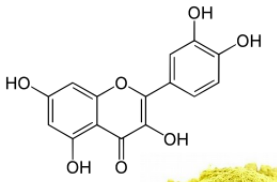
Phytochemicals

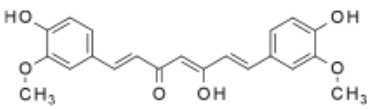
- Anti-Coronavirus (SARS, MERV, etc.) activity
- Anti-inflammatory cytokine (IL-6, IL-8, IL-1, TNF, etc.) activity

QUERCETIN



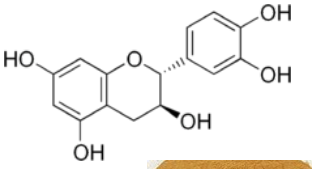
Flavonol
Major sources: Lovage, pagoda tree, dill, etc.

CURCUMIN



Polyphenol
Major source: Turmeric

CATECHINS



Flavanols
Major source: Green tea extract

Anti-Coronavirus

L. Chen, J. Li, C. Luo, H. Liu, W. Xu, G. Chen, et al. Binding interaction of quercetin-3-β-galactoside and its synthetic derivatives with SARS-CoV 3CL(pro): structure-activity relationship studies reveal salient pharmacophore features Bioorg Med Chem, 14 (24) (2006), pp. 8295-8306
https://www.sciencedirect.com/science/article/pii/S0968089606007310?via%3Dihub

Jo S, Kim H, Kim S, Shin DH, Kim MS. Characteristics of flavonoids as potent MERS□CoV 3C□like protease inhibitors. Chem Biol Drug Des. 2019; 94: 2023□ 2030.
https://onlinelibrary.wiley.com/doi/full/10.1111/cbdd.13604

Nguyen T, Woo H-J, Kang H-K, et al. Flavonoid-mediated inhibition of SARS coronavirus 3C-like protease expressed in Pichia pastoris. Biotechnology Letters. 2012;34(5):831-838.
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Anti-Coronavirus

Wen, Chih-Chun & Kuo, Yueh-Hsiung & Jan, Jia-Tsrong & Liang, po-huang & Wang, Sheng-Yang & Liu, Hong-Gi & Lee, Ching-Kuo & Chang, Shang-Tzen & Kuo, Chih-Jung & Lee, Shoei-Sheng & Hou, Chia-Chung & Hsiao, Pei-Wen & Chien, Shih-Chang & Shyur, Lie-Fen & Yang, Ning-Sun. (2007). Specific Plant Terpenoids and Lignoids Possess Potent Antiviral Activities against Severe Acute Respiratory Syndrome Coronavirus. Journal of medicinal chemistry. 50. 4087-95.
https://pubs.acs.org/doi/10.1021/jm070295s

Anti-Coronavirus

Liang W, He L, Ning P, et al. (+)-Catechin inhibition of transmissible gastroenteritis coronavirus in swine testicular cells is involved its antioxidation. Research in Veterinary Science. 2015;103:28-33.
https://www.sciencedirect.com/science/article/pii/S0034528815300588

MATSUMOTO, Mitsuyo & Mukai, Takao & Furukawa, Satoru & OHORI, Hitoshi. (2005). Inhibitory effects of epigallocatechin gallate on the propagation of bovine coronavirus in Madin□Darby bovine kidney cells. Animal Science Journal. 76. 507 - 512.
https://onlinelibrary.wiley.com/doi/full/10.1111/j.1740-0929.2005.00297.x

Anti-inflammatory cytokine

Shu-Chen Cheng, Wen-Chung Huang, Jong-Hwei S. Pang, Yi-Hong Wu, Ching-Yi Cheng. Quercetin inhibits the production of IL-1β-Induced inflammatory cytokines and chemokines in ARPE-19 cells via the MAPK and NF-κB signaling pathways. International Journal of Molecular Sciences. 2019;20(12):2957.
https://www.mdpi.com/1422-0067/20/12/2957

Weng Z, Zhang B, Asadi S, et al. Quercetin is more effective than cromolyn in blocking human mast cell cytokine release and inhibits contact dermatitis and photosensitivity in humans. Plos One. 2012;7(3):e33805
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0033805

Key, Chia-Chi & Martinez, Kristina & Xie, Guoxiang & Kennedy, Arion & Bumrungpert, Akkarach & Overman, Angel & Jia, Wei & Mcintosh, Michael. (2010). Quercetin is equally or more effective than resveratrol in attenuating tumor necrosis factor- -mediated inflammation and insulin resistance in primary human adipocytes. The American journal of clinical nutrition. 92. 1511-21.
https://academic.oup.com/ajcn/article/92/6/1511/4597559

Anti-inflammatory cytokine

Santel, Thore & Pflug, Gabi & Hemdan, Nasr & Schäfer, Angelika & Hollenbach, Marcus & Buchold, Martin & Hintersdorf, Anja & Lindner, Inge & Otto, Andreas & Bigl, Marina & Oerlecke, Ilka & Hutschenreuther, Antje & Hutschenreuter, Antje & Sack, Ulrich & Huse, Klaus & Groth, Marco & Birkemeyer, Claudia & Schellenberger, Wolfgang & Gebhardt, Rolf & Birkenmeier, Gerd. (2008). Curcumin Inhibits Glyoxalase 1—A Possible Link to Its Anti-Inflammatory and Anti-Tumor Activity. PloS one. 3. e3508.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0003508

Anti-inflammatory cytokine

Cheng A-W, Tan X, Sun J-Y, Gu C-M, Liu C, Guo X. Catechin attenuates TNF-α induced inflammatory response via AMPK-SIRT1 pathway in 3T3-L1 adipocytes. PLoS ONE. 2019;14(5):1-15.
https://journals.plos.org/plosone/article?id=10.1371%2Fjournal.pone.0217090

Molina N, Bolin AP, Otton R. Green tea polyphenols change the profile of inflammatory cytokine release from lymphocytes of obese and lean rats and protect against oxidative damage. International Immunopharmacology. 2015;28(2):985-996.
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