The diversity of the use of herbal medicine and natural products for treatment of corona virus disease 2019 (COVID-19)

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Abstract

Viral infections role in human diseases are critical and current outbreaks in the beginning of globalization and relieve of travel have minimized their avoidance as a serious problem in conservation community health. Thus, many viruses need an appropriate vaccines and successful antiviral therapies then development in immunization and drug discoveries considered as a mandatory. According to many published studies natural products and herbal medicines are an excellent source for novel antiviral drugs discoveries due to the presence of bioactive constitutes in their contents, especially functional foods that offer valuable health properties and it is worth mentioning here the biodiversity and ecosystems in Arabic countries and specifically Jordan that considered rich in plant biodiversity, with the number of vascular plants reaching nearly 2,500 species belonging to 152 families, and constituting a total of 1% of the plants recorded in the world. It is worth noting that nearly 100 species are considered endemic in Jordan, which is equivalent to 2.5% of the total number of registered plants, which is a high percentage compared to international standards. The appeared fact that COVID-19 tends to extend fast and influence people across the globe thus, it is important to discover and to understand how bioactive ingredients and functional foods considered valuable in the fight against viral diseases.

Key words: Covid-19, Viral infection, antiviral therapy, biodiversity and herbal medicine.
Introduction

The available data from the epidemiological studies for COVID-19 since the time when discovered in December 2019, suggested the incubation time was anticipated to be 1–14 days, while the period for consecutive interval was anticipated to be 4–8 days (Restubog, Ocampo and Wang, 2020). The time for COVID-19 virus to double in the number of infections was estimated for about 3–7 days (Park et al., 2020). Recently a new published study was demonstrated that among other patients there is about 5% of severe acute respiratory syndrome coronavirus-2 with moderate influenza-like symptoms (Spellberg et al., 2020). Such cases exist dynamic in the community, which supports the opportunity of continuous spread (Bourouiba, 2020).

From the development in the field of nutrition, scientists may possibly separate and determine nutrients required for human survival and growth. The collaboration of sciences and the public need originates the functional food science which is the melding on food science, medicine, and nutrition as it gives sustenance that crosses between pharmaceuticals and foods. Specially, studying components of food and their health benefit effect by researchers. They calculate changes in health and homeostatic performance through the use of indicators and biomarkers in the body. Natural products and their derivatives have potential activities in the treatment of viral infections (Mirzaie et al., 2020; Wu, Leung and Leung, 2020). Besides, there are many important issues that the food supply and food industry chain have to concentrate on in our new era. Firstly, the protection of consumer habits by adopting healthier diets and to provide a bioactive ingredients and functional foods to support their immune system that the need for these products may increase and be critical. Also, avoiding the spread of virus between retailers, producers and clients’ food safety considered as a significant issue. In addition, the food biological orders sustainability in the era of COVID-19 is another concern which should consider in order decrease related crises in the future (Lin, Hsu and Lin, 2014). Until now, there are no adequate studies on the development of anti-COVID-19 agents from herbal extracts (Kolodziej, 2011) but the rapid spread of coronavirus and its capability to transmit from person to another urged scientists to find a new approaches for treatment of the coronavirus-2 (SARS-CoV-2) and to explore the food systems in this era.

Natural products and herbal medicines

Herbal and Chinese medicines were helped in the cure of viral infections, for example, Astragulus membranaceus and ginseng root which are used in viral respiratory diseases prevention (Lin, Hsu and Lin,
2014; Luo, 2020), whereas the active herbal remedy Pelargonium sidoides is used for the inhibition of respiratory viruses’ replication (Kolodziej, 2011). Approved previous researches showed an evidence for H1N1 and SARS diseases prevention in the elevated-threat population and also mentioned that Chinese herbal formulas could be an for the obstacle of COVID-19 (Lin, Hsu and Lin, 2014; Luo, 2020). The bioactive derivatives of plants phenolic compounds and flavonoids which isolates from litchi seeds, quercetin, and kaempferol) those are used to reduce SARS 3-chymotrypsin-like protease (3CLpro) enzymatic activity and this inhibition means a control on the replication process of SARS-CoV and thus might considered as an active cure against SARS-CoV-2 and helpful treatment agent for patients with COVID-19 (Yang et al, 2020). Nowadays, seeking products to boost our immune system is among our top health aims globally and it could increase in the near future.

**Several natural products and herbal medicines proposed affecting mechanisms against corona virus:**

Saikosaponins (A, B2, C, and D) are documented to possess antiviral effects against HCoV-22E9. Saikosaponins are naturally occurring triterpene glycosides isolated from medicinal plants such as Bupleurum spp., Heteromorpha spp., and Scrophularia scorodonia, (Cheng, 2006). The HCoV-22E9 infection early stages including viral attachment and penetration could be prevented by the use of natural compounds. In addition, Artemisia annua, Pyrrosia lingua, and Lindera aggregata extracted from Lycoris radiata showed an anti–SARS-CoV effect from a selected investigation documented using Chinese medicinal herbs (Li, 2005). Natural inhibitors such as the nsP13 helicase and 3CL protease against the SARS-CoV enzymes have also been recognized including myricetin and phenolic compounds from Isatis indigotica and Torreya nucifera. Also, using of extracted water from Houttuynia cordata which identified to show different antiviral mechanisms against SARS-CoV (Li, 2005).

**Identification of Arabic natural herbs with antiviral activities**

There is a strong demand of use of medicinal herbs in Arabic countries especially in Jordan which considered rich in plant biodiversity, with the number of vascular plants reaching nearly 2,500 species belonging to 152 families, and constituting a total of 1% of the plants recorded in the world. It is worth noting that nearly 100 species are considered endemic in Jordan, which is equivalent to 2.5% of the total number of registered plants, which is a high percentage compared to international standards (MOH-Jordan, 2007). Echinacea is a genus of herbaceous flowering plants in the daisy family that Based on in-vitro studies
showed virucidal activity against coronaviruses, including SARS-CoV-2 (Verma, 2020). Artemisinin, isolated from A. annua plants, inhibit a variety of viruses including SARS-associated coronavirus (Prasad, Muthamilarasan and Prasad, 2020). A recent study showed that three important biflavonoids of Torreya nucifera leaves (amentoflavone, bilobetin and ginkgetin) can act as SARS CoV-2 Mpro inhibitors (Rajesh et al., 2020). Furthermore, a present study revealed that herbal extracts containing Flavonols acts as potential antiviral drugs targeting SARS-CoV-2 proteases (3CL pro and PL pro), spike protein, RNA-dependent RNA polymerase (RdRp) and angiotensin-converting enzyme II receptor (ACE2) (Mouffouk et al., 2021).

Conclusions

Various viruses still need available antiviral cure and also a protective vaccine. However, natural active compounds could be the perfect source of biodiversity for finding novel antiviral drugs and for indigenous and peasant communities worldwide the high rate of use of herbal medicines because it meets with their healthcare needs especially for those with low costs and high availability. Many researches showed that herbal extracts and natural products are recognized to have strong antiviral effect and their findings could aid to invent medicine and remedial leads. As numerous studies in this field are just beginnings, next investigation in distinguish the bioactive contents, defining and understand the proposed mechanisms, in addition to evaluate the efficacy and probable claim in vivo is optimistic for the reason to find effectual antiviral cures.

References


