Letter to the Editor

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Potential Therapeutic Effects of Virgin Coconut Oil on COVID-19

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Dear Editor

Since December 2019, Covid-19 disease has infected millions of people all over the world which led to many deaths. After the declaration of the pandemic on March 2020, the disease has been the subject of an ever-growing body of research worldwide.

Although several medications have been evaluated in previous studies, there is still a serious need to explore new treatment options for this complex disease due to the lack of optimal response and the growing concerns about the reported side effects of the current treatments. Considering the rapid spread of the disease on one hand and the process of designing and approving new drugs which are very time and resource-consuming on the other, thinking about already-known natural agents, which may have potential therapeutic effects on Covid-19, could be beneficial for fast tracking this process. Certain natural substances have been found to possess approved therapeutic effects on diverse pathogenesis pathways associated with the disease, exhibiting minimal adverse reactions.

Cocos nucifera, commonly known as coconut, is the fruit of a tree from the Arecaceae family. It has a wide range of applications and has been used since ancient times for its anti-thirst, antipyretic, anti-septic, and diuretic effects. Along with proven cardioprotective, hepatoprotective, antioxidant, antithrombotic, antidiabetic, and immunostimulatory effects, the antifungal, antibacterial, and antiviral activities of this fruit have also been the focus of research for many years (1).

Virgin coconut oil (VCO) is one of the available products of coconut which is prepared through several methods. In contrast to animal oil which is composed mostly of long-chain fatty acids (LCFAs), VCO mainly consists of medium-chain fatty acids (MCFAs) and short-chain fatty acids (SCFAs). Lauric acid is an MCFA that makes up about 50% of coconut oil and 70% of coconut fatty acids. Monolaurin is a lauric acid natural metabolite that has antiviral effects. These safe compounds are easily digested and directly transported to the liver via the portal vein for producing energy rather than store as fat in our body. Monolaurin is rapidly metabolized in several pathways to construct ketone bodies (1).

Previous studies have shown that lauric acid and monolaurin exert their antiviral effects through three mechanisms. First, they cause disintegration of the virus envelope resulting in its inactivation. Second, they act as a virus maturation inhibitor agent with more antiviral activity compared to other saturated fatty acids. Third, they prevent the virus from

binding to host cell membranes and interrupt the synthesis of virus membrane protein (2). Although lauric acid makes up a significant portion of the fatty acids in VCO, there are also notable amounts of SCFAs. Examples of these SCSAs are capric, caproic, and caprylic acids which consist of up to 7% of VCO and are responsible for its antiviral activity. These two groups of fatty acids are accounted for the antiviral properties of VCO against different viruses especially lipid-coated ones such as Human Immunodeficiency Virus-1 (HIV-1), respiratory syncytial virus, human parainfluenza virus type 2, Epstein-Barr virus, hepatitis-C virus, and cytomegalovirus (3). Furthermore, an in-vivo investigation has shown that VCO could increase the level of CD4+ T lymphocyte after several weeks of consumption (4). Another study evaluating the effect of a vaginal gel containing monolaurin in a HIV-1 transmission model revealed that this gel is effective in preventing virus transmission (5).

To date, several studies have focused on the increased risk of cardiovascular disorders and disseminated intravascular coagulopathy (DIC) in COVID-19 patients (6). In this regard, VCO is an effective antithrombotic supplementation enhancing fibrinolysis activity by lowering the postprandial tissue plasminogen activator (t-PA) antigen and the level of Lipoprotein (a) (7). Likewise, VCO has been shown to increase the high-density lipoprotein (HDL) level without increasing the triglyceride (8). These cardioprotective and antithrombotic activities of VCO as well as its antioxidant effect can play a beneficial role in COVID-19.

In addition, SARS-CoV-2 can lead to several complications in lungs. It induces a pathological process that increases alveolar and interstitial inflammation. These changes induce the proliferation of alveolar epithelium (9). Reduction of the infiltration of pro-inflammatory cells by VCO alleviates the inflammatory status of the respiratory system and plays an important role in remodeling the airway structure. (10) Hence, it reduces the thickness of mucosa and epithelium and deals with the hyper responses of bronchial smooth muscle (2, 9, 10). In addition, VCO has another way to confront the inflammation by pulmonary antioxidant defenses acting as a preventing agent against chronic lung inflammation (9). A recent clinical trial investigating the effect of VCO (added to meals) in COVID-19 patients has found that this intervention could result in a significant decrease in the mean C-reactive protein (CRP) level (normalized to ≤ 5 mg/dL) at the end of the second week of the treatment (2).

Till now, many investigations have confirmed the efficacy of VCO, lauric acid, and monolaurin as safe and beneficial agents against some types of viruses. VCO possesses antiviral activity against the lipid-coated viruses like SARS-CoV-2. It is also a protective agent against cardiovascular complications of COVID-19 while alleviating the respiratory inflammation. According to the aforementioned therapeutic potentials of VCO in COVID-19 in addition to its safety and availability, it is recommended to consider this natural substance and its components in future clinical researches.

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