PHYTOCHEMICAL COMPOUNDS (ANDOGRAPHOLIDE, GALLIC AICD, CURCUMIN AND ARTEMISININ) AS A POTENTIAL INHIBITOR FOR SARS COV 2: A REVIEW.

Name of Supervisor : DR. FATAHIYA MOHAMAD TAP

GROUP MEMBERS

NAME	MATRIC NO.
AHMAR YUSRY BIN YUSOF	2017628756
MUHAMMAD HAKIMI BIN JAMIL	2018267584
NUR ALEEYA NATASHA BINTI RAMLI	2018800344
NURSYAHEERA AMILA BINTI ROSLAN	2018246222

Abstract

COVID-19, a new pandemic caused by SARS-CoV-2, was first identified in 2019 in Wuhan, China. The novel corona virus SARS-CoV-2 and the 2002 SARS-CoV have 74 % identity and use similar mechanisms to enter the cell. Phytochemicals are defined as bioactive nutrient plant chemicals in fruits, vegetables, grains, and other plant foods that may provide desirable health benefits beyond basic nutrition to reduce the risk of major chronic diseases. In this case, the phytochemicals that are in focus are Andrographolide which is from the Andrographis plant, Curcumin that can be found in turmeric plant, Gallic Acid from parts of various plants and Artemisinin which can be found in the sweet wormwood plant, Artemisia annua. These phytochemicals are chosen because these compounds can obtain abundantly in Malaysia Herbs and based on their effectiveness as antioxidant reducing respiratory system problem. The study focuses on research done on published literal researches of the phytochemicals being virtually tested on the SARS-CoV2 viruses through in silico study. These phytochemicals have been virtually confirmed to be a viable compound in fighting against SARS-CoV2 through various bindings on the viruses' protease component. However, further research is necessary to investigate the ability of these compounds as viral entry inhibitors.

KEY WORDS: SARS-CoV2, Phytochemicals, Andrographolide, Curcumin, Artemisinin, Gallic Acid

Table of Contents
This section should begin on a new page. Microsoft Word® has an automated table of contents (TOC) feature under the "References" menu. For this feature to work, you must use the preset heading styles (which you can modify). However, you can also generate a table of contents manually. The TOC is the last element of the report to be completed. If changes are made after the TOC is created, be sure to update to TOC as well.

Table of Contents

1.1 INTRODUCTION

The discovery of a new coronavirus in late 2019, now known as SARS-CoV-2, has resulted in an unprecedented public health response to a global pandemic. Coronavirus disease (COVID-19) is a disease caused by a newly discovered novel coronavirus, the extreme acute respiratory syndrome coronavirus 2 (SARS-CoV-2)[1]. Coronaviruses are distinct genetically from influenza-causing viruses. Other coronaviruses that have caused major and lethal outbreaks in the past 20 years include SARS-CoV-1 and MERS-CoV that caused SARS and Middle East respiratory syndrome (MERS), respectively.

Globally, the COVID-19 pandemic redirects emphasis and prioritisation of health systems. Enforced social distancing and stay-at - home strategies, described as "lockdowns," promoted by the World Health Organization (WHO), have dominated public health responses. The spread of the pandemic of COVID-19 has sparked a race to unveil the secrets of extreme SARS-CoV-2 and its underlying respiratory acute syndrome.

SARS-CoV-2 is a type of single-strand positive sense RNA virus with a genome size of about 30,000 nucleotides and is characterised by proteins such as spikes, envelope, nucleocapsid, matrix, RNA-dependent polymerase and proteases[1]. In general, the coronavirus spike glycoprotein consists of two subunits: S1, which mediates host cell receptor virus binding, and S2, which mediates cell membrane virus fusion. Previous SARS-CoV studies have indicated that the interaction between the host cell receptor angiotensin converting enzyme 2 (ACE2) and SARS-CoV is mediated by spike protein subunits[2].

This paper is an effort to show how different phytochemicals that is common in the drug and potential medicine world could affects the SARS-CoV2 CoV2 through in silico study. All the information were extracted on how these phytochemicals reacts and possibly be effective in rendering the virus in leading humans into severe respiratory system problems. Our articles

focusing on in silico study vary in how the phytochemicals react and how it targets certain parts of the virus.

Phytochemicals are non-nutritive plant chemicals that have protective or disease preventive properties. They are non-essential nutrients, meaning that they are not required by the human body for sustaining life. It is well-known that plant produce these chemicals to protect themselves but recent research demonstrate that they can also protect humans against diseases [1]. There are more than thousand known phytochemicals. The phytochemical that are used in this case are Artemisinin, Gallic acid, curcumin and Andrographolide.

Artemisinin, also called qinghaosu, is an antimalarial medication extracted from the sweet wormwood plant, Artemisia annua. Artemisinin is a compound made up of three cyclic organic ester-bound isoprene units (lactone sesquiterpene) and is distilled from dried leaves or flower clusters of A.annua. Chinese physicians, who named the plant qinghao and prescribed a natural remedy in the form of qinghao tea, first recognised the antipyretic (fever-reducing) properties of the plant in the 4th century CE[3]. In the 1970s, the active agent, called qinghaosu, was isolated from the plant; artemisinin became commonly known as this compound[4]. Several artemisinin derivatives, including artesunate and artemether, are commonly used in the treatment of malaria.

Antimalarial drugs such as chloroquine, quinine, and artemisinin have a long history of clinical use and have been confirmed in recent years to have wide-spectrum antiviral potential. Artesunate is a structural derivative of artemisinin that is characterised by its broad-spectrum antiviral potential against DNA and RNA viruses[5]. In current and previous studies, artemisinin, especially artesunate, and its active metabolite dihydroartemisinic, were shown to have an antiviral potential.[3] Accumulating studies have suggested that artesunate, by modulating host cell metabolic pathways, is likely to impair viral infection.

Gallic acid (3,4,5-trihydroxybenzoic acid) is a phenolic acid, commonly distributed both in the free state and as part of more complex molecules, such as ester derivatives or polymers, in several different higher plant families[6]. In nature, almost every part of the plant contains gallic acid and its derivatives, such as bark, wood, leaves, fruit, roots and seeds. In popular foodstuffs,