Natural Product as Chemoprevention from Maqasid Shariah Perspective: A Narrative Review

Maryam Syahidah Azalan1 and Radiah Abdul Ghani1*

1Department of Biomedical Science, Kulliyyah of Allied Health Sciences, International Islamic University Malaysia, Jalan Istana 25200 Kuantan Pahang Malaysia

ABSTRACT

Chemoprevention strategies, which aim to prevent or reduce the risk of cancer using natural products, align with the Maqasid Shariah by promoting the preservation of life and the protection of health, which are fundamental objectives of Islamic law. This review aimed to understand the role of natural products (plants source) as chemoprevention from Maqasid Shariah viewpoint. The study of natural products as chemoprevention and their conceptualization are in parallel with the Al-Qur’an and As-Sunnah were found through a thorough search of the literature. Chemoprevention is a type of intervention that, in accordance with the first principle of Maqasid Shariah which emphasis on the preservation of life (hifz al-nafs). Several types of natural products from plant resources mentioned in Al-Qur’an and Al-Hadith for instance, dates, figs, olive, fennel, acacia, cucumber, pomegranate, ginger, onion, and black cumin possessed medicinal properties for disease treatments and anti-cancer effects. While different cancer types respond differently to natural products as anticancer agents, this review has identified categories of plants with chemopreventive efficacy in parallel with the concept of Maqasid Shariah that can serve as a guide for additional in-depth research in the biomedical sciences field.

Keywords: chemoprevention, Maqasid Shariah perspective, natural products, plants.

ABSTRAK


Kata Kunci: pencengahankemo, pandangan Maqasid Shariah, produk semulajadi, tumbuhan

*Corresponding author:
Radiah Abdul Ghani
Kulliyyah of Allied Health Science, International Islamic University Malaysia
Email: radiah@iium.edu.my
1.0 INTRODUCTION

Promoting good health and well-being for all is the third indicator of Sustainable Development Goals (SDG) in Malaysia according to the mandate of the United Nations in reaching its agenda in 2030 (Transforming Our World: The 2030 Agenda for Sustainable Development, 2015). The global burden of cancer is expected to increase continuously accounting for almost 30,000 mortalities in Malaysia in 2020 (The Global Cancer Observatory: Malaysia, 2021). In 2019, cancer contributed to 12.18% of all deaths in the Ministry of Health Malaysia (MOH) hospitals compared with 9.54% in 2004 (National Strategic Plan for Cancer Control Programme: 2021-2025, 2021). The Ministry of Health Malaysia (MOH) targeting to overcome the disease by understanding the nature of cancer, its prevention, screening and early diagnosis, treatment, rehabilitation, survivorship, and possible outcomes by ensuring all patients are cared for through holistic approach. Cree (2011) summarized the seven “emblem” of cancer that includes self-sufficiency in growth signals, insensitivity to growth-inhibitory (anti-growth) signals, evasion of programmed cell death (apoptosis), limitless replicative potential, sustained angiogenesis, tissue invasion and altered immunity. Meanwhile, the occurrence of cancer disease had been insinuated through The Qur’an (63:8) translated as, “Say (to them): The death from which you flee, that will surely get to you, then you shall be made to return to the All-Knower of the Unseen and the Seen (to Allah). Then (Allah) will inform you of that which you have done,” as malignancies are the results from DNA damage that went through mutations where it eventually escaped the programmed cell death (apoptosis) through de novo synthesis and metastasise themselves (El-Khodary, 2018; Mishra et al., 2018).

Whether chemotherapy, surgery, immunotherapy, or radiotherapy are the current mainstream of cancer treatment, they have made significant strides in improving patient outcomes. However, they are not without limitations. Surgery may not be feasible for tumours in critical locations, and chemotherapy and radiation can cause significant side effects and damage to healthy tissues (Tao et al., 2023; Zaer et al., 2023; Zawrzykraj et al., 2023). Cancer cells can develop resistance to targeted therapies over time, limiting their long-term effectiveness. Furthermore, these treatments often do not address the underlying causes of cancer, such as genetic mutations, making it crucial to explore more personalized and innovative approaches to cancer management (Dasari et al., 2023; Davodabadi et al., 2023; Tang et al., 2023). Chemoprevention involves using natural or synthetic chemical agents to suppress or prevent cancer by regulating cell growth, inflammatory effects, antioxidant activity, hormonal signalling, immune response, oncogenic pathways, and DNA repair mechanisms (Penny & Wallace, 2015; Shankar et al., 2022; Tuli et al., 2022). The intervention use of bioactive phytochemicals has shown promising therapeutic benefits because of their non-toxic effects and thus there have been much chemoprevention research focused on agents found in natural products (Singh et al., 2012). Chemoprevention strategies can be divided into three categories: primary, secondary, and tertiary prevention. Primary chemoprevention aims to reduce the risk of cancer in the general population or individuals with heightened risk factors, such as a family history of cancer, advanced age, obesity, or substance use. Secondary chemoprevention, as noted by Li & Sui (2021), is geared toward patients with precancerous lesions that have a likelihood of progressing to invasive disease. In contrast, tertiary chemoprevention focuses on individuals in remission who have already undergone potentially curative treatments but remain at risk of cancer.
that is why, where he heard the Prophet Muhammad (PBUH) saying, “Truffles are a kind of manna (the plant that grow naturally without human care) and their water heals eye diseases.” (Muhammad, 1997). There were several medicinal plants that have been mentioned in the Al-Qur’an and Al-Hadith that also have been used as traditional remedies and further studied of its chemo preventive agent through in vitro and in vivo research. This article intended to review the up-to-date knowledge of chemo preventive herbs and spices mentioned in the Al-Qur’an which could be a guide for more further investigation chemoprevention agents.

2.0 METHODOLOGY

Searches were carried out using Google Scholar, IIUM discovery service-EBSCO, and hand searches (keywords: natural products, herbs, plant, chemoprevention, and anti-cancer, Maqasid Shariah, Islamic perspective or Islam or Qur’anic medicine, Al-Qur’an, Sunnah, or Al-Hadith). The references of identified academic journals, the indexes of journals from which articles were retrieved and key reviews were also searched. The publication of two language either English or Bahasa Malaysia were selected for writing up this article. Information used to write this paper was collected from the sources listed in Table 1.

<table>
<thead>
<tr>
<th>Sources of information</th>
<th>Year</th>
<th>Search keywords</th>
</tr>
</thead>
<tbody>
<tr>
<td>Google Scholar</td>
<td>2014</td>
<td>Natural products; chemoprevention;</td>
</tr>
<tr>
<td></td>
<td>2021</td>
<td>cancer; Maqasid Shariah; Al-Qur’an; Al-Hadith</td>
</tr>
<tr>
<td>IIUM discovery service</td>
<td>2010</td>
<td>Natural products; chemoprevention;</td>
</tr>
<tr>
<td>EBSCO</td>
<td>2021</td>
<td>Maqasid Shariah; Al-Qur’an or Qur’an or Koran or Qur’an or Kor'an or Al-Hadith</td>
</tr>
</tbody>
</table>

Table 1: Journals sources of information

In Islamic context, chemoprevention is equally important as curing the disease as Islam emphasise on the prevention is better than cure concept. This concept is very much in line with the first principle of Maqasid Syariah, which is to preserve life (hifz al-nafs). From The Qur’an (5:32) translated as, “That is why We ordained for the Children of Israel that whoever takes a life—unless as a punishment for murder or mischief in the land—it will be as if they killed all of humanity; and whoever saves a life, it will be as if they saved all of humanity. And indeed, again and again did Our Messengers come to them with clear directives; yet many of them continued to commit excesses.” (Abdullah, 2016). Usage of chemoprevention agents is benefitted for patients with cancer remission was not only found to improve quality of life of cancer survivors but also demonstrates cost-effectiveness to reduce the prevalence of cancer on high-risk populations (Masuda et al., 2011; Serrano et al., 2015; Svatek et al., 2008).

Natural products are considered the reservoir of bioactive materials especially phytochemicals interventions including anti-inflammatory, antioxidant, hepatoprotective effect, anti-cancer and many more. Approximately, 25% of newly approved anti-cancer therapies drugs are initiated from natural products including from microbes, plants, marine environments, slime moulds, and other living organisms after detailed extensive clinical studies conducted for its efficacies and side effects (Huang et al., 2021). The Islamic teachings mentioned various types of food that can provide general health benefits as well as disease treatments. Al-Hadith from Al-Bukhari (hadith no. 609), narrated by Said bin Zaid where he heard the Prophet Muhammad Peace be Upon Him (PBUH) saying, "Truffles are a kind of manna (the plant that grow naturally without human care) and their water heals eye diseases." (Muhammad, 1997). There were several medicinal plants that have been mentioned in the Al-Qur’an and Al-Hadith that also have been used as traditional remedies and further studied of its chemo preventive agent through in vitro and in vivo research. This article intended to review the up-to-date knowledge of chemo preventive herbs and spices mentioned in the Al-Qur’an which could be a guide for more further investigation chemoprevention agents.

2.0 METHODOLOGY

Searches were carried out using Google Scholar, IIUM discovery service-EBSCO, and hand searches (keywords: natural products, herbs, plant, chemoprevention, and anti-cancer, Maqasid Shariah, Islamic perspective or Islam or Qur’anic medicine, Al-Qur’an, Sunnah, or Al-Hadith). The references of identified academic journals, the indexes of journals from which articles were retrieved and key reviews were also searched. The publication of two language either English or Bahasa Malaysia were selected for writing up this article. Information used to write this paper was collected from the sources listed in Table 1.

<table>
<thead>
<tr>
<th>Sources of information</th>
<th>Year</th>
<th>Search keywords</th>
</tr>
</thead>
<tbody>
<tr>
<td>Google Scholar</td>
<td>2014</td>
<td>Natural products; chemoprevention;</td>
</tr>
<tr>
<td></td>
<td>2021</td>
<td>cancer; Maqasid Shariah; Al-Qur’an; Al-Hadith</td>
</tr>
<tr>
<td>IIUM discovery service</td>
<td>2010</td>
<td>Natural products; chemoprevention;</td>
</tr>
<tr>
<td>EBSCO</td>
<td>2021</td>
<td>Maqasid Shariah; Al-Qur’an or Qur’an or Koran or Qur’an or Kor'an or Al-Hadith</td>
</tr>
</tbody>
</table>
3.0 FINDINGS
(A) Prevention of Cancer from Maqasid Shariah viewpoints

Cancer remains a significant global public health burden, accounting for the top cause of morbidity, second only to cardiovascular diseases (WHO Report on Cancer: Setting Priorities, Investing Wisely and Providing Care for All, 2020). Cancer treatments involving the administration of anti-cancer drugs have become a vast dispute as 90% of chemotherapy failures resulted from drug resistance during metastasis and invasion of cancers (Mansoori et al., 2017). Increasing prevalence of cancer recurrence or death could also occur after five years of chemotherapy as drug resistance impedes the progress of cancer patient’s prognosis. As a result, different applications of chemoprevention are suggested to be executed to intercept the development or post-therapeutic recurrence of cancer. This intervention of ameliorate (reduce harm) and essence of healing (promote well-being) literally harmonizes with the Islamic perspective in Maqasid Shariah where the concept of human needs already been put forward through the proof reflected in Usul fiqh that comes from four sources: Holy Qur’an, As-Sunnah, Ijma’ and Qiyas. It was also further discussed in Maqasid Shariah that realize the way of life of human being which are to protect faith (Ad-Din), preserve life (Al-Nafs), protect human intellect (Al-‘Aql), lineage (An-Nasl), and property (Al-Mal) (Hashi, 2019). The principle of Maqasid Shariah in safeguarding the health from carcinogenesis improving the quality of life viewed to be in complementary with the third goal of Sustainable Development Goals (SDG) as the aim is to develop the strategy of holistic betterment of human life. Besides, chemoprevention strategy also cost-effective intervention which contributes to reduce diagnosis and treatment cost of malignancy (Gilmartin et al., 2021; Kondo et al., 2009).

A verse from The Qur’an (13:4) translated as, “And in the earth are tracts (diverse though) neighbouring, and gardens of vines and fields sown with corn, and palm trees – growing out of single roots or otherwise: watered with the same water, yet some of them We make more excellent than others to eat. Behold, verily in these things there are signs for those who understand!” This verse had accentuated the sign of greatness and power of Allah that variety of plants have their own uniqueness where they contain different nutrition and bioactive compounds that will impart various benefits to human health. Natural product such as herbs and spices have been traditionally used for various treatments as deciphered from ancient Malay Medical Manuscript, Ayurvedic Medicine from India, traditional Chinese medicine, Kampo or Unani. Though the ancient medical knowledge is rooted by the sense of logic and science, the revelations of Holy Qur’an between 610 and 632 CE through The Prophet Muhammad PBUH have also explained that the readily available sources of nutrition from natural products can be used to maintain healthy life as well as to cure diseases. Further discovery of medicinal benefits of natural products have been conducted in various biomedical sciences disciplines in vitro and in vivo.

Provisionally, the role of natural products to induce cytotoxicity, angiogenesis or apoptosis in cancer cell lines were widely studied as chemoprevention that not directly targeting cancer patients but as preliminary action to prevent the diseases. Moreover, natural products have been scrutinized for its anticancer properties as it has great resources of bioactive compounds with therapeutic
potential since half century ago (Khalid et al., 2016). The utmost benefits of natural products as anti-neoplasms are because of low toxicity, minimum side-effects, and off-target effects. Hence, natural products had its prominence as chemo-protective effect in terms of reducing chemotherapy-associated side effects and enhancing the therapeutic efficacy (Esposito et al., 2019). The Prophet Muhammad PBUH had portrayed the Sunnah that the disease come from compulsive overeating and concomitantly mentioned that the cure can be achieve through healthy diet. This were proved from the Al-Qur’a’n (20:81) and Al-Hadith (hadith no. 592) narrated by Abu Huraira, I heard Allah’s Apostle saying, “There is healing in black cumin for all diseases except death.”

(B) Classification of Natural Products for Human Health

Natural products, often derived from plants, animals, marine organism, or microorganisms, encompass a vast array of chemical compounds with diverse structures and biological activities. The classification of natural products is typically based on their chemical composition and sources (Figure 1). These compounds can be broadly categorized into primary metabolites, which are essential for the organism’s basic functions, and secondary metabolites, which serve various ecological roles (Barciela et al., 2023; Rai et al., 2023; Yang et al., 2023). Primary metabolites include compounds such as amino acids, nucleotides, and sugars, while secondary metabolites encompass alkaloids, terpenoids, polyketides, and phenolic compounds. These secondary metabolites play crucial roles in defence mechanisms, signalling, and adaptation, making them invaluable resources in drug discovery, agriculture, and various industries. Further subdivisions within natural product classification may focus on the source organism, specific chemical structure, or bioactivity (Ahearne et al., 2021; Ebrahimi & Lante, 2021; Manoharan et al., 2019). These classifications help researchers explore the vast natural product landscape, identify potential therapeutic agents, and gain insights into the ecological and evolutionary significance of these compounds. With advances in analytical techniques and molecular biology, the study of natural products continues to provide valuable insights into the intricacies of life, offering opportunities to improve human health and develop sustainable solutions for various challenges.

In recent years, there has been a growing body of literature focusing on the use of natural compounds for cancer prevention, where natural products have gained considerable attention as potential novel therapeutic strategies in this field. These compounds, originating from various natural sources, can be categorized based on their ability to prevent cancer, their chemical structures, and their mechanisms of action. For instance, some researchers have discovered that several phytochemicals, which are compounds derived from plants like onions, tea leaves, ginger, citrus fruits, and garlic, possess potent anticancer properties that can be further subdivided into various groups, including flavonoids, resveratrol, polyphenols, ellagic acid, carotenoids, and alkaloids (Chen et al., 2023; Sehrawat et al., 2022; Shin et al., 2022). Additionally, terpenoids, another group of compounds found in plants and microorganisms, also showed convincing evidence in cancer prevention. Examples of terpenoids with potential cancer-preventive properties include curcumin from turmeric, known for its anti-inflammatory and antioxidant effects, and taxol from the Pacific yew tree, used in chemotherapy for various cancers such as leukaemia, breast, ovarian, and cervical cancers (Kalantzis et al., 2018; Sun et al., 2016). Conversely, polyamines, small positively charged molecules present in various foods like corn and soybeans,
play a role in cell growth and differentiation and may influence the development of certain cancers, including prostate cancer (Radiah et al., 2015; Wang et al., 2022). Hence, previous research has recommended avoiding foods with high polyamine content as they could potentially increase the metastasis rate of cancer cells and undermine the effectiveness of cancer patients’ chemotherapy. These natural products appear to have diverse roles in cancer prevention strategies, with some originating from plant sources aiding in cancer prevention, while others may hinder the efficiency of cancer treatment.

Natural products used in cancer prevention are derived from a wide range of sources, each offering unique bioactive compounds that have the potential to reduce the risk of cancer. Whether obtained from plants, fungi, or marine life, these compounds can be integrated into dietary and lifestyle strategies for cancer prevention, serving as sources of inspiration for the development of new cancer preventive agents in the field of biomedical sciences and cancer research (Dong et al., 2022; Guo et al., 2022; Song et al., 2021). Ibn Al-Qayyim, a medieval Islamic scholar, wrote extensively on various aspects of medicine, including traditional and prophetic medicine. In his writings, he discussed the treatment of ailments, including tumours, based on the guidance from the Al-Qur’an and As-Sunnah (the teachings and practices of the Prophet Muhammad). There are seven approaches to the treatment of cancers from the perspective of Prophetic Medicine and Islamic tradition (Ibn Al-Qayyim, 2014).

1. **Tawakkul (Reliance on God):** Prophetic Medicine emphasizes the importance of trust in Allah (God) in all aspects of healing. Patients are encouraged to have faith and trust that Allah’s will plays a significant role in their recovery (Hamdy, 2009; Rayan, 2018).

2. **Diet and Nutrition:** Ibn al-Qayyim’s writings emphasize the importance of a balanced and wholesome diet. Consuming natural and pure foods, free from harmful additives, is encouraged. Fruits, vegetables, and natural remedies are often recommended to support overall health (Muhammad Yusoff & Ab Razak, 2020).

3. **Herbal Remedies:** Prophetic Medicine includes the use of various herbs and natural substances for healing. Ibn al-Qayyim highlighted the benefits of certain herbs and plants, such as black seed (*Nigella sativa*), as potential remedies for various ailments, including tumors (Al-Naggar et al., 2012; Zaid et al., 2010).

4. **Hijama (Cupping Therapy):** Cupping therapy, a traditional practice endorsed by the Prophet Muhammad, involves creating suction on specific points of the body using cups. It is believed to promote circulation and relieve various health issues, including pain and inflammation (Amiruddin et al., 2022; Jahroni, 2020).

5. **Ruqyah (Spiritual Healing):** Islamic tradition includes the practice of Ruqyah, which involves reciting specific verses from the Al-Qur’an and supplications to seek protection and healing. This spiritual aspect of healing is believed to have a positive impact on one’s health and well-being (Ahmad et al., 2016; Mohd Yusoff & Haron, 2010).

6. **Prayer and Supplication:** Regular prayer (Salat) and making supplications (Du’as) are integral parts of an Islamic lifestyle. These acts of devotion are seen to seek God’s assistance in dealing with illnesses, including tumours (Maarof et al., 2023).
7. **Seeking Professional Medical Advice**: Prophetic Medicine does not discourage seeking the expertise of qualified medical professionals. Islamic tradition encourages the use of medical knowledge and treatments alongside faith-based remedies (Latif & Ab. Rahman, 2020; Orayj, 2022).

It’s important to note that the approach to treating tumours in Prophetic Medicine is holistic, combining both physical and spiritual elements. Patients are advised to seek a balanced and well-rounded approach to healing that aligns with Islamic principles and guidance. Additionally, individual cases may vary, and consultation with qualified healthcare professionals is recommended when dealing with serious medical conditions like tumours.

![Figure 1: Classification of Natural Products](image)

**Figure 1**: Classification of Natural Products

(C) **Natural products from plant sources listed in The Qur’an and Al-Hadith with its Chemoprevention Effects**

Chemoprevention are permissible human conducts by *Maqasid Shariah* as its set to facilitate positive and good outcomes in life while it has prohibited conducts that cause harm in all aspects of life. Faradisa & Fakhruddin (2021) summarizes medicinal fruits and vegetables according to the *Al-Qur’an* in a scientific perspective where its bioactive compounds showed several medical benefits including antioxidant, anti-inflammatory, anti-microbial and anti-cancer effects. The author diligently discusses lists of fruits mentioned in the *Al-Qur’an* (cucumber, fig, olive, pomegranate, grape, ginger, dates, and banana) with its phytochemical nutrient contents and its effects on health. The review paper also reported that olive (O. europaea), Ginger (Z. officinale), banana (P. granatum) and fig (F. carica L.) was found to have anti-carcinogenic, anti-proliferative and anti-angiogenesis activity on cancer cell lines. The claimed was also in agreement by studies that elaborate the effects of fig, ginger, and olive on different types of cancer cell lines including Colon (HT29, SW260), breast (MCF-7), liver (HepG2 and Huh7), lung (H1299), glioma, pancreatic, prostate, and cervical (HeLa) cancer cells (Castejón et al., 2020; Ridzuan et al., 2019; Shang et al., 2019).

Meanwhile, Wani *et al.* (2011) addresses 10 herbs mentioned in the *Al-Qur’an* and *Al-Hadith* with its medical benefits which are onion, beet root, sweet flag, chicory, garlic, fenugreek, squash, costus, wild thyme, and barley. Although the authors did not specify the anti-cancer properties of those herbs, the uses of herbs as traditional remedies were properly conveyed. However, the chemopreventive effects of onion (*A. cepa L.*) with its important bioactive compounds on breast cancer (MDA-MB-231), glioblastoma (A1235), colorectal cancer (HT-29, HCT116), hepatocellular carcinoma (HepG2), cervical cancer (HeLa) cell lines had been reported in several studies (Fredotovíc et al., 2017; Kumar et al., 2022; Qamariah, 2019). *In vitro* studies also found that fenugreek, wild thyme, and beet root showed cytotoxicity against several
cancer including liver (HepG2), breast (MCF-7), and cervical (WISH) cancer cell lines (Al-Oqail et al., 2013; Berdowska et al., 2013; Das et al., 2016). The detailed bioactive compounds and chemopreventive effects on cancer cell lines were tabulated in Table 2.
Table 2: Natural products mentioned in *Al-Qur’an* and *Al-Hadith* with its phytochemical profiles and chemopreventive effects on cancer cell lines.

<table>
<thead>
<tr>
<th>Natural products (Scientific name)</th>
<th>Reference from <em>Al-Qur’an</em> or <em>Al-Hadith</em></th>
<th>Phytochemical profiles/ Bioactive compounds</th>
<th>Chemopreventive effects on cancer cell lines</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ginger (<em>Z. officinale</em>)</td>
<td><em>The Qur’an</em> (76:17)</td>
<td>Gingerols, shogaols, paradols, quercetin, zingerone, gingerenone-A, 6-dehydrogingerdione, terpene</td>
<td>Breast, cervical, colorectal, liver (HepG2), pancreatic, and prostate cancer</td>
<td>Mao <em>et al.</em> (2019); Ridzuan <em>et al.</em> (2019)</td>
</tr>
<tr>
<td>Black cumin (<em>N. sativa</em>)</td>
<td><em>Al-Bukhari</em> (hadith no. 5687)</td>
<td>Thymoquinone, thymohydroquinone, dithymoquinone (DIM), 4-terpineol, carvacrol, carvone, t-anethol, α-pinene, thymol, α-hederin, limonene, nigellicine, nigellidine, nigellimicine, nigellimidine-N-oxide, oleic acid, linolenic acid, linoleic acid, eicodadienoic acid, arachidic acid, palmitoleic acid, palmitic acid, stearic acid and myristic acid</td>
<td>Lung (A549), liver (HepG2), breast (MCF-7), colon, renal, cervical cancer (HeLa and SiHa), pancreatic ductal adenocarcinoma, leukimia (HL-60)</td>
<td>Mohamad <em>et al.</em> (2018); Shafiq <em>et al.</em> (2014)</td>
</tr>
<tr>
<td>Garlic (<em>Allium sativum</em>)</td>
<td><em>The Qur’an</em> (2: 61)</td>
<td>Allicin, alliin, diallyl sulfide, diallyl disulfide, diallyl trisulfide, ajoene, S-allyl-cysteine, β-resorcylic acid, pyrogallol, gallic acid, rutin, protocatechuic acid, and quercetin</td>
<td>Liver (HepG2), colon (Caco2), prostate (PC-3), and breast (MCF-7 and MDA-MB-231), ovarian (A2780) cancer cells</td>
<td>Shang <em>et al.</em> (2019); Wani <em>et al.</em> (2011)</td>
</tr>
<tr>
<td>Onion (<em>Allium cepa L.</em>)</td>
<td><em>The Qur’an</em> (2: 61)</td>
<td>Quercetin, myricetin,isorhamnetin, kaempferol, vanillic acid, catechin, epicatechin, p-coumaric acid, ferulic acid, protocatechuic acid, p-hydroxybenzoic acid, cyanidin, morin,</td>
<td>Breast cancer (MDA-MB-231), glioblastoma (A1235), colorectal cancer (HT-29, HCT116), liver (HepG2), cervical cancer (HeLa)</td>
<td>Fredotovíc <em>et al.</em> (2017); Kumar <em>et al.</em> (2022); Qamariah (2019); Wani <em>et al.</em> (2011)</td>
</tr>
<tr>
<td>Natural products (Scientific name)</td>
<td>Reference from Al-Qur’an or Al-Hadith</td>
<td>Phytochemical profiles/ Bioactive compounds</td>
<td>Chemopreventive effects on cancer cell lines</td>
<td>Reference</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>---------------------------------------</td>
<td>---------------------------------------------</td>
<td>---------------------------------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>Cucumber (<em>C. sativus</em>)</td>
<td><em>The Qur’an</em> (2: 61)</td>
<td>Tannins, polyphenols, phenols, cyanogenic glycosides, anthocyanins, glycosides, saponins, alkaloid, flavonoids, terpenoids, resins, chlorophyll, steroids, reducing sugars and uronic acid.</td>
<td>Cervical (HeLa) and breast (MCF-7) cancer cells.</td>
<td>(Khafagi <em>et al</em>., 2006; Tuama &amp; Mohammed, 2019; Uthpala <em>et al</em>., 2020)</td>
</tr>
<tr>
<td>Fennel (<em>F. vulgare</em>)</td>
<td><em>The Qur’an</em> (2: 61)</td>
<td>Acetic acid, anisaldehyde, ascorbic acid, camphor, carvone, chlorogenic acid, D-limonene, eicosamethyl-cyclodecasiloxane, estragole, eugenol, fenchone, linoleic acid, margaric acid, myrecene, myristic acid, oleic acid, palmitic acid, phenethylamine, quercetin, stearic acid, α-pine, α-terpineol, γ-asarone, and γ-terpinene</td>
<td>Liver (HepG2), breast (MCF-7, MDA-MB-362, MDA-MB-231), colon (HT29), colorectal, cervical, pancreatic (SNU-213), oral (Ca9-22), mammary, prostate, gastric (HGC-27), stomach, and lung (A549) cancer cells</td>
<td>Kaur <em>et al</em>. (2022); Qamariah (2019)</td>
</tr>
<tr>
<td>Olive (<em>O. europaea</em>)</td>
<td><em>The Qur’an</em> (95: 1-3)</td>
<td>Oleuropein (OL), dimethyl-OL, and ligstroside secoiridoids, OL-aglycone, oleocanthal, oleacein, elenolate, oleoside-11-methyl ester, elenoic acid, hydroxytyrosol, and tyrosol</td>
<td>Colon (HT29, SW260), breast (MCF-7), liver (HepG2 and Huh7), lung (H1299), glioma, and cervical (HeLa) cancer cells</td>
<td>Castejón <em>et al</em>. (2020); Faradisa &amp; Fakhruddin (2021)</td>
</tr>
<tr>
<td>Natural products (Scientific name)</td>
<td>Reference from Al-Qur’an or Al-Hadith</td>
<td>Phytochemical profiles/ Bioactive compounds</td>
<td>Chemopreventive effects on cancer cell lines</td>
<td>Reference</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>--------------------------------------</td>
<td>-----------------------------------------------</td>
<td>---------------------------------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>Acacia (Acacia catechu Willd.)</td>
<td>The Qur’an (56: 27 – 35)</td>
<td>Catechins, epicatechins, ellagic acid, rutin, quercetin, gallic acid, chlorogenic acid umbelliferone, kaempferol, coumaric acid, caffeic acid, camphor, phytol, vitamin E acetate, fisetinidol, hexadecane, caryatin, and baicalein</td>
<td>Human oral squamous cell carcinoma (SCC-25), breast (MCF-7), colorectal (HT-29), human lung (A549), colon (HCT-16, Colo-205), leukemia (THP-1, HL-60 and K562), prostate (PC-3), and liver (HepG2) cancer cells</td>
<td>Adhikari <em>et al.</em> (2021); Chiaino <em>et al.</em> (2020); Qamariah (2019)</td>
</tr>
<tr>
<td>Pomegranate (Punica granatum Linn.)</td>
<td>The Qur’an (55:68)</td>
<td>Alkaloids, flavonoids, tannins, phenols, phytosterol, cardiac glycosides, saponins, and phlobatannins, anthocyanins</td>
<td>Human colon cancer (Hct116), breast cancer (MCF-7, Hs578T), prostate cancer, cervical cancer (HeLa), liver (HepG2)</td>
<td>Eroglu Ozkan <em>et al.</em>, (2021); González <em>et al.</em>, (2023); Habchi <em>et al.</em>, (2023); Kiraz <em>et al.</em>, (2016)</td>
</tr>
</tbody>
</table>
Furthermore, other paper highlights the plants and herbs according to Al-\textit{Qur’an} and \textit{Al-Hadith} by classifying the lists according to the food groups which are bread and grains; fruits and vegetables; meat and poultry; beans; and milk and dairy products (Aslam, 2021). The paper also specifically focuses on functional foods with evidence from Islamic sources by relating them with crucial phytochemical properties and its health benefits supported by medical research. The majority of plants and herbs mentioned contains metabolites that have antioxidant, anti-carcinogenic, anti-proliferative properties and free-radical scavenging activities on cancer cells while protecting the functions and genetic materials of normal cells. Hossain \textit{et al.} (2016) also had discussed the lists of natural products from the \textit{Al-Qur’an} and revealed that there are 27 medicinal plants species where they classified them into six categories: tree, forage plant, fruits, aromatic plants, crops and vegetables. The chemopreventive properties from certain plants were also specified which are sweet basil (\textit{O. basilicum} L.) and Indian jujube (\textit{Z. mauritiana} L.). Although the papers did not critically discuss the natural products as chemoprevention from the \textit{Al-Qur’an} and \textit{Al-Hadith}, which are the main interest of this review, we agree that the other healing benefits of natural products should not be abandoned, as they are typically consumed for various purposes.

In the review paper by Zaid \textit{et al.} (2010), the Arabic Muslim scholars agreed that the first cancer treatment strategy is to prevent further growth of malignant cells and the disease must be identified as early as possible. However, cancer resistance had also been admitted being the major challenges in treating cancer as Ibn Sina stated that strong medication will trigger the cancer evil. He also interpreted the Prophet Muhammad PBUH words by Sahih Al-Bukhari, (\textit{Al-Hadith no. 592}) by describing four approaches to treat cancer which are tumour cell arrest, preventing the progression, improving the diet and directly targeting involved organ with known effective medicine (Zarshenas & Bardbori, 2017). The concept of Greco-Arab and Islamic herbal medicine, as expounded by renowned Muslim physicians such as Al-Razi, Ibn Sina, Al-Zahrawi, and Ibn Al-Nafis, also outlined cancer treatment and prevention using natural products, drawing from the \textit{Al-Qur’an} and \textit{Al-Hadith} as sources. Since dietary intake plays a crucial role in bodily health, Arab-Islamic treatments of cancers describe six characteristics of natural products that could potentially target cells when using herbal cancer remedies. These include showing cell cycle arrest, antioxidant properties, apoptosis induction, angiogenesis inhibition, anti-inflammatory effects, and the modulation of signal transduction pathways. Moreover, Zaid \textit{et al.} (2010) also provides chemoprevention properties of several natural products including garlic, onion, black seed, pomegranate, olive, and bread wheat.

On the other hand, the Prophetic Medicine by Ibn Al-Qayyim, which is a branch of Islamic traditional medicine based on the teachings of the Qur’an and Sunnah listed several types of natural products (Ibn Qayyim, 2014).

1. \textbf{Honey: The Qur’an} (16:68) translated as, "And your Lord inspired to the bee, Take for yourself among the mountains, houses, and among the trees and [in] that which they construct." Moreover, Jabir bin Abdullah narrated that, the Prophet PBUH saying, "If there is any healing in your medicines, then it is in cupping, a gulp of honey or branding with fire (cauterization) that suits the ailment, but I don't like to be (cauterized) branded with fire," (Al-Bukhari, no. 587). Several studies investigated that honey could disrupt carcinogenesis process in endometrial, skin, cervical, kidney, prostate, bladder, oral and bone cancer cells (Bouali \textit{et al.},
2. **Black cumin (Nigella Sativa):** The Prophet PBUH said, "In the black seed, there is healing for every disease except death," (Al-Bukhari, no. 5687).

3. **Olive Oil:** "Allah is the light of the heavens and the earth. The example of His light is like a niche within which is a lamp, the lamp is within glass, the glass as if it were a pearly [white] star, lit from [the oil of] a blessed olive tree, neither of the east nor of the west, whose oil would almost glow even if untouched by fire," (The Qur’an, 24:35).

4. **Dates:** The Prophet PBUH said, "If somebody takes some Ajwa dates every morning, he will not be affected by poison or magic on that day until night," (Al-Bukhari, no. 663). Previous studies found that Ajwa dates induced apoptosis in several cancer cell lines, including hepatocellular carcinoma, prostate, and breast cancer (AlMalki, 2021; F. Khan et al., 2016; M. A. Khan et al., 2021; Mirza et al., 2018).

5. **Zamzam Water:** The Prophet PBUH said, "The water of Zamzam is good for whatever it is drunk for," (Ibn Majah: 3062). Several studies found that Zamzam water showed cytotoxicity and anticancer effects against human colon, breast, lung, and uterine cancer cell lines (Abd-Rabou et al., 2018; Al Zahradi et al., 2019; Omar et al., 2017).

6. **Camel's Milk:** The Prophet PBUH recommended the consumption of camel's milk for its health benefits. As narrated by Anas, "Some people were sick and they said, 'O Allah's Apostle! Give us shelter and food. So, when they became healthy, they said, 'The weather of Medina is not suitable for us.' So, he sent them to Al-Harra with some she-camels of his and said, 'Drink of their milk.' But when they became healthy, they killed the shepherd of the Prophet and drove away his camels. The Prophet sent some people in their pursuit. Then he got their hands and feet cut and their eyes were branded with heated pieces of iron. I saw one of them licking the earth with his tongue till he died," (Al-Bukhari, hadith no. 589). Recent in vitro evidence suggests that camel’s milk functions as a potent antifungal, antibacterial, and exhibits anticancer effects on colorectal, fibrosarcoma, and breast cancer (Krishnankutty et al., 2018; Murali et al., 2021; Shaban et al., 2023).

### 4.0 CONCLUSION

The principles of Maqasid Al-Shariah in healthcare practices have been implemented through early Muslim physicians where the fundamental of protecting life of human as the essential aim by preventing harms and maintaining good health. Chemoprevention is the intervention that fit the principles of Maqasid Shariah where various natural products can be utilized as the blocking or suppressing agents in three pathways during initiation, promotion, and progression of cancer. The Al-Qur’an and Al-Hadith had also provided several medicinal plants that have been studied for its variety of medical benefits including as chemoprevention. Generally, most of the plants, fruits or herbs mentioned in the Islamic sources had gone through extensive cancer research in the biomedical sciences area where the findings provide valuable information in better management of diet among cancer patients as well as individuals with susceptible risks of developing cancers.

### ACKNOWLEDGMENT

The authors are grateful for the publication's support from the Fundamental Research Grant Scheme of the Ministry of Higher Education (MOHE) of Malaysia (FRGS/1/2021/SKK0/UIAM/02/8).
REFERENCES


https://doi.org/10.1002/tqem.22077

https://doi.org/10.3389/fonc.2022.866

https://doi.org/10.3390/pr11041111

http://www.jstor.org/stable/25488262


https://www.researchgate.net/publication/309319916

https://doi.org/10.1007/s13659-020-00293-7


https://doi.org/10.21274/epis.2020.15.02.315-343

https://doi.org/10.2174/1389201019666181112103637

https://doi.org/10.3390/molecules27134077


Murali, C., Mudgil, P., Gan, C.-Y., Tarazi, H., El-Awady, R., Abdalla, Y., Amin,


Serrano, D., Lazzeroni, M., & Bonanni, B. (2015). Cancer chemoprevention: Much has been done, but there is still


**Article History**

Received: 31/08/2023
Accepted: 07/11/2023