



The antiviral properties of a miracle oil (virgin coconut oil) from *Cocos nucifera* L.: a review

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Abstract: Virgin coconut oil (VCO) from *Cocos nucifera* is the purest form of coconut oil, water white color extracted from the fresh coconut milk using cold processed technology, and not undergone oxidation and heating process. These mechanical and natural processes maintain all the natural constituents and goodness, aroma, and antioxidants of the oil. Virgin coconut oil is rich in medium-chain fatty acids, has good cholesterol and so little amounts of trans fatty acids and has a luscious, tropical coconut scent and flavor. It has a unique taste and cologne with an abundant amount of essential fatty acids and antioxidants of medicinal and therapeutic properties. Over the past few years, from the several studies that were recorded the Virgin Coconut Oil is capable of promoting health benefits, such as: a powerful biochemical to boost the immune system and treat a vast range of medical conditions; can slow the aging process by keeping the skin healthy; has anti-viral, anti-fungal, anti-bacterial, anti-inflammatory and immune-boosting action. This review analyzed the published literatures and scientific evidence to support on the so-called health claims such as anti-viral properties of Virgin Coconut Oil (VCO). Many studies in various parts of the world revealed that VCO is a miracle oil for people with HIV/AIDS, in reducing their virus, providing them energy and helping them regain weight and health. Furthermore, from the reviewed research studies, the results are very promising, as not only does it show that the VCO, by itself can destroy the virus, but it also has a key mechanism in upregulating the immune response against COVID-19. There are more ongoing studies on the efficacy of virgin coconut oil as adjunctive treatment for COVID-19. This avenue will serve as igniter to go for further studies that will prove more of its anti-viral properties.

Keywords: Virgin Coconut Oil (VCO), *Cocos nucifera*, antiviral properties, COVID-19



INTRODUCTION

In the advent of the COVID-19, government leaders, scientists, pharmaceuticals in the entire globe are searching for alternative ways on combating this virus that has brought too many mortalities. The researchers are doing their studies to be able to come up with a solution with this global crisis even there are prominent and effective vaccines given to many people, we are hopeful that medicinal plants can be the answer in battling this virus. Researchers are doing their very best to look for the plant that can be the other sources in stopping the spread of this COVID-19 virus. Until one plant from the Palm family has been identified to contain an antiviral quality, the coconut.

Coconut or *Cocos nucifera* Linn is one of the largest among the monocotyledon group known for its usefulness, a slender tree with root system known as fasciculate that has thousands of roots that grows in its life span. It is tall with about 15-30 meters in height when it reaches maturity (1). Coconut is the most versatile among the Palm Family, its fruits and every part of it has the highest economic value if properly utilized. That is why it has been called as the Tree of Life, Tree of Abundance, and King of all Tropical Flora. But what is most significant about its part is the mature kernel that after a process is done to it produces the Virgin Coconut Oil (VCO) and we called it as edible oil or now the “miracle oil”.

Coconut oil has a high content of fatty acids such as lauric acid which claim to have antiviral activity. This is mentioned by Guan Yu Lim, in her article entitled “Coconut and Covid-19: Philippines studying antiviral properties of coconut oil as a potential treatment *“Virgin Coconut Oil has been found to be effective in reducing inflammation and showed rapid symptom relief in suspected and probable COVID-19 subjects, according to an RTC from the Philippines.* Another findings from the researchers from DOST and ADMU said that antiviral property of lauric acid and monolaurin through its action of breaking down the virus envelope, inhibits the virus replication cycle and prevents the binding of viral proteins to the host cell membrane (2).

There is a need for food supplements that can help to enhance health conditions of individual especially when one is suspected to be infected of the virus. This VCO will be the one that can be used to prolong the life of those infected with virus. As for this date, researchers are doing clinical trials to resolve and determine the safety of this VCO. Researchers in different countries are currently working on the study of VCO’s potential therapy in Covid-19 patients.

Bawalan and Chapman noted that Dr. Dayrit as, a Professor Emeritus of the Department of Pharmacology in the University of the Philippines, College of Medicine came up with a book entitled “The Truth about coconut oil (drugstore in a bottle)”. Mentioned in the book that, aside from the versatility of VCO, it is suitable for human consumption without undergoing further processing. Dr. Dayrit as a person with a real advocacy of extending generous contributions in the field of VCO study, as a professor of Biology of the Department



of Chemistry, School of Science and Engineering of Ateneo de Manila University has worked on “The Properties of Lauric Acid and their Significance in Coconut Oil”. His research was published in the American Oil Chemists’ Society Journal, a SCOPUS-indexed journal, in 2015. The paper highlighted the metabolic and physiological properties of lauric acid that showed for many of the properties of coconut oil, the studies discussed and have shown how ingested lauric acid is transported directly to the liver where it is directly converted to energy which can be used by extrahepatic tissues, such as the brain and heart. Furthermore, Lauric acid and monolaurin have demonstrably significant antimicrobial activity against gram positive bacteria and a number of fungi and viruses.

Today, there are many commercial products that use lauric acid and monolaurin as antimicrobial agents. Lauric acid is a popular subject for scientific and medical research, as the compound plays a vital role in metabolism, and also displays anti-viral and anti-bacterial properties. Among the numerous current projects of Dr. Dayrit and his team tackled the relationship between VCO metabolism and Alzheimer’s disease. His passion for coconut oil research extends to writing popular and scientific articles and books about coconut oil. His 2013 book, “Coconut Oil: From Diet to Therapy” updates the 2005 book “The Truth about Coconut Oil – Drugstore in a bottle” which was started by his father, Dr. Conrado Dayrit (3).

Pacheco mentioned in his article, that the first-ever pilot human trial on HIV treatment with coconut oil was done in 1998 by the Filipino scientists and medical researchers led by Dr Eric Tayag of San Lazaro Hospital and Dr Conrado Dayrit, Jr. It was funded by DOH and spearheaded by the Philippine Coconut Research and Development Foundation (PCRDF), a private foundation dedicated to coconut research. The trial was done in San Lazaro hospital in Manila, the infectious diseases unit of the Department of Health. It was a successful trial. It showed that coconut oil when ingested releases monolaurin, a derivative of coconut oil’s super nutrient lauric acid. (4)

According to Mumbai, Coconut oil contains 48.6 per cent lauric acid. Monolaurin the active principle found to suppress the HIV virus. In her article, she also mentioned that, Jon J Kabara, professor emeritus, Michigan State University, US, The New Zealand Journal of Medicine. announced that Lauricidin tablets made out of coconut oil have been tested against HIV / AIDS Virus with success and that coconut and its products, bring down the viral load in HIV infected patients to undetectable levels (5).

With the ongoing studies on the efficacy of virgin coconut oil to many parts of the world as adjunctive treatment for COVID-19 the present researchers decided to collate varied. There are also foreign studies that prove the anti-viral properties of VCO. From the results obtained, it can be concluded that Virgin Coconut Oil contains anti-viral properties. And we hope, that the results of the ongoing studies, will provide an answer/ treatment to the present health problems and pandemic COVID-19 the Philippines and the whole world is facing.



MATERIAL AND METHODS

Electronic literature review method was used in this study. The data were thoroughly gathered, collected and compiled from different major and reputable databases such Google Scholar, PubMed, Research Gate, Stuart Exchange, Scribd, Science Direct, NCBI and various scientific literature and journals like Elsevier of both local and international.

RESULTS AND DISCUSSION

Botanical Description: Coconut tree (*Cocos nucifera*) has a fasciculate and fibrous root system that grows just below the surface of the soil. It has an erect, columnar or slightly curved stem that grows from a swollen base. The stem is smooth, light gray, and has prominent leaf scars. It is tall with a height of about 15–30 m when fully mature. It has large unbranched pinnate leaves. In an adult palm, carries 30–40 paripinnate leaves are usually carried in its crown. Annually, the palm produces an average of about 12 leaves. The inflorescence is called spadix when fully grown and bears 30–35 flower-bearing spikelets densely set with male flowers. The male flowers number about 250–300 per spikelet while the female flowers are found at the base of the spikelet, and each spikelet carries one or a few female flowers. Flowers are monoecious. Inflorescence consists of female and male axillary flowers that are small and light yellow (6).

In Botany, the coconut fruit is a drupe not a true nut. Fruits are roughly ovoid, measures up to 5 cm long and 3 cm wide. It has three layers, an outer epicarp/ exocarp, a mesocarp, and an inner endocarp. The epicarp, is the outer skin of the fruit, and the mesocarp, is heavy, fibrous part which become tanned when dry. The exocarp and the mesocarp together make up the thick, fibrous husk of the coconut. The endocarp which is the hard dark core makes up the hard, brittle, hairy coconut shell. A solid white albumen is found inside the endocarp. They are of varied thickness, depending on the age of the fruit. Another material found inside the endocarp is coconut water, a liquid albumen that is thick, sweet, and slightly acidic and also with oily pulp consistency (7).

Geographical distribution: The coconut palm grows on sandy soils and is highly tolerant of saline water. It thrives in areas with abundant sunlight and regular rainfall. Coconuts also prefer high humidity for its optimum growth and development. Coconut originated from Southeast Asia namely: Malaysia, Indonesia, Philippines. and the islands between Indian and Pacific Oceans. It is also believed that coconut have been brought to India and East Africa, and introduced in West Africa, American continents and other tropical regions in the world (7).

The coconut tree is one of the most useful and beautiful trees in the tropics where it grown in different countries and with world production concentrated in Asia and the Pacific. Cited on the article, 80% of the total area of the Philippines, Indonesia, India, Sri Lanka, Thailand, Malaysia and Papua New Guinea are planted to coconut (8).



The same was noted that coconut (*Cocos nucifera*) is widely distributed in tropical regions of the world, Coconuts are grown in 80 countries: in the Asia–Pacific region, the east and west coasts of Africa and Central and South America. Coconut which is called the “tree of life” plays a vital role in human’s life as food, drink and shelter, in many small island countries in the Caribbean, Indian, and Pacific Oceans (9).

The main coconut producing countries are the Philippines, Indonesia, India, Papua New Guinea and the Pacific Islands. Today, the Philippines is only second to Indonesia as the top world’s largest producer of coconut products. According to The Philippine Statistics Authority (PSA), about 3.6 million hectares of coconut trees are planted all over the country, that dominates the land in 68 out of the total 81 provinces. This year, from January to March, coconut production was recorded at 3.31 metric tons, according to PSA. Still, the top coconut-producer is, Davao Region which contributed 14.4% to the country’s total production, followed by Zamboanga Peninsula with 13.6% and then Northern Mindanao with 12.9% (10).

Taxonomic classification: Coconut tree (*Cocos nucifera*) popularly known as coconut palm or “Malayan dwarf” belongs to the monocotyledonous family Arecaceae or palm tree family. It is the only living species of the “genus coco” and there are 150 species of coconut palm in over 80 different tropical & subtropical countries. The Taxonomic classification of *Cocos nucifera* is as follows: Domain: Eukaryota, Kingdom: Plantae, Phylum: Spermatophyta, Subphylum: Angiospermae, Class: Monocotyledonae, Order: Arecales, Family: Arecaceae, Genus: *Cocos*, Species: *Cocos nucifera*, (CAPI) (11).

Physicochemical constituents and the biological activities of Virgin Coconut Oil: It was in the study of Nameer Khairullah Mohammed et. al. about the different extraction methods on the VCO that determined and compared the fatty acid composition, physicochemical properties and the antioxidant activities of the VCO against the commercial refined, bleached and deodorized coconut oil. Results showed VCO demonstrated superior physicochemical and antioxidant properties compared to the commercial coconut oil. It was also found out that the extracted VCO had much higher phenolic content than the refined, bleached and deodorized coconut oil (12).

Another study of Shrivastava Y, et al. was found as Virgin Coconut Oil (VCO) was compared to Copra Coconut Oil (CCO). Findings attributed to the marginal differences that exist with respect to refractive index, iodine value, fatty acids profile, saponification value, moisture content, and specific gravity. VCO was claimed to prevent the oxidation of low density lipoprotein lipid as it increases the antioxidant enzymes. Included in the findings the difference in total polyphenol, phytosterol, tocopherol, monoglycerides and diglyceride content. VCO was found to be good frying oil in terms of stability and acceptability after 8 hours of frying of soaked Bengal gram dhal. It was also stated that



blends of VCO were found to be stable for up to 12 months of storage in various flexible and rigid packaging systems at varying temperatures (13).

Virgin coconut oil is rich in medium-chain fatty acids, has good cholesterol and so little amounts of trans fatty acids and has a luscious, tropical coconut scent and flavor. It has a unique taste and cologne with an abundant amount of essential fatty acids and antioxidants of medicinal and therapeutic properties. This was affirmed in the study conducted by Maurikaa C S, et. al which primarily compare the physicochemical properties of Refined, Bleached and Deodorized (RBD) oil, Virgin Coconut Oil (VCO), and Cold Pressed Oil (CPO, Chekku oil). The physicochemical properties taken for the study includes refractive index, moisture content, iodine value, acid value, saponification value, polenske value, unsaponifiable matter and % free fatty acids. The physicochemical properties of all three samples obtained are in compliance with Asian and Pacific Coconut Community (APCC) standards. Of all the samples, VCO showed 1.3% FFA which was higher when compared, that it should be consumed only to a certain limit for cooking. VCO has very low moisture content of 0.11% where the shelf life of oil can be naturally preserved. The acid value of VCO was 2.7 mg KOH/g which has the highest amount of AV whereas for other samples it was less than 1.0 mg KOH/g. The findings of their study were suggested to be used for chemical analysis and adulteration detection (14).

The researchers found another comparative study by Marina, A.M. et.al., on the physicochemical properties of virgin coconut oil (VCO) with different coconut oils namely refined coconut oil and other essential oils on the International Journal of Chemical studies. There are other chemical compositions of VCO such as the major triacylglycerols obtained for the oils were lauric, capric and myristic). Saponification value ranged from 250.07 to 260.67 mg KOH/g oil; low peroxide value (0.21–0.57 mequiv oxygen/kg); anisidine value ranged from 0.16 to 0.19 and Free fatty acid content of 0.15–0.25 All chemical compositions were within the limit of Codex standard for edible coconut oil. Total phenolic contents of VCO samples (7.78–29.18 mg GAE/100 g oil (15).

In the study conducted by Suryani,S.,et.al. which aims to check the unique factors of VCO as compared with coconut and palm oil. Results of the study confirmed that VCO contains lactic acid bacteria and bacteriocin, wherein isolation of the Lactic Acid Bacteria (LAB) was conducted by the dilution method using MRSA +0.5% CaCO₃ media. Lauric acid content was analyzed by the Chromatographic Gas Method. Macromolecular identification was conducted also by 15S rRNA. The VCO was distinguished by a higher content of lauric acid (C12:0) 41% -54.5% as compared with 0% coconut oil. On the study the VCO contains LAB, namely *Lactobacillus planetarium* and *Lactobacillus paracasei*. The LAB inhibits the growth of pathogenic bacteria such as *Pseudomonas aeruginosa*, *Klebsiella*, *Staphylococcus aureus*, *S. epidermidis*, *Proteus*, *Escherichia coli*, *Listeria monocytogenes*, *Bacillus cereus*, *Salmonella typhosa* and *bacteriocin*. Comparison with VCO is based on having a high content of lauric acid, 54%, and LAB content. The difference is on the fatty acids content between the 3 kinds of oils. In VCO there are lauric acid and stearic acid, namely lauric acid VCO (A)



54.06%, VCO (B) 53.9% and VCO (C) 53.7%. The content of stearic acid VCO (A) is 12.03%, VCO (B) 12.01% and VCO (C) 11.9%. Coconut oil contains a little lauric acid, which is 2.81%, stearic acid 2.65% and palmitic acid 2.31%. It was found out that palm oil can be said to have very little lauric acid (16).

Parallel study with other noted researchers were found by the present researchers. To name was the study by Soorya Parathodillam, et.al. Virgin coconut oil (VCO), extracted from the fresh coconut kernel, was a food supplement enriched with medium chain saturated fatty acids and polyphenolic antioxidants. The polyphenol content (VCOP), have been attributed to its pharmacological benefits. The different laboratory procedures like Liquid chromatography/mass spectroscopy (LC/MS) analysis of VCOP documented the presence of gallic acid, ferulic acid (FA), quercetin, methyl catechin, dihydrokaempferol and myricetin glycoside. Also, the pre-treatment of VCOP at different concentrations (25-100 $\mu\text{g}/\text{mL}$) significantly reduced the H_2O_2 and 2,2'-azobis (2-amidinopropane) dihydrochloride (AAPH) and induced cell death in HCT-15 cells. Further insight to its mechanistic basis, oxidative stress induced alterations in glutathione (GSH) levels and activities of GPx (Glutathione-Peroxidase), GR (Glutathione-Reductase), catalase (CAT) and GST (Glutathione-S-Transferase) were restored to near-normal by VCOP, thus concomitantly reduced lipid peroxidation. The efficacy of VCOP was similar to that of Trolox and FA added in the culture. Furthermore, the study suggested that to check if VCOP protects cells from pro-oxidant insults then, cellular antioxidant status must be modulated (17).

Virgin coconut oil anti-viral properties and other health benefits: Over the past few years, the health benefits of Virgin Coconut Oil were considered endless. To cite a few :VCO is a powerful biochemical to boost the immune system and treat a vast range of medical conditions from common allergies to critical ailments; VCO helps in the absorption of fat-soluble vitamins; can slow the aging process by keeping the skin healthy; has anti-viral, anti-fungal, anti-bacterial, and has immune-boosting action, found with slimming effect, too; has an anti-inflammatory action when massaged on limbs and joints; used to relieve gout, arthritis, joint pains, rheumatism, kill skin fungus, swelling, and found effective in wart removal. Reported as well that VCO can stimulate hair follicle growth when the oil is massaged on the scalp. (18)

On the same paper, VCO was reported to have the unique ability to normalize bodily function. It gives more energy. The hormonal system goes where it should be in proper balance. For an aged people, it can turn back the clock making them feel more youthful. On report, the reversal of age-related hormonal changes. It was cited on the report the reversal of menopause and the revitalization of the bodily functions. Cited, too that VCO is like a "Fountain of Youth". From the findings, many people consider VCO as the "Healthiest Oil on Earth" (18).

As Virgin Coconut Oil become known as a functional popular food oil as mentioned on the study conducted by Gerard G. Dumancas, et. al. it was also considered as the newest,



high value coconut product. Numerous studies have investigated the pharmacological properties of VCO including analgesic, anti-inflammatory, anti-oxidant, antipyretic, anti-stress, and antimicrobial properties. Cited on the paper that several studies were also investigated referring to bone loss prevention and also cardioprotective concerns. (19).

The researchers were able to find the narrative review of Taylor C. Wallace which summarizes the current peer-reviewed literature and mechanisms about the health effects of coconut oil products. Included on the reviewed literature is the limited but consistent evidence that support the topical use for the prevention and treatment of atopic dermatitis, and the “oil pulling” for the prevention of dental caries. Coconut oil products helped to reduce hair damage caused by protein loss and ultraviolet (UV) exposure during grooming. Copra oil that has been refined, bleached, and deodorized appears to have a lower effect on total and low-density lipoprotein (LDL) cholesterol than butter fat (20).

Abdul Rohman, et.al. studied the extraction, the physicochemical and biological properties and the authentication analysis of the VCO. It was from their findings that VCO from the varied pharmacological activities done exhibited the antioxidant, anti-inflammatory, and immunomodulatory, anti-hyperlipidemia, anticancer, antidiabetic, anti-bacterial and neuroprotective activities. The study brought the high price value of VCO in the fats and oils industry (21).

Immunization is a process of giving/receiving a vaccine to /from a person to protect against disease. The term Immunity by immunization is the same to the immunity a person would get from disease. But the saying goes instead of getting the disease you get the vaccine. This is when we consider the vaccines a powerful medicine.

This time of Pandemic COVID-19 is the disease. There are still other options for fighting COVID-19. Although more study is needed before we can develop a feasible prevention or treatment option. This present study aims to give hope to Filipinos. The search for a cure or alleviation from the deadly novel coronavirus could just be around the bush and this may lead to a Philippine product that has sparked a slew of health claims, the coconuts.

According to Savillo, D. coconuts are considered to be one of the most flexible fruits when it comes to utilization. It is being utilized for its water, tasty meat, milk and oil. In recent years, coconuts have grown in popularity due to their flavor, culinary usage, and potential health advantages. Moreover, the most valuable component of a coconut is its oil. The health and nutritional benefits of coconut oil have become a hot issue in health and nutrition circles throughout the world. Now, due to its health potential benefits (22).

The health and nutritional benefits of coconut oil have become a hot issue in health and nutrition circles throughout the world. Now, due to its health potential benefits, mentioned by Ben O. de Vera on his report that the Department of Science and Technology (DOST) was examining the potential of virgin coconut oil as a virus buster. It was very true



that when the report came out nCoV virus was relatively new. Quoted by de Vera was the Secretary of DOST Fortunato T. Dela Peña with the following lines “If you will start only now the clinical trials, it will not really be timely for this particular occurrence, it will be long term”. Another quoted lines from Dela Peña “And besides, it will be very difficult to find the afflicted persons for whom we will conduct the clinical trials”. But, nonetheless disclosed that government scientists were trying to explore all possible means on what to claim as possible health supplements (23).

Still cited on the report of de Vera was the lines from Fabian Antonio M. Dayrit which goes “something that we should look at is VCO as claim says it can help”. Then several researchers have been designing drugs to specifically target protease enzymes in coronavirus. It was included also on the report that the Ateneo School of Science and Engineering posted on its website the study of Dayrit and Dr. Mary Newport of Spring Hill Neonatology, Inc., entitled “The Potential of Coconut Oil and Its Derivatives as Effective and Safe Antiviral Agents Against the Novel Coronavirus”. (23)

With these findings from varied readings, the present researchers were further motivated to continue to look for more posted researches about Virgin Coconut Oil if it is really meant to alleviate the present Pandemic that the whole world is experiencing at the moment.

The researchers are hereby presenting more researches. According to Chua, Hazel all safe and viable COVID-19 treatments must be examined and studied first. The statement was seconded by the Cabinet Secretary Karlo Nograles. After consulting the doctors, and specialists of DOST (Department of Science and Technology) Cabinet Secretary, Karlo Nograles begun distributing boxes of virgin coconut oil (VCO) to Level 1 hospitals in Metro Manila that care for patients with moderate symptoms of Covid 19. To complement their Covid-19 medication, 61 patients have decided to follow a VCO-supplemented diet. In addition, the VCO Philippines supported Nograles' campaign by distributing free VCO boxes to its member companies. It also included patient permission forms, as well as guidance and protocols developed by Dr. Fabian Dayrit which Nograles shared with the hospital staff. Another trial conducted by the Department of Science and Technology regarding the usage of VCO was done to a total of 57 suspected COVID-19 patients in two quarantine facilities. (24).

The Department of Health (DOH) supported the study as those with symptoms like the presence of fever, cough, cold, body ache, headache, loss of taste, as well as those with recent travel history are the one that defined the suspected COVID-19 patients. Fortunately, the study found that patients with suspected COVID-19 and were given virgin coconut oil (VCO) had less symptoms and recovered faster compared to the control group. Dr. Imelda Angeles-Agdeppa supported the result when she stated that the study's key outcomes were decreased signs and symptoms such as better breathing and less coughing, as well as reduced C-Reactive Protein levels (CRP). 29 subjects were administered liquid VCO mixed with their meals for 28 days in the treatment group. Whereas, the other 28 subjects were in control. Based on the observation, in the VCO group, the symptoms were significantly reduced by the second



day. On the other hand, in the control group, the symptoms were reduced by the third day. “These outcomes indicate quicker recovery in the VCO group compared to the control group, which is more likely the early improvement in the C-Reactive Protein (CRP) levels supports.”, Additional statements were added that the antiviral characteristics of VCO were most likely the mechanism through which it alleviated symptoms. Moreover, due to the capability of VCO in reducing symptoms, it was hoped to be used as a supplement. However, VCO is not a cure; rather, it is an adjuvant therapy that may prevent COVID-19 from becoming severe. DOST has also supported a melatonin study in COVID-19 patients, in addition to VCO. On the point of view of Dr. Jaime Montoya, the use of high dose melatonin in COVID-19 pneumonia patients did not consider melatonin as a direct virucidal agent. However, melatonin helped in the neutralization of the COVID-19-causing SARS-CoV-2. Melatonin was found useful as an adjuvant therapy for regulating the immune system, inflammation, and oxidative stress, as well as for reducing the problems of acute lung injury/acute respiratory distress syndrome and associated multi-organ disorders (2).

Resurreccion, L. added that the volunteers in the study had to meet the following criteria: they had to be suspect or probable. Covid-19 instances; no preference for gender; aged 20 and up. At the time of baseline data collection, volunteers had been in the quarantine facility for three days or less; were willing to participate with a completed informed permission form; had controlled hypertension and maintenance medicines; and had normal liver enzyme testing. Those who had a history of heart disease, were using statins or other heart disease drugs, had a history of hyperlipidemia or high cholesterol levels, were asymptomatic, or were pregnant were excluded from the study (25).

From the point of Gumaru (n.d.) of the Department of Science and Technology’s Food and Nutrition Research Institute, the study on the virgin coconut oil as dietary supplement to COVID-19 probable and suspected cases unveiled a result of manifested diminishing signs and symptoms as early as the second day to the 5 out of 29 patients who were served meals with VCO. However, the same meal, without VCO, was served to only one patient yet it showed similar improvement. At Day 18, the VCO Group of patients who were served VCO-containing meals had no COVID-19-related symptoms, whereas symptoms remained in some Control Group patients who were served the identical meals without VCO until Day 23. VCO was given as an adjunct supplement in probable and suspect COVID-19 instances to prevent symptoms from becoming severe (26).

This point of time, more researches are needed to assess the efficacy of VCO as an additional therapy for COVID-19 patients with other comorbidities. Apart from monitoring the signs and symptoms of COVID-19 in the study volunteers, Dr. Agdeppa revealed that the research team noticed that the mean C-Reactive Protein (CRP) levels in the VCO Group had already normalized to 5 milligrams per liter or less by Day 14. Dr. Agdeppa said that the C-Reactive Protein, or CRP, is a quantifiable marker used to monitor inflammation or infection, and that a CRP of 5 milligrams per liter or fewer indicates recovery from inflammation or infection. Dr. Agdeppa further observed that while the Control Group's CRP levels decreased to normal from Day 1 to 14, they stayed on the borderline of 5 milligrams per liter from Day



14 until the completion of the intervention. To guarantee product quality, the VCO used in the study was thoroughly examined by the Philippine Coconut Authority's Laboratory Services Division. Furthermore, Dr. Fabian M. Dayrit contributed research inputs and methodologies based on prior VCO studies among HIV patients. With his support for the study's findings, he added that multiple studies have demonstrated VCO's intriguing antiviral characteristics, and that additional research is needed to fully explore its potential. The general public is encouraged to carefully read the labels of VCO goods to ensure that ingredients, nutrient analysis, manufacture, and expiration dates are all clearly stated. This VCO study could benefit not just the coconut business and the millions of coconut farmers who rely on the "tree of life" to improve their quality of life, but also the prevention and management of symptoms among COVID-19 suspicious and probable patients. (27)

In the same paper of Gonzalez, C., the researchers discovered that compounds derived from coconut oil and virgin coconut oil, or VCO, reduced coronavirus count by 60-90 percent at low viral load, after six months of experiments. The compounds were also found to boost cell survival, according to the researchers. More research is needed, however, to see if larger quantities of these compounds limit the virus's replication rate even more. The experiments have promising results, according to Dr. Jaime C. Montoya, because it proves that VCO not only can eliminate the virus by itself, but it also has a vital mechanism in upregulating the immune response against COVID-19. Due to the shortage of available COVID-19 vaccinations, the Department of Science and Technology (DOST) is stepping up its efforts to find alternative solutions to the rising number of COVID-19 cases by promoting Filipino research and innovation. The DOST is currently investigating the ability of VCO to upregulate the immune system in collaboration with the Food and Nutrition Research Institute and the University of the Philippines - Manila. The results of these ongoing VCO clinical trials will establish whether VCO can be utilized as a COVID-19 adjunct medication (27).

According to Fortunato de la Peña, the study has a hospital-based component as well as a community-based component. VCO was used as a supplement to the daily treatment regimen of COVID-19 participants in the hospital study. In addition to the medications being tested in clinical trials, the goal was to investigate the potential advantages of VCO in patients with moderate to severe COVID-19. Persons under Investigation (PUIs) under COVID-19 were held in isolation facilities in communities and hospitals throughout the capital region. VCO were included in the food provided to PUIs by the national Food and Nutrition Research Institute, with the goal of evaluating the potential advantages for COVID-19 patients and those in high-risk groups (27).

Coconut has been an important element of the food of people living in the tropics for thousands of years, according to Fabian M. Dayrit, Ph.D. But it provides more than just sustenance. Coconut flesh has roughly 20% coconut oil in it. "Lauric acid's science and practical applications are well-known," Dayrit says. Clinical investigations are now required to validate this and to prescribe an intake amount. Dayrit's team was working with in vitro



efficacy against SARS-Cov-2 and discussing the VCO methodology with medical professionals before the clinical studies were permitted. On the university's website, Dayrit and her partner Mary Newport wrote about their work. Depending on the age, variety, and location of the coconut, the quantity of lauric acid contained in VCO ranges from 45 to 53 percent of total fatty acids. Because VCO is widely available and has shown no harm in multiple acute dosage tests, it may be simple for patients to obtain (28). The team of the researchers from the Polytechnic University of the Philippines' Institute for Science and Technology Research (ISTR) began producing ethyl alcohol from virgin coconut oil (VCO) at the university's new Engineering Science and Research Laboratory (ESCR). The initiative is part of the university's ongoing COVID-19 response. According to a recent study performed by the Department of Science and Technology (DOST), suspected COVID-19 patients who were given VCO had less symptoms and recovered faster than a control group. Researchers also pointed out that aside from the PUP community, the project will benefit 24 barangays, five (5) hospitals, and two (2) police stations (29).

CONCLUSION

Virgin Coconut Oil (VCO) provides promising biological effects that are beneficial to health of humans. The physico-chemical characteristics of the VCO and its derivatives that are elucidated by the pharmacological properties and its polyphenolic chemical constituents like its lauric acid and monolaurin that have demonstrably significant antimicrobial, anti-inflammatory, immunomodulatory, and antiviral activity. VCO offers various health benefits such as reducing cholesterol and its efficiency in fighting germs, bacteria and viruses, are some of its medicinal properties.

Since virgin coconut oil has a potential health advantage as shown on records researchers need not to stop to investigate the capability of VCO as an alternative source of medication. Furthermore, as proven by multiple lab tests were done by varied researchers in different parts of the world with coconuts as the main source of Virgin Coconut Oil, its proven potential antiviral property, the researchers would further recommend to continue to investigate for the common belief that the Virgin Coconut Oil is the miracle oil from the fruit of the coconut plant that can help and be an answer to the most awaited alternative source to fight the present Pandemic problem - COVID-19.

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DECLARATION OF CONFLICT OF INTEREST

No conflict of interest to declare.

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