



The Effect of Date Content in Reducing Oxidative Stress from The Perspective of Hadith and Science

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Abstract. This study aims to determine the effect of date content in reducing oxidative stress based on the perspective of hadith and science. The type of method used is Systemic Literature Review (SLR) which is to collect, identify, map, and critically evaluate research results on certain topics. There are 3 stages of the SLR method, namely planning, conducting, and reporting. The results of this study reveal that dates contain antioxidant compounds, namely phenolics, and flavonoids, which can increase antioxidant levels in the body and reduce oxidative stress. This is in accordance with the recommendation of the Prophet Muhammad ﷺ to consume dates as medicine and antidote.

Keywords: *dates; oxidative stress; hadith; science*

INTRODUCTION

In our daily lives, we cannot be free from free radical compounds such as cigarette smoke, fried foods, motor vehicle fumes, certain medications, and air pollution. When at low or moderate concentrations, free radicals play several roles that are beneficial to the organism, but in excess, they cause a negative impact known as oxidative stress. Oxidative stress is when there is an imbalance between free radicals and antioxidants in the body. This can negatively affect several cellular structures such as membranes, lipids, proteins, lipoproteins, and deoxyribonucleic acid (DNA) (Halliwell, 2007).

This condition, if not treated immediately, will lead to both chronic and degenerative diseases. This is in line with the research of Pizzino, et al (2007) who mentioned several diseases related to oxidative stress including cancer, Cardiovascular Diseases (CVDs), neurological diseases, respiratory diseases, kidney diseases, and sexual death. One way to protect against oxidative damage is to increase antioxidant levels in the body.

Antioxidants are compounds that function to capture free radicals and overcome oxidative damage by providing electrons so as to break the chain reaction (Winarsi, 2007). There are two types of antioxidants: endogenous antioxidants that can be produced by the body and exogenous antioxidants that come from outside the body. Sources of exogenous antioxidants include spices, tea, grains, fruits, vegetables, and fresh water (Sayuti & Rina, 2015). The Quran mentions many

fruits that indicate the benefits and properties they contain, so consuming these fruits becomes a special thing (Muyassaroh, 2020). One of them is in Surah al-An'an verse 99 which mentions several plants, namely dates, grapes, olives, and pomegranates. In the hadith of the Prophet SAW also often mentions several plants that can be a medicine and antidote to poison, one of which is dates.

عَنْ سَعْدِ رَضِيَ اللَّهُ عَنْهُ يَقُولُ سَمِعْتُ رَسُولَ اللَّهِ صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ يَقُولُ مَنْ تَصَبَّحَ سَبْعَ تَمْرَاتٍ عَجْوَةً لَمْ يَضُرَّهُ ذَلِكَ الْيَوْمَ سُمٌّْ وَلَا سِحْرٌ

Sa'd radiallahu 'anhu reported: I heard Rasulullah ﷺ say: "Whoever eats seven 'ajwah dates every day in the morning, no poison or witchcraft will harm him on that day." (HR.Bukhari: 5327).

As the results of research by Saryono, et al (2017) state date seed powder can increase antioxidants and reduce oxidative stress in pre-menopausal women. In line with research by Saafi, et al (2011) dates can prevent oxidative stress due to the induction of hepatotoxicity. Based on this background, it is necessary to study the content of dates that have the potential to reduce oxidative stress in the body. So this study aims to determine the effect of date palm content in reducing oxidative stress from the perspective of Hadith and Science.

METHOD

The type of method used in this study Systemic Literature Review (SLR) is a literature review method, which is to collect, identify, map, and critically evaluate research results on certain topics (Dresch, Pacheco, Jos, & Advacement, 2015). The stages of SLR method consist of 3 stages, namely Planning, Conducting, and Reporting in Figure 1.

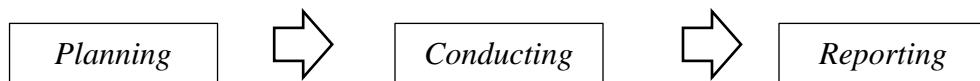


Figure 1. Stages of SLR Preparation

The first stage, Planning, begins with developing a review question (RQ) and developing a structured protocol according to the research topic. The second stage, Conducting is by identifying relevant literature, screening abstracts, and extracting data. The last stage, Reporting is summarizing the results of the study (Rukmana, Ritonga, & Latifah, 2022).

The planning stage begins with setting a research question (RQ) (Haniefardy, Fadhillah, & Rochmah, 2019). RQ is used as a reference in the next stage. The following RQ is used in the research in Table 1.

Table 1. Research Question

ID	Question
RQ1	Is oxidative stress harmful to the body?
RQ2	How do dates reduce oxidative stress from the perspective of Science and Hadith?
RQ3	Why can dates reduce oxidative stress?

The implementation stage begins with searching or searching for literature relevant to the RQ set. The search process is carried out using a search engine (Microsoft Edge) with journal websites such as Google Scholar. Then filtering and Sorting are adjusted to the criteria. Article quality assessment criteria can be seen in Table 2.

Table 2. Quality Assessment Criteria

ID	Quality Assessment Criteria	Qualified	
		Yes (Y)	No (T)
QA1	Was the article published within 2017-2022?		
QA2	Are they research articles?		
QA3	Is the article accredited?		
QA4	Is the article accessible on the journal website?		

Based on the filtering and sorting results of the articles found, 10 articles were obtained that fit the above criteria. Consisting of 7 articles on the antioxidant activity of dates against oxidative stress and 3 articles on antioxidant compounds in dates. Followed by final inclusion or determining the literature used and data extraction and synthesis of the selected articles. Then the Reporting stage or writing the results of the review has been completed in the form of writing.

RESULT

The results of the literature search conducted obtained 10 articles that fit the objectives and criteria determined consisting of 7 articles on the antioxidant activity of dates against oxidative stress and 3 articles on antioxidant compounds in dates which can be seen in Table 3.

Table 3. Results of Relevant Literature

No	Title	Author	Publisher	QA			
				QA1	QA2	QA3	QA4
1	Efek Suplementasi Sari Kurma Dan Teh Hijau Terhadap Penurunan Kadar Malondialdehyde (Mda)Lasma Pada Anak Dengan Talasemia	(Istikomah, et al., 2018)	Jurnal Kesehatan Kusuma Husada	Y	Y	Y	Y
2	Pengaruh Pemberian Sari Buah Kurma (Phoenix Dactylifera) Terhadap Kadar Malondialdehyd (MDA) Mencit Balb/C Yang Dipapar Asap Rokok	(Rochmah, 2017)	Repository Universitas Jember	Y	Y	Y	Y
3	Radioprotective effect of Date syrup on radiation- induced damage in Rats	(Abou-Zeid, et al., 2018)	Scientific Raport	Y	Y	Y	Y
4	Impact of date palm pollen (Phoenix dactylifera) treatment on paracetamol-induced hepatorenal toxicity in rats	(Al-Asmari, et al., 2020)	International Journal of Phytomedicine and Phytotherapy	Y	Y	Y	Y
5	Date palm fruit extract attenuated oxidative stress	(El arem, et al., 2017)	Mediterranean Journal of Nutrition and Metabolism	Y	Y	Y	Y

No	Title	Author	Publisher	QA			
				QA1	QA2	QA3	QA4
	induced by two haloacetic acids in Wistar rats						
6	Effect of date fruit (Phoenix dactylifera L.) Extract on tnfα levels and brain weight of alzheimer’s model rats	(Marintan, et al., 2022)	Malang Neuron Journal	Y	Y	Y	Y
7	Effect of date fruit supplemented diet on serum lipidemic and oxidative stress biomarkers in rodent experimental modelling	(Awan, et al., 2019)	International Food Research Journal	Y	Y	Y	Y
8	Functional composition and antioxidant activities of eight Moroccan date fruit varieties (Phoenix dactylifera L.)	(Bouhlali, et al., 2017)	Journal of the Saudi Society of Agricultural Sciences	Y	Y	Y	Y
9	Assessment of polyphenol composition, antioxidant and antimicrobial properties of various extracts of Date Palm Pollen (DPP) from two Tunisian cultivars	(Daoud, et al., 2019)	Arabian Journal of Chemistry	Y	Y	Y	Y
10	Antioxidant Activity and Total Phenolic Content of Date Palms Syrup (Phoenix dactylifera L)	(Elisya, et al., 2017)	SANITAS: Jurnal Teknologi dan Seni Kesehatan	Y	Y	Y	Y

Oxidative Stress

An imbalance between the number of free radicals/ROS and the antioxidants that neutralize them in the body that can cause oxidative damage is called oxidative stress. Oxidative damage can include DNA, proteins, lipids, or carbohydrates that can lead to changes in chromosomal instability, genetic mutations or modulation of cell growth, causing various diseases (Berniyanti, 2018; Adwas et al., 2019). One indicator of high oxidizer stress in the body due to exposure to free radicals is the high malondialdehyde (MDA) compound in the body (Nielsen et al., 1997). The compound is formed as a result of free radical degradation of OH unsaturated fatty acids and then becomes a highly active radical.

Uncontrolled oxidative stress can cause various diseases, both chronic and degenerative, which can accelerate the aging process of the body. Here are some diseases caused by oxidative stress in the body:

a. DNA oxidation and cancer

One of the factors that cause cancer is the mutation of genes caused by DNA oxidation that forms byproducts in the form of hydrolyzed DNA bases (Fitria, Triandini, Mangimbulude, & Karwur, 2013). DNA oxidation due to free radical compounds that cause oxidative stress plays a role in carcinogenesis and changes in cell properties to become very active so as to form

malignant tumors. DNA oxidation damage can be identified through the compound 8-deoxyguanosine which is a biomarker of DNA oxidation damage.

b. Organ aging

Exposure to free radicals can reduce mitochondrial function which causes the heart, lungs, liver, and kidneys to experience ischemia due to blood vessel disorders (Poulose & Raju, 2014). Decreased organ function will increase oxidative stress resulting in decreased organ performance or organ aging.

c. Chronic obstructive pulmonary disease (COPD)

Factors that promote inflammation in COPD include autoimmunity, foreign particles or heavy metals, and chronic bacterial infections. Exposure to free radicals can inactivate α 1-proteinase inhibitors, reducing their ability to bind substrates such as elastase from neutrophils. The inflammatory process will cause stress as it has the potential to produce excessive ROS (Domaj, Oettl, & Renner, 2014). COPD causes pathophysiological changes in the lung that result in systemic inflammation and airway inflammation such as rheumatoid arthritis, diabetes mellitus, neurodegenerative, cancer, cardiovascular disease, and asthma (Fischer, *et al.*, 2015; Phaniendra, *et al.*, 2015).

d. Cardiovascular disease

Oxidative stress can cause atherosclerosis, which is the narrowing or hardening of arterial blood vessels due to the accumulation of plaque in the walls of blood vessels. This is due to the presence of excess ROS so that the circulating LDL is oxidized to form foam cells and fat accumulation called atherosclerotic plaque. Narrowing of blood vessels results in various cardiovascular diseases such as heart attack, stroke, heart failure, coronary heart disease, arrhythmia, and others.

e. Pregnancy complications

ROS production increases during pregnancy due to an increase in basic metabolism and oxygen consumption and the use of fatty acids as an energy source (Wrobel, *et al.*, 2020). Excessive and unbalanced ROS production has adverse effects on pregnancy, pregnancy health, and fetal development. It is the cause of incorrect embryo implantation, miscarriage, premature birth, low birth weight, and malformations (Sultana, *et al.*, 2017). A natural indicator of oxidative stress and lipid peroxidation is the increased concentration of MDA in the plasma of pregnant women. Oxidative stress also causes DNA structural abnormalities that can result in miscarriage, preeclampsia, fetal growth restriction, fetal abnormalities, and birth defects.

Date Content

Date fruits contain various nutritional functional components and bioactive components. Compounds that are antioxidants are phenolics and flavonoids. The research of Bouhlali, *et al* (2017) stated that the highest total phenolic compound in dates was 537 mg/100 g, and flavonoid compounds in dates ranged from 68.88 - 208.53 mg/100 g. The most common phenolic content is cinnamic acid (coumarin and caffeic acid). The most common phenolic content is cinnamic acid (coumarin and caffeic acid) and benzoic acid (gallic and vanillic acid), while the most common flavonoid compounds are epicatechin, catechin, rutin, and quercetin (Daoud, *et al.*, 2019). The percentage of date phenolic compounds in the study of Daoud, *et al* (2019) ranged from 40-90% while flavonoid compounds amounted to 9-58%. The

antioxidant activity of phenolic and flavonoid compounds is due to the presence of hydroxyl groups that donate protons to free radicals (Elisya, Certika, & Rizkiana, 2017). The highest levels of phenolic and flavonoid compounds were found in ajwa dates, with phenolic compounds ranging from 3932.3 mg GAE/100g to 3154.7 mg GAE/100g while flavonoid compounds ranged from 1897.4 mg QEC/100g to 2956.2 mg QEC/100g (Syamsu, R. F., & Muchsin, A. H., 2022.; Khalid, S., Ahmad, A., & Kaleem, M., 2017)

Effect of Date Palm Antioxidants on Oxidative Stress

Based on research by Istikomah, et al (2018), plasma MDA levels of patients diagnosed with β -major talamesia decreased significantly with an average decrease of $0.65 \pm 0.82 \mu\text{mol/L}$ after consuming date juice with green tea. Date juice has antioxidant activity and total phenol content that can affect the inhibition of lipid peroxide and protein oxidation and hydrox radicals so that it can reduce plasma MDA levels in children with talesemia.

Research by Rochmah (2017) showed that giving date juice can reduce blood plasma MDA levels in mice exposed to cigarette smoke. The antioxidant content of date palm juice can reduce superoxide and hydroxyl free radical levels by 50% of the initial concentration. Compounds that act as antioxidants from the phenolic group, flavonoids, and vitamin C.

Abou-Zeid, et al (2018) date syrup repairs tissue damage caused by whole-body irradiation as evidenced by improved liver function and lipid profiles. Date juice increases the body's antioxidants characterized by an increase in liver glutathione concentration and catalase activity by reducing liver MDA concentration. Phenolic compounds, anthocyanins, flavonoid glycosides, and procyanidins are responsible for the antioxidant activity of date fruit extract by detoxifying free radicals thereby inhibiting lipid peroxidation. The radioprotective effect of date syrup can also reduce DNA strand breaks in the presence of antimutagenic compounds such as proanthocyanidins, anthocyanins, β -carotene, selenium, and phenolic acids.

Research by Al-Asmari, et al (2020) date pollen treatment can reduce paracetamol toxicity triggered by liver and kidney biomarkers. date pollen treatment provides a strong antioxidant effect on paracetamol-induced changes in liver and kidney malondialdehyde and non-protein sulfhydryl concentrations. This protective effect is due to bioactive constituents such as flavonoids and phenolic compounds that have antioxidant activity.

Research by El arem, et al (2017) said that in vegetables, fruits, and grains, toxic disinfectant by-products formed during water chlorination were detected, namely dichloroacetic acid (DCA) and trichloroacetic acid (TCA). So exposure to these compounds is through food consumption. The administration of date palm extract can prevent superoxide and hydroxyl radicals thus inhibiting lipid peroxidation and oxidation. This protective effect is due to the presence of antioxidant compounds such as carotenoids, phenolic acids, proanthocyanidins, catechins, flavonoids, glutathione, and tocopherols. So that it can reduce the harmful effects of exposure to DCA and TCA compounds.

Research by Awan, et al (2019) date fruit can reduce lipid peroxidation by 13.64% to 33.67% in normal and atherogenic rats. In addition, giving dates can substantially increase the endogenous enzymes superoxide dismutase (SOD) and catalase (CAT) in toxic groups by 29.05% and 27.99%,

respectively. Phytochemical compounds in dates that have antioxidant potential are also able to inhibit the production of reactive oxidant species thereby reducing intracellular oxidative stress.

Research by Marintan, et al (2022) date fruit extract containing antioxidants can function as an anti-inflammatory and reduce TNF α levels so as to prevent the development of Alzheimer's disease. Phenolic compounds and flavonoids are responsible for anti-inflammatory activity by inhibiting the production of pro-inflammatory cytokines. In addition, there are polyphenolic compounds that act as antioxidants to counteract free radicals due to beta-amyloid accumulation which results in decreased nerve density and brain weight. This results in the occurrence of Alzheimer's disease.

Based on the description of the results of the 7 studies that have been conducted above, it can be concluded that the antioxidant content contained in dates such as phenolic compounds, flavonoids, and others can reduce or counteract free radicals in the body both from within the body and from outside the body. This could be the reason why the Prophet Muhammad SAW made dates a favorite fruit.

This recommendation is found in the Hadith from Abu Hurairah narrated by Imam Ahmad number 8314 that the Prophet ﷺ said, "Al-Ajwah (the Prophet's date) is a fruit from heaven and it is a cure for poison, and Al kam`ah (a kind of plant) is from Al Manna, its water is a cure for poison." This Hadith has corroboration in the Sahih of the Prophet Muhammad ﷺ. This hadith has corroboration in Sahih Muslim 3814, Sunan Abu Daud 3378, and Musnad Ahmad 1488 (Dasril, Darmalaksana, Darmawan, & Utami, 2021). In line with another Hadith of the Prophet SAW he said "Whoever eats seven dates in the morning then that day he will not be exposed to poison or magic (HR. al-Bukhari 5130 & Muslim 5460). In another hadith from Saidina Aisha radhiyallahu anha, the Prophet said, "Verily in ajwah dates from the region of Aliyah there is medicine. Or that ajwah is anti-poison in the morning." (HR Muslim 5462). The poison in the hadith above can be interpreted as exposure to free radicals in the body which can cause various diseases and from research that has been done it can prove that dates have benefits if consumed regularly and not excessively. As for the recommendation to consume an odd amount, according to research, the effects caused when consuming dates in an odd or even amount on the body are the same for sugar levels and the body's metabolism, because the body has no way of distinguishing between an odd or even number of incoming dates. Odd numbers are just a common belief among Muslims that are in accordance with religion, culture, and advice from the Prophet Muhammad SAW. From the many hadiths that discuss dates, it can be ascertained that there are benefits to it.

CONCLUSION

Based on the above discussion, it is concluded that oxidative stress is harmful to the body because it can cause various diseases such as cancer, organ aging, cardiovascular disease, complications in pregnancy, etc. The content of dates can reduce oxidative stress due to antioxidant activity in it in accordance with the Hadith of the prophet which states that dates can ward off toxins. The content of phenolic compounds and flavonoids as antioxidants can transfer protons to free radicals so as to stop the negative effects caused by free radicals.

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