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Antioxidant Potential of Several Food Ingredients in Al-Quran and Hadith on Inflammation Process in Covid-19

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ABSTRACT

Coronavirus first appeared in China. The coronavirus spread rapidly and swiftly became a global pandemic. The mortality rate of this disease is known to be related to the pathobiological processes that occur and the increased pro-oxidant response. Antioxidants are required to maintain the balance of processes that occur in the body. Al-Quran and Hadith mention several food ingredients that have the potential as antioxidants. The literature review of published journals spanning 2010–2020 was reviewed with the topic of information related to the antioxidant potential of food ingredients in the Al-Quran and Hadith on the inflammatory process of COVID-19.

1. INTRODUCTION

Coronavirus, commonly known as SARS–CoV–2 (severe acute respiratory syndrome coronavirus), was first identified in China [1]. The spread of the coronavirus spread very quickly and became a worldwide pandemic [1]–[3]. More than 200 countries were infected, with a total number of cases as of May 5, 2020 were 3,517,345 with 243,401 persons died (the death rate reached 6.9 percent) (World Health Organization (WHO), 2020). Since December 2019 in Wuhan City, Hubei Province, this incidence rate indicates that SARS-CoV-2 is spreading quickly. There is a pneumonia outbreak within China due to an unknown reason. On January 7, 2020, it was discovered that the virus that caused the pneumonia outbreak in Wuhan was SARS-CoV-2, and on February 11, 2020, the WHO named the virus COVID-19 [2] [3].

Cases of COVID-19 infection in Indonesia were first announced on March 2, 2020, and as of May 5, 2020 the number in Indonesia reached 12,071 confirmed cases of COVID-19, with the number of patients who died as many as 872 people and 2197 people declared cured. This data shows that the death rate in Indonesia is 7.2%, higher than the death rate in the rest of the world [4].

The mortality rate of this disease is known to be related to the pathobiological processes that occur [5]. COVID-19 can cause major lung damage, particularly acute respiratory distress syndrome (ARDS), which can lead to death. In the ARDS process, there is an increase in oxidative stress due to the rapid and continuous production of free radicals and cytokines, this is referred to as a cytokine storm [6] [7].

Research related to cytokine storm is reviewed through bacterial and viral infection processes, both of which show an increase in oxidative stress through general and specific pathways [7]. Cytokine storm is a process that initiates an increase in oxidative stress (nitrogen and reactive oxygen groups). This process is also followed by with oxidative injury and breakdown of the capillary–alveolar barrier. Oxidative stress is a key factor in the severity of lung injuries such like ARDS and acute lung injury

(ALI). Both of these acute respiratory clinical manifestations have high rates of morbidity and mortality [7].

In addition to cytokine storm, several studies suggest that there are other processes in COVID-19 infection that can increase oxidative stress [8] [9] [10]. The activation pathway of the renin-angiotensin system (RAS) would be supposed as a double-edged sword, acting as a viral entry receptor and as a negative regulator in severe symptoms of infection and lung injury [11] [12]. SARS–CoV protein binding to the angiotensin converting enzyme-2 (ACE2) receptor is linked to ACE2 downregulation, increased angiotensin synthesis by ACE, and impaired angiotensin heptatide 1–7 vasodilatory activity. This process then leads to the excessive production of pro-atrophic, pro-fibrotic, pro-inflammatory, and pro-oxidant agents [12].

Pathological processes that occur after the entry of SARS-CoV-2 into the host body, either in the form of cytokine storm or through activation of the RAS pathway, both have the consequence of increasing pro-oxidant responses [11] [13]. Oxidative stress markers such as hsCRP have increased. Nuclear factor erythroid 2 (nfe2)–related factor 2 (nrf2) is a transcription factor that regulates the expression of the protective antioxidant response element (ARE). Activation of the Nrf2 signaling pathway is a major pathway of protection of cells and tissues from injury as a consequence of increased oxidative stress [7]. Non-specific pro-oxidants are an immune response to various pathogens, are normal biological processes. However, the problem with COVID-19 is the specific antioxidant response that is inhibited by SARS-CoV-2 [11].

Pro-oxidants appear as a sign of oxidative stress. One of the body's responses in an effort to counteract these harmful effects is the activation of antioxidant defense mechanisms [14] [11] [15]. Endogenous antioxidant defense mechanisms involve specific antioxidant enzymes and non-enzyme molecules which are normally distributed in the cytoplasm and various cell organelles [15]. In humans, several antioxidant enzymes are available. Superoxide dismutase (SOD), catalase, and certain peroxidases, when present in large amounts, can catalyze complicated cascade events to convert reactive oxygen species (ROS) into more stable molecular forms like water and oxygen. In addition to enzyme molecules, there are secondary molecules that act like enzymes, which also function in binding ROS [14]. Antioxidant systems, both enzymatic and non-enzymatic, play a critical role in maintaining redox homeostasis [15] [16] [16].

Antioxidants can be obtained from endogenous and exogenous. Exogenous antioxidants can be obtained from food intake [14] [17]. Biological activity seen in natural food sources suggests anti-inflammatory, anti-apoptotic, and anti-oxidant properties. Recently, natural sources of exogenous antioxidants have received attention [14]. One of the natural sources of exogenous antioxidants is fruit, vegetables, and grains.

For Muslims, the Quran and hadith serve as a guide to living. It includes all the explanations needed by humans, including good and bad food also the most complete health program for human beings. One of the key concepts in Quran is Quranic medicine that defines the course of human's health in three categories: medicine, health care and maintenance of health and wellbeing. "Invitation to healthy nutrition" is mentioned in Holy book repeatedly. [18]The Qur'an mentions several food ingredients that are rich in vitamins and minerals that have significant effects on human health [19]. Natural sources of exogenous antioxidants are also mentioned in the Qur'an and Hadith, some examples being ginger, pomegranate, honey, olives, grapes and onion [19].

There has been no literature review on the subject, to the author's knowledge, based on past literature reviews about antioxidant potential of food ingredients in the Al-Quran and Hadith on the inflammatory process of COVID-19. Therefore, the authors feel the need to conduct a literature review to determine the antioxidant potential of food ingredients in the Al-Quran. and Hadith on the inflammatory process of Covid-19.

2. METHOD

The design of this study was a literature review. Literature review is a method used to collect data or sources related to a particular topic obtained from various sources such as journals, books, internet, and other libraries.

Search for publication articles on Google scholar and Pubmed, using selected keywords: Stress oxidation, Antioxidant, coronavirus, COVID 19, Quran and Hadith. The articles or journals that meet the inclusion and exclusion criteria are selected for further investigation.

This literature review uses the literature published in 2010 - 2020. The criteria for the journals reviewed are research journal articles and literature reviews with the topic of antioxidant potential of several food ingredients mentioned in the Al - Quran and Hadith on Covid-19 infection.

3. RESULTS AND DISCUSSION

Based on the literature review in Abu Dhabi, there are 2 components of the immune response system involved in COVID-19 infection, pro-inflammatory (pro-oxidant) and anti-inflammatory (anti-oxidant) (Kim et al., 2020). SARS-CoV-2 infection will induce the RAS pathway and activate the pro-oxidant response, which in turn will lead to an imbalance of pro-oxidant and anti-oxidant mechanisms [11]. The increase in pro-oxidant components and inflammatory markers (cytokine storm) is the main key to the occurrence of lung, liver, kidney, and other organ failure [12]

Based on several studies in China, infection with the SARS-CoV-2 virus showed an increase in pro-oxidative indicators. The results of the blood examination of 29 patients infected with COVID-19 showed an increase in high-sensitivity C reactive protein (hs-CRP) which is an indicator of oxidative stress (L et al., 2020). HIPK1 levels increased in ALI model mice which indicated an inflammatory process and an increase in oxidative stress indicators such as H2O2, O2, and NO (Meng et al., 2019).

SARS-CoV infection is driven by both viral and host variables. The cytopathic effect of the virus and its ability to overpower the immune response determines the severity of the infection. Infection with SARS-CoV-2 causes immune system dysregulation, which leads to tissue destruction. Viral replication and tissue damage result from an insufficient immune response (Susilo et al., 2020).

The pathophysiology of SARS-CoV-2 infection is not fully comprehended. First, the virus infect individuals via ACE2 receptors. Then, the host innate immunity suppressed and the oxidative stress inducted by the virus. The virus replicate in target cells (lung, blood vessels, and other) and activate the granulocytes, macrophages, and monocytes. The body release proinflammatory cytokine (cytokine storm). Inflammation in the lungs and other afflicted tissues is the next step, activation of HAS2 and synthesis of HA in the lung, fluid accumulation in the lung then ARDS or pneumonia or multiorgan failure based on the viral infection [20].

SARS-CoV-2 pathogenesis, on the other hand, can be divided into two phases. Phase 1: An asymptomatic phase with or without detectable virus. Phase 2: Symptomatic phase with high viral load. Phase 1 is critical in terms of prevention since people in this stage are carriers and can inadvertently spread the infection. During phase 2 of the infection, in addition to maintaining the general health of affected patients, the line of treatment may be focused on adapting strategies including the use of antioxidant-rich nutritional supplements that can suppress ongoing oxidative stress, acute inflammation, and cytokine storm, suppressing tissue destruction and damage. This is where antioxidants plays its role [20].

Antioxidants are compounds that aid in the protection of organisms against the oxidation of active substances. An ideal antioxidant must have the following properties: can act on the lesion site in time with appropriate concentration; can react with active oxidation substances promptly; the reaction product has decreased toxicity than the original active oxidation species; under certain conditions, antioxidants can restore the initial state for continuous scavenging free radicals [21]. The body can prevent damaging effects on cells by employing a variety of techniques, including damage prevention and repair processes to minimize oxidative damage, physical protection against mechanical damage, and the main one is antioxidant defense mechanisms. Antioxidants can be obtained from endogenous and exogenous. Endogenous antioxidants are enzymatic or non-enzymatic components of the body's metabolism. Exogenous antioxidants are antioxidants that we obtain from our diet through the consumption of antioxidant-rich foods and supplementation [15].

Food ingredients in the Qur'an and Hadith have anti-oxidant potential with phenolic indicators [22]. Pomegranate is mentioned 3 times in the Quran, one of them is surah Ar Rahman (chapter 56) verse 68. This fruit has antioxidant potential because it is known to contain vitamin C, vitamin B5 (pantothenic acid), potassium, and polyphenols. This content affects the mechanism of increasing serum

antioxidant levels, decreasing lipid peroxidation, and decreasing LDL. Therefore the pomegranate also can serve as antiatherogenic which can prevent against cardiovascular disease**.** Pomegranate juice has also been shown to interfere with nitric oxide function, reduce inflammation and angiotensin-converting enzymes leading to a decrease in systolic hypertension (Ranjbar et al., 2013b). A glass of pomegranate juice can contain 100 mL of polyphenol antioxidant compounds. The antioxidant effect can help to maintain the artery wall, therefore it can help to prevent heart disease [23].

Honey is mentioned in verse 15 of Surah Muhammad (chapter 47). It contains minerals such as K, Fe, P, I, Mn, Al, Cu, S, Cr, Li, Ni, Zn, Ti, Na, and organic compounds, mannites, pollen, lactic acid, malic acid, tartaric acid, oxalic acid, citric acid, and essential oils. Also, honey contains six vitamins (E, K, D, C, B, A) and one of the most nutritious sugars. So far, different sugars such as 40% fructose, 30% glucose, and sugarcane have been extracted from honey. Other literature mentions that pathogens that can infect humans cannot live in honey. Honey was given for 12 weeks in a study. Evaluation of indicators of oxidative stress in the form of renal malondialdehyde levels, mRNA expression, glutathione transferase, antioxidant glutathione S-transferase (GST), and catalase (CAT), showed that after the use of honey, systolic hypertension caused by renal oxidative stress decreased [17] [16]. Other research showed that honey contain phenolic compounds such as phenolic acid and flavonoid which serve as antioxidant (Becerril-Sánchez, Quintero-Salazar, Dublán-García, & Escalona-Buendía., 2021)

Olives is mentioned in the Quran 6 times, for example in surah Al An'am (chapter 6) verse 99. Olives contain oleic acid and phenolic. These ingredients have the benefit of inhibiting the process of apoptosis, reducing ROS, and having anticancer effects. In another study, olives were shown to have the effect of reducing malondialdehyde on HepG2 cells under conditions of nitro-derivative-induced oxidative stress, and enhanced enzymatic antioxidant activity and lowered lipid peroxidation [16].

Grapes, mentioned eleven times, one of them is Surah An nahl (chapter 16) verse 11, are one of the best natural sources for glucose and fructose. These sugars account for 20% of the grape's makeup. Grapes contain tartaric acid and malic acid in addition to sugar. Minerals such as Na, K, Ca, and Fe are abundant. Grapes are a source of grape antioxidant dietary fiber, according to research (GADF), which is a natural compound that can increase glutathione production and BCl2 and BCl-Xl expression in the apoptotic pathway, thereby reducing oxidative stress in experimental mice. Grape polyphenols have antioxidant and anti-inflammatory properties, as well as influencing the apoptotic signaling cascade. Consumption of grapes, both in vitro and in vivo, has been shown to increase antioxidant activity through the induction of glutathione peroxidase, cytooxide superoxide dismutase, and catalase activity. The potential of polyphenols in grapes can reduce endothelial dysfunction in mice and be useful as antioxidants in DNA damage in mice [16].

Onions are also mentioned in the Quran, in verse 61 of Surah Al Baqarah (Chapter 2). Several different studies show that garlic has organic sulfur compounds, which give it its special taste, which has therapeutic features. The results of in vitro and in vivo studies show that garlic extract has antioxidant properties, organic sulfur compounds, and s-allyl cysteine. These studies indicate that garlic can remove active oxygen and nitrogen compounds, and can increase levels of enzymatic antioxidants and peroxidase enzymes such as xanthine oxidase, cyclooxygenase, and NADPH oxidase [16].

These are some ingredients mentioned in the Qur'an and hadiths (Habiba et al., 2019; Ranjbar et al., 2013b). Phenolic levels in fresh food preparations have been shown to be higher than phenolic levels in dry or preserved food (Aboul-Enein, 2017; karam et al., 2008). Fresh food ingredients in the Qur'an and hadith that have anti-oxidant potential in order from highest to lowest are grape, pomegranate, and black olives (Farhangi et al., 2014; Mirzaei & Ghavami zadeh, 2012). Meanwhile, dry food ingredients in the Quran and hadith that have anti-oxidant potential with the highest to lowest order are pomegranate, ginger, green olives, and grape [17].

4. CONCLUSION

Covid-19, widely known as SARS–CoV–2 (severe acute respiratory syndrome coronavirus), has a high transmission rate. Patients with Covid-19 have a wide range of clinical presentations, including asymptomatic, moderate symptoms, pneumonia, severe pneumonia, ARDS, sepsis, and septic shock. In its pathogenesis, there is an increase in oxidative stress due to the rapid and continuous production of free radicals and cytokines, known as cytokine storm. Some of the foods mentioned by the Qur'an and

Hadith, namely pomegranate, honey, olive, grape and onion have some antioxidant content. As a result of this conclusion, next research is required to establish the possible anti-oxidant content of the foods mentioned in the Qur'an and hadith on the inflammatory process of Covid-19.

REFERENCES

[1] C. A. Devaux, J.-M. Rolain, P. Colson, and D. Raoult, "New insights on the antiviral effects of chloroquine against coronavirus: what to expect for COVID-19?," *Int. J. Antimicrob. Agents*, vol. 55, no. 5, p. 105938, 2020.

[2] Y. Yang, M. S. Islam, J. Wang, Y. Li, and X. Chen, "Traditional Chinese medicine in the treatment of patients infected with 2019-new coronavirus (SARS-CoV-2): a review and perspective," *Int. J. Biol. Sci.*, vol. 16, no. 10, p. 1708, 2020.

[3] R. Zhang *et al.*, "COVID-19: Melatonin as a potential adjuvant treatment," *Life Sci.*, vol. 250, p. 117583, 2020.

[4] Y. Yuliana, "Corona virus diseases (Covid-19): Sebuah tinjauan literatur," *Wellness Heal. Mag.*, vol. 2, no. 1, pp. 187–192, 2020.

[5] R. J. Mason, "Pathogenesis of COVID-19 from a cell biology perspective," *European Respiratory Journal*, vol. 55, no. 4. Eur Respiratory Soc, 2020.

[6] F. A. Rabi, M. S. Al Zoubi, G. A. Kasasbeh, D. M. Salameh, and A. D. Al-Nasser, "SARS-CoV-2 and coronavirus disease 2019: what we know so far," *Pathogens*, vol. 9, no. 3, p. 231, 2020.

[7] R. Z. Cheng, "Can early and high intravenous dose of vitamin C prevent and treat coronavirus disease 2019 (COVID-19)?," *Med. drug Discov.*, vol. 5, p. 100028, 2020.

[8] N. U. Azmi, M. U. Puteri, and D. Lukmanto, "Cytokine storm in COVID-19: an overview, mechanism, treatment strategies, and stem cell therapy perspective," *Pharm. Sci. Res.*, vol. 7, no. 4, p. 1, 2020.

[9] J. Beltrán-Garc\'\ia *et al.*, "Oxidative stress and inflammation in COVID-19-associated sepsis: the potential role of anti-oxidant therapy in avoiding disease progression," *Antioxidants*, vol. 9, no. 10, p. 936, 2020.

[10] A. Susilo *et al.*, "Coronavirus disease 2019: Tinjauan literatur terkini," *J. penyakit dalam Indones.*, vol. 7, no. 1, pp. 45–67, 2020.

[11] Y. Buinitskaya, R. Gurinovich, C. G. Wlodaver, and S. Kastsiuchenka, "Highlights of COVID-19 pathogenesis. Insights into Oxidative Damage.," 2020.

[12] S. Kouhpayeh *et al.*, "The molecular story of COVID-19; NAD+ depletion addresses all questions in this infection," 2020.

[13] L. Meng, X. Zhao, and H. Zhang, "HIPK1 interference attenuates inflammation and oxidative stress of acute lung injury via autophagy," *Med. Sci. Monit. Int. Med. J. Exp. Clin. Res.*, vol. 25, p. 827, 2019.

[14] A. A. Adwas, A. Elsayed, A. E. Azab, and F. A. Quwaydir, "Oxidative stress and antioxidant mechanisms in human body," *J. Appl. Biotechnol. Bioeng*, vol. 6, no. 1, pp. 43–47, 2019.

[15] A. Rahal *et al.*, "Oxidative stress, prooxidants, and antioxidants: the interplay," *Biomed Res. Int.*, vol. 2014, 2014.

[16] A. Ranjbar, H. Tavilani, F. Mohsenzadeh, and others, "Quran and pharmaceutical plants: Antioxidants," *Quran Med.*, vol. 2, no. 1, 2013.

[17] S. Y. Qusti, A. N. Abo-khatwa, M. A. Bin Lahwa, and S. Qusti, "Screening of antioxidant activity and phenolic content of selected food items cited in the Holly Quran," *EJBS*, vol. 2, no. 1, pp. 40–51, 2010.

[18] N. S. Amanda and N. Aslami, "Analisis Kebijakan Perdagangan Internasional," *J. Econ. Curr. Study*, vol. 4, no. 1, pp. 14–23, 2022.

[19] E. Azarpour, M. Moraditochaee, and H. R. Bozorgi, "Nutritional and biochemical compounds of Quranic plants," in *Biological Forum*, 2014, vol. 6, no. 2, p. 242.

[20] M. Mrityunjaya, V. Pavithra, R. Neelam, P. Janhavi, P. M. Halami, and P. V Ravindra, "Immune-boosting, antioxidant and anti-inflammatory food supplements targeting pathogenesis of COVID-19," *Front. Immunol.*, p. 2337, 2020.

[21] L. Niu and D. Han, *Chemical analysis of antioxidant capacity: mechanisms and techniques*.

Walter de Gruyter GmbH \& Co KG, 2020.

[22] T. E. Shian and A. Abdullah, "Antioxidant properties of three banana cultivars (Musa acuminata ﷺBeranganﷺ,ﷺMasﷺ and ﷺRajaﷺ) extracts," *Sains Malaysiana*, vol. 41, no. 3, pp. 319–324, 2012.

[23] A. Atabik, M. R. Muqtada, Suhadi, Irnawati, and A. Rohman, "Pomegranate (Punica granatum L.) fruits in the Quranic Hermeneutics and scientific perspectives," *Food Res.*, vol. 6, no. 5, pp. 1–13, 2022, doi: 10.26656/fr.2017.6(5).504.