

QUERCETIN

Quercetin is a flavonoid found in plants like apples, onions, capers, cilantro, berries, dill, and lovage.

Studies have shown that Quercetin has antiviral and anti-inflammatory properties against the SRS-CoV-2.

When a virus enters the body, there is a rapid viral replication that is followed by Immune dysregulation. The SARS-CoV-2 multiplies, dies off, the viral debris stays behind, and the immune system acts on that viral debris and to the organ systems of the host, causing a cytokine (inflammatory) storm which leads to severe illness.

Quercetin can stop both viral replications and prevent autoimmunity. Below is the scientific basis and supporting studies for Quercetin's actions.

Antiviral Properties of Quercetin

- Quercetin blocks the SARS-CoV-2 spike protein from attaching to the ACE2 receptor.
- Quercetin blocks the **RNA- dependent RNA polymerase** and prevents viral replication.
- Quercetin acts on **3-chymotrypsin-like protease (3CLpro)**, which controls coronavirus replication and is essential for its life cycle.
- Quercetin inhibits **papain-like protease (PLpro)** of the SARS-CoV-2. In doing so
 - It prevents virus-induced cellular destruction.
 - Maintains the antiviral interferon pathway that is necessary for an effective immune response and
 - Reduces viral replication in infected cells.

Quercetin's anti-inflammatory functions

Quercetin **decreases the mRNA and protein levels of the proinflammatory molecules;**

Intracellular adhesion molecule-1 (ICAM-1), cell adhesion molecule-1 (CAM-1), Interleukin 1 β , (IL-1 β), IL-6 (IL-6), IL-8, IL-18, and Monocyte chemoattractant protein-1 (MCP-1). Modulating inflammation is necessary to prevent the cytokine storm seen in severe COVID-19.

Quercetin also **prevents abnormal blood clot formation** thru its inhibition of thrombin which is a significant component of the clotting pathway. Abnormal blood clot formation is typically seen in severe COVID-19. The arterial blockage leads to pulmonary embolism, strokes, ischemic legs, hearts attacks, renal failure, and intestinal necrosis.

Quercetin also increases the expression of Sirtuin1 or SIRT-1. SIRT-1 downregulates neural factor kappa beta, thus decreasing inflammation.

Quercetin also has psychostimulant properties, can prevent platelet aggregation, decreases capillary permeability, lipid peroxidation, and enhances mitochondrial biogenesis.

Like HydroxyChloroQuine (HCQ) and Chloroquine (CQ), quercetin also serves as a zinc ionophore. And like HCQ and CQ, quercetin appears to also work to block the binding of COVID virus spike proteins to the ACE2 receptors, impairing spike protein-virus entry into the cell, or impairing spike protein alone from entering the cells (Pan et al., 2020; Derosa et al., 2021).

Summary of Quercetin's Benefits

Here is a summary of Quercetin's benefits, particularly when it is combined with ZINC:

- Anti-viral properties
- Anti-inflammatory
- Blocks spike proteins from attaching to the cells
- Prevents abnormal blood clot formation as it inhibits thrombin
- Prevents platelet aggregation
- Enhances mitochondrial function and energy production

Please note, that Quercetin should always be taken with Zinc.