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Hesperidin and SARS-CoV-2: New Light on the Healthy Function of Citrus Fruits

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Abstract

Among the many approaches to Coronavirus disease 2019 (COVID-19) prevention, the possible role of nutrition has so far been rather underestimated. Foods are very rich in substances, with a potential beneficial effect on health, and some of these could have an antiviral action or be important in modulating the immune system and in defending cells from the oxidative stress associated with infection. This short review draws the attention on some components of citrus fruits, and especially of the orange (*Citrus sinensis*), well known for its vitamin and flavonoid content. Among the flavonoids, hesperidin has recently attracted the attention of researchers, because it binds to the key proteins of the Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Several computational methods, independently applied by different researchers, showed that hesperidin has a low binding energy, both with the coronavirus "spike" protein, and with the main protease that transforms the early proteins of the virus (pp1a and pp1b) into the complex responsible for viral replication. The binding energy of hesperidin to these important components is lower than that of lopinavir, ritonavir, and indinavir, suggesting that it could perform an effective antiviral action. Furthermore, both hesperidin and ascorbic acid counteract the cell damaging effects of the oxygen free radicals triggered by virus infection and inflammation. There is discussion about the preventive efficacy of vitamin C, at the dose achievable by the diet, but recent reviews suggest that this substance can be useful in the case of strong immune system burden caused by viral disease. Computational methods and laboratory studies support the need to undertake apposite preclinical, epidemiological, and experimental studies on the potential benefits of citrus fruit components for the prevention of infectious diseases, including COVID-19. View Full-Text (/2076-3921/9/8/742/htm)

Keywords: citrus fruits (/search?q=citrus%20fruits); *Citrus sinensis* (/search?q=Citrus%20sinensis); hesperidin (/search?q=hesperidin); virus and oxidative stress (/search?q=virus%20and%20oxidative%20stress); COVID-19 (/search?q=COVID-19); vitamin C (/search?q=vitamin%20C); SARS-CoV-2 (/search?q=SARS-CoV-2); sweet orange (/search?q=sweet%20orange)

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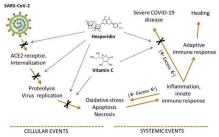

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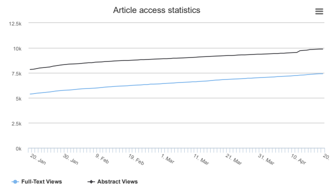

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