

## FOR THOSE WHO ENJOY DRINKING GREEN TEA, THERE MAY BE AN ADDED BENEFIT. THE JURY IS STILL OUT BUT PRELIMINARY RESULTS LOOK HOPEFUL

Adding to its long list of health benefits, new research finds antiviral activity from green tea. In a new study, one of its ingredients, epigallocatechin gallate (EGCG), blocked severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) from binding to human angiotensin-converting enzyme 2 (ACE2) receptors and can subsequently prevent infection of human lung cells. This action was also observed in the SARS-CoV-2 variants of concern (VOC).

Green tea is one of the most consumed beverages in world. It has high anti-inflammatory and anti-oxidative properties that could help reduce the risk of developing severe COVID-19 symptoms.

*In a recently<sup>1</sup> reported study, researcher wrote: “. . . our data as well as the findings just reported by others indicate the possibility that consumption of green tea or its active ingredient EGCG is beneficial for preventing or reducing SARS-CoV-2 transmission and infection... Given its low toxicity, antiinflammation, antioxidant, and anti-SARS-CoV-2 variant properties, use of GTB or EGCG is likely to minimize the SARS-CoV-2 spread, ameliorate symptoms and disease severity.”*

Green tea effectively prevented infection from the wild-type SARS-CoV-2 or D614G and the COVID-19 variants B.1.429 found in California and B.1.351 found in South Africa — in a dose-dependent manner. Researchers also found green tea beverages prevented other coronaviruses' infections.

The researchers next looked to see what was in green tea that was causing these antiviral effects. Catechins — EGCG, EGC, ECG, and EC — were studied because they are green tea's active ingredients.

The results showed three catechins: EGCG, EGC, and ECG, dose-dependently blocked a the infection caused by the wild-type SARS-CoV-2 strain.

Upon closer inspection, the researchers deduced EGCG as the most potent inhibitor for viral infection. EGCG makes up more than 50% of catechins found in green tea beverages.

In addition, exposing EGCG to mutated strains such as D614G, K417N, E484K, and N501Y suppressed its ability to cause infection.

The researchers also found EGCG inhibited viral infection of cells containing variants of concern, including B.1.17, B.1.351, and B.1.429.

EGCG was tested on infected human lung epithelial cells, where they discovered it could suppress SARS-CoV-2 before and after infection. Although, the inhibitory activity was greater when cells were pretreated with EGCG before SARS-CoV-2 infection.

Catechin's antiviral activity was also effective in preventing infection from other related coronaviruses. EGCG was the most effective in suppressing HCoV OC43, while EC was the least effective.

## **EGCG prevents inhibition by blocking SARS-CoV-2 binding to ACE2 receptor**

EGCG was most effective in stopping the viral entry of SARS-CoV-2 in human cells before infection — although it was also somewhat effective during infection.

The researchers found it blocked viral entry by preventing the S1 subunit — which has the highest binding affinity — to ACE2. EGCG also decreased binding of the S2 subunit, although it already had a little binding affinity to ACE2.

***The publication has not yet been peer-reviewed and, therefore, should not be regarded as conclusive, and should not guide clinical practice/health-related behavior, or be treated as established information.***

## Journal reference:

- <sup>1</sup>Liu J, et al. Epigallocatechin Gallate from Green Tea Effectively Blocks Infection of SARS-CoV-2 and New Variants by Inhibiting Spike Binding to ACE2 Receptor. *bioRxiv*,2021.doi: <https://doi.org/10.1101/2021.03.17.435637>, <https://www.biorxiv.org/content/10.1101/2021.03.17.435637v1>

## **Green tea recipe with prebiotics and Manuka honey**

- **Fill a Pyrex<sup>®</sup> microwave safe cup with 16 ounces (2 cups) of distilled water. Place in a microwave oven and heat until the water comes to a rolling boil. The amount of time may vary from 3½ minutes to 6 minutes, or more, depending on the energy capability of your microwave oven. If a microwave oven is not available, the water can be boiled on a stove.**
- **Carefully remove the cup from the microwave oven.**
- **Place a teabag of green tea in the cup of boiled water. (Preferred brands are Twinning<sup>®</sup> or Bigelow<sup>®</sup> green tea. ) Do not place the tea bag in the cup of distilled water before it undergoes boiling. Add the bag to the boiled water after removing it from the microwave or stove.**
- **Allow the tea bag to steep in the water for 2 or more minutes depending on your preferred strength of the tea. Since green tea contains caffeine, the longer the tea bag is steeped in the water, the more caffeine the final preparation will contain.**
- **Add 1 level teaspoon of Jarrow Formulas<sup>®</sup> Inulin-FOS powder. (May be purchased on the Internet from Amazon or other retailers.)**
- **Add 1 level teaspoon of Bare Organic<sup>®</sup> Agave Inulin powder. (May be purchased on the Internet from Amazon or other retailers.)**
- **Add 1 level teaspoon of Benefiber<sup>®</sup> powder. Avoid adding this ingredient if you have been diagnosed with celiac disease or have a wheat**

sensitivity. (Benefiber® may be purchased on the Internet from Amazon or other retailers.)

- Add 1 teaspoon of Manuka honey. Manuka honey has been shown to have antiviral effects.
- Stir well and drink

Note that Manuka honey comes in different grades which is based on the chemical concentration of specific elements produced by the bees in the nectar of the honey. It is imported from New Zealand.

The honey will contain a UMF potency score. Authentic Manuka honey will have the score printed on the label.

- Low grade Manuka honey has a UMF grade of 5+ to 10+.
- Medium grade Manuka honey has a UMF grade 10+ to 15+.
- High grade Manuka honey has a UMF grade of 15+ to 20+.
- A Manuka honey with a UMF grade of 24 or more is considered superior but is rarely available—or affordable.

For preparing the green tea recipe, a Manuka honey with a UMF score of 15 or more is recommended.

The cost for higher grade Manuka honey can be prohibitively high and cost up to \$10-15 dollars an ounce. It can be readily purchased from iHerb.com on the Internet. It may also be found in some health food stores. It is not sold in grocery stores or pharmacies.

Potential side effects can occur in sensitive individuals since the tea leaves in green tea contain caffeine. Leaving the tea bag in the water (steeping) for longer periods of time, will deliver higher concentrations of caffeine which can result in heart palpitations or jitteriness. Steeping for about 2 minutes is recommended. The steeping time may be adjusted based on individual reactions, if any.

**Another potential side effect may be an increase in intestinal gas with resultant abdominal bloating, distention, flatulence and pain. If any of these side effects occur, the amounts of Benefiber® and the two inulin powders may be reduced.**

**The green tea preparation has increased palatability if a flavored coffee creamer is added and a dash of cinnamon. A commonly used coffee creamer is Duncan Donuts Extra Extra® milk, cream, or half and half cream can also be used. Flavorings are optional and can be added in whatever amounts suit your taste. Do not drink more than 2 cups of the tea preparation a day.**