Protocol: Use of Virgin Coconut Oil (VCO) Against COVID-19

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Date: April 6, 2020

Introduction: This document gives the scientific rationale for the use of virgin of coconut oil (VCO) for COVID-19 patients using oral and nasal routes of delivery. However, there is no claim of efficacy. This protocol can be combined with other supplements that strengthen the immune system.

Scientific Basis:

VCO is a food product that is generally recognized as safe (GRAS) and considered as a functional food (Marina 2009; Dumancas 2016). As a functional food, VCO provides benefits beyond its calories, such as its antiviral properties.

Coconut oil has antiviral properties

Lauric acid (C12) is the major fatty acid in coconut oil accounting for about 50% of this oil by weight. Upon ingestion of coconut oil, C12 and its biochemical precursor, monolaurin (ML, also known as glycerol monolaurate), are naturally released by lipase enzymes in the body. Three mechanisms have been proposed to explain the antiviral activity of C12 and ML in various viruses:

1. C12 and ML act like surfactants against lipid-coated viruses. C12 and ML caused the disintegration of the virus membrane in the enveloped bacteriophage ϕ6 virus model system (Sands 1979; Hierholzer & Kabara, 1982; Thormar 1987). Lipid membrane disintegration is the mechanism by which the betaCoV group of viruses can be effectively inactivated; SARS-CoV-2 belongs to the betaCoV class (Cascella 2020).
2. C12 and ML inhibited the late maturation stage in the virus replicative cycle of the lipid-coated Junin virus (JUNV) (Bartolotta 2001).
3. C12 and ML prevented the binding of viral proteins of the vesicular stomatitis virus (VSV) to the host cell membrane (Hornung 1994).

Although C12 accounts for much of the reported antiviral activity of coconut oil, capric acid (C10) and monocaprin have also shown promising activity against viruses, such as HIV-1 (Kristmundsdóttir 1999). Hilarsson and co-workers (2007) tested virucidal activities of fatty acids, monoglycerides and fatty alcohols against respiratory syncytial virus (RSV), human parainfluenza virus type 2 (HPIV2) and influenza A virus and reported that the most active compound was monocaprin. C10 accounts for about 7% of coconut oil. Thus,

at least two fatty acids in coconut oil (C12 and C10) and their monoglycerides (monolaurin and monocaprin) have antiviral properties.

Coconut has been safely and effectively used in animals as nutritional and prophylactic supplements. Coconut meat and coconut oil are fed to chicken, swine and pet dogs as supplements because of the antiviral and antibacterial protection that it provides (Cocjin 1991; Baltic 2017). ML itself has been shown to effectively protect chicken against avian influenza virus (van der Sluis 2015).

Coconut oil and its constituents have significant beneficial impact in humans. C12 is present in human mother's milk and has been shown to provide antiviral protection to the newborn baby (Dodge 1991; Hamosh 1999). Coconut oil and ML have been shown to have potential anti-HIV properties. In the first pilot clinical trial on HIV, coconut oil (45 mL daily) and ML (95% purity, 800 mg daily) were given to individuals with HIV-AIDS. This study involved 15 HIV patients, aged 22 to 38 years, 5 males and 10 females, for 6 months. There was only one fatality and 11 of the patients showed higher CD4 and CD8 counts after 6 months (Dayrit 2000). In another study, 40 HIV subjects with CD4+ T lymphocyte counts less than 200 cells/microliter were divided into a VCO group (45 mL daily) and control group (no VCO). After 6 weeks, the VCO group showed significantly higher average CD4+ T lymphocyte counts versus control (Widhiarta 2016).

Safety of virgin coconut oil

Coconut oil is part of the traditional diet that is consumed by almost 1 billion people who live in the coastal tropical areas, either as food, cooking oil, or food supplement. VCO is extracted directly from the fresh coconut meat. A number of animal studies which fed acute doses of coconut oil have established its safety (Ibrahim 2011; Pekson 2012). Studies on humans have similarly reported on its safety with the most common complaint being mild gastrointestinal discomfort (Dela Paz 2010). It should also be noted that VCO is taken as a laxative to address constipation.

Several published studies have used VCO as food supplement at doses ranging from 30 mL/day to 50 mL/day, for periods from 4 to 6 weeks (Chinwong 2017; Harris 2017; Khaw, 2018). The outcomes in all studies were favorable with no adverse effects reported apart from mild stomach discomfort.

Dynamics of the SARS-CoV-2 virus

The dynamics of the SARS-CoV-2 virus in infected patients shows a complex picture. Coronaviruses in general cause upper and lower respiratory tract infections (Horvath & Acs 2015) and are known to be transmitted through oral-fecal route indicating infection of the stomach, which causes gastrointestinal conditions (Gu 2020). Digestive symptoms have been reported to be common in COVID-19 patients and those with such symptoms had longer recovery time (Pan 2020a). Zhang and co-workers (2020) found the presence of the SARS-CoV-2 virus in oral and anal swabs and blood. However, there were more positives in the anal swab than oral swab towards the later stage of infection, suggesting shedding and transmittal through multiple routes. In another study which was based on 1070 specimens collected from 205 patients with COVID-19, the virus was detected in following samples (Wang 2020):

- bronchoalveolar lavage fluid: **93%**
- sputum: **72%**
- nasal swabs: **63%**
- fibrobronchoscope brush biopsy: **46%**
- pharyngeal swabs: **32%**
- feces: **29%**
- blood: **1%**

It was also observed that the viral load varied with the number of days after infection. In another study of 30 pairs of throat swab and sputum samples, viral loads were significantly correlated between the two sample groups depending on the number of days of infection. Respiratory samples gave the highest viral loads while about half of the stool samples were positive for the virus (Pan 2020b). The use of chest computerized tomography (CT) confirmed the presence of the COVID-19 disease in the lungs (Fang 2020). These data suggest that direct treatment of the respiratory system is important.

These observations indicate that both an oral route, that includes treatment of the stomach and circulatory system, and a nasal route, that treats the respiratory system, should be considered. The proposed modes of delivery of VCO are intended to match the dynamics and distribution of the SARS-CoV-2 virus in the body.

Proposed modes of delivery of VCO for COVID-19 patients and for prophylaxis

This protocol, which is suggested for COVID-19 patients, proposes the introduction of VCO through the oral and nasal routes. Since VCO is a mixture of triglycerides, it is necessary that lipase enzymes be present in the routes of introduction so that the active compounds – C10, C12, monolaurin and monocaprin – can be formed within the body from VCO. In the human body, lipase enzymes are found throughout the digestive system, as well as the bronchia and pharynx (Hamosh 1975). Lipoprotein lipase, the enzyme that is responsible for the hydrolysis of triacylglycerols in plasma, has been shown to be present in the lungs of guinea pigs (Camps 1991). A study using rabbits as animal model showed that VCO inhalation was effective at alleviating inflammation in the airway, indicating that introduction of VCO by inhalation is effective (Kamalaldin 2017). The direct introduction of oils through nasal drops is a traditional practice in Ayurveda, known as nasya (Ayurvedic Institute). The use of nasal products is also recognized by the European Pharmacopoeia (European Medicines Agency 2006).

Following are recommended ways by which VCO can be administered to COVID-19 patients.

Oral dose: 1.8mL VCO/kg bw daily. For a 70kg person: 3 tablespoons (45 mL) of VCO, three times a day after meals (= 135 mL/day oral dose). The high oral dose of VCO may cause diarrhea in some patients. The initial dose for the first 2-3 days may be lowered then gradually raised.

Gargle: Gargle 1 tablespoon of VCO 5 times a day.

Nasal delivery: either protocol may be followed. Daily dose: 9 mL/day nasal dose

a. Nasal spray (Dumaluan, pers. comm.): Add 1/6 tspn salt to 30 mL boiled water in a spray bottle and 3 mL VCO. Shake the bottle vigorously and slowly apply into each nostril alternately. Repeat 3 times a day.
b. Nasal drop (Newport, pers. comm.): Using a medicine dropper, drip VCO into each nostril a few drops at a time while reclining back about 45 degrees. Repeat 3 times a day.
c. Nasal swab: Dip a cotton bud in 3 mL VCO and swab this on the nasal passage. The patient should inhale deeply through the nose after the VCO is administered. Repeat 3 times a day.

As a prophylactic, take 1 tablespoon of VCO after each meal (=3 tablespoons/day) and gargle 1 tablespoon of VCO in the evening before sleeping.

To strengthen the immune system, supplements containing vitamins (A, B1, B6, B12, C, D, E) and zinc are also recommended.

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