Assessment there are 2.1 to 4.4 grams of **coumarin** in every kilogram of cassia. This is above the Tolerable Daily Intake set by the European Food Safety Authority.<sup>9</sup>

By comparison, Ceylon has a much lower percentage of coumarin. Coumarin is a naturally occurring substance found in cinnamon.<sup>10</sup> Synthetically produced coumarin is also added to cosmetic products to give them a fresh scent. Medically it can be used to treat edema and has exhibited antitumor activity.<sup>11</sup> However, when used medicinally, even in low doses it can cause liver damage over a short time.<sup>12</sup>

## **Ceylon Cinnamon Extract May Modulate Severe COVID**

A 2021 paper published in *Frontiers in Plant Science*<sup>13</sup> reviewed the medicinal uses of hops and Ceylon cinnamon. Although cassia cinnamon is much easier and cheaper to acquire, the health risks associated with coumarin make it an unsound choice.

There were several bioactive compounds identified in Ceylon cinnamon extract including cinnamic acid, trans-cinnamaldehyde, cinnamyl alcohol and benzoic acid. The review of the research demonstrated that the synergistic activity between all the

compounds in the extract offered greater anti-inflammatory properties than the actions of single compounds.<sup>14</sup>

In one animal study,<sup>15</sup> Ceylon cinnamon extract demonstrated the ability to protect the aorta from induced **atherosclerosis**. During their review of past studies, the scientists found evidence that cinnamaldehyde is an effective Nrf2 inducer, which elicited an antioxidant response in the human colon cells tested during a lab study.<sup>16</sup>

Nrf2 helps regulate cellular antioxidant activity, helping to detoxify reactive oxygen species.<sup>17</sup> The paper then went on to review past clinical studies using Ceylon cinnamon, often administered as a powder in pill form.<sup>18</sup>

There were no specific clinical studies evaluating Ceylon cinnamon for the effect it may have on a cytokine storm, but they found 30 clinical studies that dealt with the anti-inflammatory effects the compound had on a variety of health conditions, including **diabetes**, polycystic ovary syndrome and obesity.

Referring to the cytokine storm, they hypothesized that “the strong anti-inflammatory properties of Ceylon cinnamon may mitigate this complication.”<sup>19</sup> Additionally, the writers cite past research that concluded, “Our results demonstrate no significant side effects and toxicity of CZ [Cinnamomum zeylanicum], including hepatotoxicity and anti-coagulation properties.”<sup>20</sup>

They found additional research that demonstrated cinnamon extract could inhibit vascular endothelialitis, angiogenesis and thrombosis, which all play a part in **severe COVID-19 infections**.<sup>21</sup> The preponderance of the evidence gathered from the literature review suggested to the researchers that:<sup>22</sup>

*“Ceylon cinnamon extracts may ameliorate complications that are associated with severe cases of COVID-19 and that testing both extracts, either alone or in combination, and particularly as a supplemental treatment to other medications, might be a promising therapeutic approach.”*

## **Anti-Inflammatory Effect Helps Reduce Migraines**

Migraines are recurring headaches that can cause moderate to severe pain. Up to 25% of people report that before the headache they experience an aura,<sup>23</sup> which is a temporary neurological change that goes away as the pain begins. Migraines often trigger nausea, weakness and sensitivity to light and sound.<sup>24</sup>

Some experts believe there may be a genetic predisposition to migraines that are then triggered by specific environmental causes. These can include stress, anxiety, hormones, loud noises and medications to name a few.

According to the Migraine Research Foundation,<sup>25</sup> nearly 1 in 4 households in America include a person with a history of migraine. It's estimated 18% of women and 6% of men in the U.S. have a history of migraine headaches, which occur more commonly from age 18 to 44.

During a **migraine headache**, increased levels of nitric oxide, interleukin-6 and calcitonin gene-related peptide contribute to the pain and rising inflammation. There are several treatment options, which include acute and preventive medications.<sup>26</sup>

A treatment option that helps to protect the neurological system and has anti-inflammatory properties is cinnamon. One study<sup>27</sup> published in *Phytotherapy Research* engaged 50 participants who had a history of migraine headaches. They were split into two groups: The intervention group received 1,800 milligrams (mg) of cinnamon each day and the control group received 100 mg of cornstarch.

The study went on for two months, during which the participants measured the duration, frequency and severity of their migraine attacks. Blood tests for interleukin-6, calcitonin gene-related peptide and nitric oxide were also given and compared between the two groups.

The intervention group had significantly lower levels of interleukin-6 and nitric oxide than the control group, but the levels of calcitonin gene-related peptide remained unchanged. The researchers concluded that supplementation with cinnamon may be “regarded as a safe supplement to relieve pain and other complications of migraine.”<sup>28</sup>

## Studies Link Depression to Inflammation

According to the National Institute of Mental Health,<sup>29</sup> one of the most common mental conditions in the U.S. is major depression. There were an estimated 17.3 million adults over the age of 18 who had at least one episode in 2017. This was 7.1% of the population.

Although the condition can develop in men and women at any age, it appears more prevalent in women and the median onset is 32.5 years.<sup>30</sup> A study<sup>31</sup> published in September 2020 concluded that the prevalence of symptoms of depression during 2020 was three times higher as compared to before the COVID pandemic.

The initial theory that **depression was caused by a chemical imbalance** in the brain was a driving force behind development and manufacture of many pharmaceuticals. Today, it's been largely discredited as data repeatedly show the popular **selective serotonin reuptake inhibitor** class of antidepressants work no better than placebos for those who experience mild to moderate symptoms.<sup>32</sup>

However, researchers are finding links between inflammation and depression. In one systematic review<sup>33</sup> of the safety and effectiveness of anti-inflammatory agents in people with depression, the data revealed these medications reduce symptoms when compared against a placebo. Results from another large literature review<sup>34</sup> revealed similar findings.

It showed anti-inflammatory medications reduced the symptoms of depression when used alone and compared against a placebo. Yet another study<sup>35</sup> demonstrated patients with depression who were treated with immunotherapeutics for an inflammatory disorder experienced symptomatic relief that was not associated with treatment-related changes and their physical health.

The link between depression and inflammation indicates the use of anti-inflammatory substances would trigger antidepressant activities. This theory was born out in a 2017 published animal study.<sup>36</sup> The researchers used cinnamon essential oil and concluded that it may be an adjunctive therapy in the treatment of depression and anxiety.

The researchers believe the results may in part be due to the increase of neurotrophic factors, such as BDNF, that occur with the administration of cinnamon. This increase may have a positive effect on the treatment of depressive disorders.

In another animal study<sup>37</sup> published in 2020, researchers believed cinnamon extract “possessed antidepressant efficacy by inhibiting the inflammatory process in the hippocampus so it was able to optimally increase serotonin levels in the hippocampus.”<sup>38</sup>

## More Benefits Associated With Cinnamon

In addition to the anti-inflammatory effects that may impact the treatment of severe COVID-19, migraines and depression, cinnamon has **more benefits**. For example, cinnamon contains several polyphenols, including rutin, catechin and quercetin.<sup>39</sup> When the antioxidant capacity of cinnamon was compared against other plants in the same family, it was a clear winner.<sup>40</sup>

These **antioxidants** may play a role in data that show cinnamon can enhance cognitive function. Information presented to the Association for Chemoreception Sciences<sup>41</sup> demonstrated that whether it was smelled or tasted, cinnamon increased the participants’ “scores on tasks related to attentional processes, virtual recognition memory, working memory and visual-motor response speed.”<sup>42</sup>

This may also affect performance. For example, the results of a study from Wheeling Jesuit University in Wheeling, West Virginia, demonstrated that the smell of cinnamon or **peppermint** while driving may keep you more alert, reduce your frustration and reduce the demand on your temporal lobe.<sup>43</sup>

Cinnamon also plays a role in the structural health of your brain. Two compounds in cinnamon, cinnamaldehyde and epicatechin, can inhibit the aggregation of a protein called tau.<sup>44</sup> Tau plays a significant role in the structure and function of neurons.

Although this protein is normal in cell structures, if tau accumulates it can develop “neurofibrillary tangles,” which are a hallmark of Alzheimer's disease. Cinnamaldehyde

and epicatechin were proven to protect tau from oxidative damage that can lead to dysfunction.<sup>45</sup>

Cinnamon also has a positive impact on glycemic status indicators in people with Type 2 diabetes.<sup>46</sup> Data showed it helps to lower blood sugar levels, weight, BMI and body fat mass.

## Using Cinnamon at Home

As I mentioned, there are two main types of cinnamon, cassia and Ceylon. Cassia is darker, has a stronger flavor and is the cinnamon you likely find on your grocery store shelves. Ceylon is typically more expensive and more difficult to find. It's lighter in color and has a more delicate flavor.<sup>47</sup>

Using cassia as a dietary spice does not pose significant health challenges. However, when considering cinnamon as a dietary supplement in larger doses, it is important to seek out Ceylon cinnamon that has less coumarin than cassia and is therefore less likely to cause liver injury.

There are several ways of enjoying the health benefits from cinnamon, including drinking cinnamon tea, flavoring your food, taking supplements or making an infused cinnamon bark oil. If you're considering supplementing with cinnamon, whether as an oil, supplement or using a daily in your food, it is wise to use Ceylon cinnamon.

A cup of cinnamon tea is a warm and relaxing way of getting your daily dose. Simply boil one or two sticks of Ceylon cinnamon in water. Try adding a little raw honey, some fresh ginger or the peelings from organic apples as you're boiling your tea. Of course, cinnamon is not a cure-all to make up for poor dietary habits or lack of exercise. However, adding it to your diet is a positive step.

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