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***Corresponding author**

Muhammed J. Kadhim

Email

muhammedkadhim74@gmail.com

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Benefits of Consuming Citrus Fruits as Vitamin C Source in the Treatment of COVID-19

Muhammed J. Kadhim*

Department of Power Mechanical Techniques, Institute of Technology, Middle Technical University, Baghdad, Iraq

Abstract

Coronavirus disease 2019 (COVID-19) is the name that World Health Organization gives to the virus that causes severe acute respiratory syndrome (SARS). This virus affects people unevenly with most cases showing mild symptoms, especially in children and young adults. However, some cases can appear severe and dangerous, as many patients require medical care in hospitals. On the other side, nutrition is very beneficial to health, especially in cases where it may need to strengthen the immune system. For this reason, the World Health Organization and the National Institutes of Health (NIH) have provided a set of general guidelines and a list of the best foods for consumption during the period of the Corona pandemic like bananas and apple fruits, as well as citrus fruits. Citrus fruits like oranges, clementine, and grapefruit are the famous source of vitamin C. Numerous studies have indicated that vitamin C assists in decreasing mortality and improving oxygen support status in patients with Coronavirus disease without adverse events. This letter is focused to introduce the benefits of vitamin C in the treatment of influenza and COVID-19 viruses since the outstanding properties and positive results shown by this vitamin in the treatment of cold encouraged specialists to use it as adjuvant therapy in COVID-19.



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Dear Editor,

COVID-19 is an infectious virus caused by a newly discovered strain of coronavirus called as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Most infected people have mild to moderate symptoms with the most common signs, including respiratory symptoms such as dry cough, fever, and rapid breathing [1]. Symptoms of COVID-19 can sometimes last for months with long-term effects. The virus can harm the brain, lungs and heart, raising the hazard of long-term health difficulties. Most patients with coronavirus disease completely recover within a few weeks [2]. In most severe patients, the infection can be caused by pneumonia, severe acute respiratory syndrome and occasionally death. Standard commendations to avoid the diffusion of COVID-19 contain repeated cleaning of hands by "using alcohol-based hand rub or soap and water; covering the nose and mouth with a flexed elbow or disposable tissue when coughing and sneezing and avoiding close contact with anyone that has fever and cough" [3].

As COVID-19 continued to spread and transform (like beta, gamma, and omicron), studies have been conducted to compare this virus with the influenza virus. As they both attack the respiratory system, major variances exist between the two viruses and their spreading methods [4]. This has significant effects on public health actions that can be practiced to prevent each virus to spread. First, influenza and COVID-19 viruses have alike illness performance. That is, respiratory diseases manifest as an extensive range of diseases from mild or asymptomatic to severe disease and death. Second, both viruses are diffused by contact, fumes and droplets [5]. Therefore, the general health procedures are the same; for example, hand cleanliness, good ventilation of the respiratory system and other health measures are important actions for everyone that can be taken to prevent disease [6]. As an approach to clinical treatment, vitamin C is effective in reducing colds with influenza [1], while the use of this vitamin may also be effective in COVID-19 disease [7].

Vitamin C is a very important biochemical molecule contributing to significant cellular functions. It is essential as an antioxidant, antitoxin and fights infections in the blood. The production and metabolism of other important biochemical molecules require vitamin C. The tissues have 7–70 mg/dL concentration of vitamin

C. Therefore, it can be beneficial in resolving infection and inflammation because it has iterative antiviral activity [8]. The outstanding properties and positive results shown by vitamin C in the treatment of colds encouraged specialists to use it as adjuvant therapy for COVID-19. During the ongoing spread of COVID-19, there are many research studies aiming to determine the effective role of vitamin C in treating COVID-19 patients [1]. These studies indicated that a high dose of vitamin C decreased inflammatory signs associated with sepsis and acute respiratory distress syndrome (ARDS). High-dose vitamin C may reduce mortality and improve oxygen support status in patients with coronavirus disease without adverse events [9]. In the case of COVID-19 patients, it was observed that intravenous administration of vitamin C significantly reduced inflammation in these cases, suggesting that the use of this vitamin may contribute to the clinical treatment of COVID-19. It has also been shown that vitamin C can inactivate *in vitro* a wide range of viruses and this virus inactivation was shown to be dependent on oxygen [7]. High-dose vitamin C may reduce mortality and improve oxygen support status in patients with coronavirus disease without adverse events.

Different studies have shown that most of the patients with acute respiratory distress syndrome in COVID-19 patients were deficient in vitamin C [10, 11]. The oxidative stress due to acute respiratory distress syndrome leads to the production of cytokines and free radicals, resulting in cellular damage and defects and ultimately organ failure. So, the use of antioxidant factors in the management of ARDS disease is gaining acceptability as treatment [12]. In the investigation of reported literature on the use of intravenous vitamin C for COVID-19 cases, there is consistency of progress in results, such as inflammation, fever, oxygenation, blood cell count and even markers of clotting and the healthier results appear to be related with intravenous higher doses of vitamin C (>10,000 – 25,000 mg/daily) [7]. As countries take drastic measures to prevent the spread of COVID-19, including self-quarantine for healthy feeling people and for those showing severe symptoms of shortness of breath are asked to stay at home. On the other side, nutrition is very beneficial to health, especially in cases where it may need to strengthen the immune system, for this reason,

the world health Organization / Europe and the National Institutes of Health have provided a set of general guidelines and a list of the best foods for consumption during the period of the corona pandemic [13]. The World Health Organization recommends consuming vegetables and fruits (per/day) during the corona pandemic. Vegetables like cabbage, cauliflower and broccoli, as well as onions, garlic, and ginger; root vegetables such as turnips, beets and carrots, and fruits like bananas and apple, as well as citrus fruits like oranges, clementine and grapefruit are good options [14]. Consuming different types of citrus fruits as a source of vitamin C (19-58 mg/100g) is very beneficial in treating influenza [15]. In a randomized experiment, it is found that using different kinds of citrus fruits like orange, lemon and citrus Aurantium was more effective in treating colds than using citrus juice alone. Most people with COVID-19 are using the same citrus fruits and juices as a healthy food that contributes to reducing the effects and symptoms of COVID-19, but if these patients use a mixture of citrus fruits and juices, those could contribute to reducing the effects and symptoms of this virus even more; however, this needs more experiments and studies.

Conflict of interest

The authors declare no conflict of interest.

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