Natural Polyphenols of Pomegranate and Black Tea Juices can Combat COVID-19 through their SARS-CoV-2 3C-like Protease-inhibitory Activity

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Abstract

The SARS-CoV 3C-like protease-inhibitory activity of natural polyphenols of tea and their potential for the treatment of SARS was proved previously in the literature. Besides, the phenolic composition of pomegranate juice was evaluated by some researchers. Also, the recent studies proved that the novel COVID-19 acts via a similar mechanism with SARS. Based on these considerations, we strongly proposed that the black tea and pomegranate juice can be useful to combat COVID-19 through the inhibition of SARS-CoV-2 3C-like protease by their natural polyphenolic contaminates.

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Although the SARS-CoV-2 is a novel betacoronavirus and the present data about its mechanism action is unclear, the recent studies proved that the novel COVID-19 acts via a similar mechanism with SARS [1][2]. We know that the common coronavirus infections such as SARS damage the cells through the binding of the SARS-CoV to the target cells via ACE2. Besides, some researchers believe that the SARS-CoV-2 accesses host cells through affecting the ACE2 enzyme (angiotensin-converting enzyme 2) via connecting to thepeplomer (a special surface glycoprotein) of the enzyme [3][4][5][6][7][8][9][10][11]. Moreover, recently, B. Nutho et al[12] reported that HIV-1 protease inhibitors (i.e. lopinavir and ritonavir) show SARS-CoV-2 3C like protease-inhibitory activity via molecular complexation between each inhibitor and SARS-CoV-2 3C like protease and consequently, the HIV-1 protease inhibitors can combat the COVID-19.

Also, C.N. Chen et al [13] studied the SARS-CoV 3C like protease-inhibitory activity of natural polyphenols found in tea such as tannic acid, 3-isotheaflavin-3-gallate (TF2B), theaflavin (TF-1), and theaflavin-3,3'-digallate (TF-3) for treatment of SARS. They founded that the SARS-CoV 3C-like protease activity was inhibited about 80% by tannic acid, 65% by TF-1, 60% by TF2B, and 80% by TF-3. They evaluated the 3CLPro-inhibitory activity of Puer tea, oolong tea, green tea, and black tea, founded that the Puer and black tea are more effective than oolong and green teas. Besides, M. I. Gil et al [14] characterized the phenolic composition of pomegranate juice. They reported that the main composition of pomegranate juice has consisted of polyphenols including hydrolyzable tannin, punicalagin, ellagic acid, and galloylglucose. Hence, based on the above discussion, we strongly proposed that the black tea and pomegranate juices can be useful to combat COVID-19 through the inhibition of SARS-CoV-2 3C-like protease by their natural polyphenolic contents such as hydrolyzable tannin, punicalagin, ellagic acid, tannic acid, 3-isotheaflavin-3-gallate (TF2B), and theaflavin-3, 3-digallate (TF3) because the novel COVID-19 acts via a similar mechanism with SARS.

Declaration of interests

The authors declare that they have no known competing for financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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