
Greco-Arab and Islamic diet therapy: Tradition, research and practice

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Abstract: Diet therapy is one of the oldest methods of prevention and healing of all types of known diseases and built a substantial part of Greco-Arab medical system in maintaining healthy body, soul, and spirit. According to a statement by Al-Razi (Rhazes, 864-930) "*As long as you can heal with food, do not heal with medication*". Therefore, in the Greco-Arab medical system, the patients are treated through a scheme starting with diet and physiotherapy; if these failed, simple drugs were used, and then compound drugs, and at last, surgery would be used.

The past twenty years have witnessed significant progress in studying the cellular and molecular interactions between intake of healthy foods (e.g., edible wild plants, nuts, seeds, fruits, vegetables as well as olive oil) and reduced rate of cardiovascular diseases, diabetes, common cancers, degenerative diseases and ageing. This is attributed to the fact that these foods may provide an optimal mix of dietary fiber, natural antioxidants, vitamins, essential fatty acids and minerals. Various active compounds in the food can control the physiological functions of the body, and supporting immune responses. Immune functions are indispensable for defending the body against attack by pathogens or cancer cells, and thus play a pivotal role in the maintenance of health. Hence, the ingestion of foods with immune-modulating activities is considered as an efficient way to prevent immune functions from declining and reduce the risk of infection or cancer. This review focuses on food therapy in the Greco-Arab and Islamic medicine and its role in preventing and curing diseases on the daily basis.

Keywords: Diet therapy, Greco-Arab and Islamic medicine, Black seeds, Olive oil, Honey

Introduction

Paralleling and even exceeding the growth in utilization of Greco-Arab and Islamic medical system-based herbal/diet therapies, the past three decades have witnessed significant progress in studying the risks and benefits of diet and medicinal herbs at cellular and molecular levels. Diet and herbal-based medicines represent the first choice for prevention/treatment of many health problems in the Mediterranean region. Currently, the

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surge in information available to the public in the media, health food stores and the Internet is daily increased. For example, an internet search using the term "Arab herbal medicine" reveals more than 400,000 citations in Google and about 15,000 scientific citations in Scholar Google [Saad and Said 2011, Saad and Said 2010, Said *et al.*, 2011a, Saad *et al.*, 2013, Zaid and Saad 2013].

Historical Background: In Islamic tradition, the first Muslim physician is believed to have been the Prophet Mohammad (PBUH), as a significant number of Hadiths (Statements by the Prophet) concerning medicine are attributed to him. He stated that, "*There is no disease that Allah has created, except that He also has created its treatment*", "*Make use of medical treatment, for Allah has not made a disease without appointing a remedy for it, with the exception of one disease, namely old age*, and "*For every disease, Allah has given a cure*". These statements encouraged early Muslims to engage in medical research and seek out a cure for every disease known to them and hence, initiated the foundations of Arab-Islamic medicine. Early Muslims utilized many plants and animal products mentioned in the Holy Qur'an and in the *Hadith* of the Prophet for health promotion, e.g. dates, black seeds, olive leaf and olive oil, honey, and camel milk. Later on, these products formed the basis for the Prophet's medicine (Al-Tibb al-Nabawi), which includes medical treatments, prescriptions of diseases, prevention, health promotion, and spiritual aspects that were recommended by Prophet (PBUH) to his companions (Figure 1) [Saad and Said 2011a, Saad and Said 2010, Said *et al.*, 2011, Saad *et al.*, 2013, Zaid and Saad 2013, Saad 2015, Saad, 2014, Zaid *et al.*, 2010, Said *et al.*, 2002, Ibn Albitar 1974, Ibn Rasool Alturkmani 1930].

Diet is a matter of faith in Arab-Islamic culture, and plays an important role in maintaining a healthy body, soul, and spirit. The prophet Mohammad (PBUH) stated, "*The stomach is the central basin of the body, and the veins are connected to it. When the stomach is healthy, it passes on its condition to veins, and in turn the veins will circulate the same and when the stomach is putrescence, the veins will absorb such putrescence and issue the same*". Indeed, the Prophet used to prefer food for ailments even to herbs or medicines. He used everything from barley soup to honey to camel's milk to heal his followers and advised them to eat certain foods to prevent or cure other diseases. For example, Figs are a top source of fiber, as well as potassium and vitamin B6. Fiber results in bulkier stools, which lessen the incidence of constipation, hemorrhoids and colon cancer. Fiber also lowers cholesterol and the risk of heart disease. Dates are mentioned in 20 places in the Quran.



Figure 1: Diet Therapies used in the Prophetic medicine

The Prophet is reported to have said: *"if anyone of you is fasting, let him break his fast with dates. In case he does not have them, then with water. Verily water is a purifier"*. Melon is one of the best recommendations for health the Prophet (PBUH) has given us. Melon is one of the few fruits and vegetables rich in vitamin C, beta-carotene, and potassium. Concerning

olive oil, the Prophet (PBUH) said *"Eat olive oil and massage it over your bodies since it is a holy tree"*. Black seeds were regarded as a medicine for that cures all types of diseases. The Prophet once stated, *"The black seed can heal every disease, except death"*.

Later on, the school of Greco-Arab and Islamic medicine adapted Hippocrates ideas that the mind and the body are in continues interaction, they influence and control and regulate each other. Hence, the body should be treated as a whole and not just as a series of separated organs and tissues. Al-Razi (Rhazes, 864-930) supported this concept by this recommendation. He said: *"When the disease is stronger than the natural resistance of the patient, medicine is of no use. When the patient's resistance is stronger than the disease, the physician is of no use. When the disease and the patient's resistance are equally balanced, the physician is needed to help tilt the balance in the patients favour."* In another statement, he said, *"The physician, even though he has his doubts, must always make the patient believe that he will recover, for state of the body is linked to the state of the mind."* Later on, Ibn Sina (Avicenna, 980-1037) stated that *"We have to understand that the best and most effective remedy for the treatment of patients should be through the improvement of the power of the human body in order to increase its immune system, which is based on the beauty of the surroundings and letting him listen to the best music and allowing his best friends to be with him"*. It is now clear that the mind and the body interact, influence and regulate each other. The perception of stress can lead to production of 'stress hormones', as well as immune modulators. These 'stress hormones' act in a feedback pathway to regulate their own production and the production of certain cytokines. These cytokines act on the brain to modify behavior and the ability to perceive and to respond to stressful challenges by inducing lethargy, fever and nausea [Saad and Said 2011a, Saad and Said 2010, Said et al., 2011, Saad et al., 2013, Zaid and Saad 2013, Saad 2015, Saad, 2014, Zaid et al., 2010, Said et al., 2002, Ibn Albitar 1974, Ibn Rasool Alturkmani 1930, Ibn Sina 1994].

Based on the recommendations of Al-Razi and Ibn Sina, Greco-Arab and Islamic medicine treated patients through a scheme starting with physiotherapy and diet, if this failed, drugs were used. Drugs were divided into two groups, simple and compound drugs. Arab and Muslim physicians were aware of the interaction between drugs, thus, they used simple drugs first. If these failed, compound drugs, consisting of two or more compounds were used. If these conservative measures failed, surgery was undertaken. Therefore, Al-Razi started the treatment with diet therapy; he noted, *"If the physician is able to treat with foodstuffs, not*

medication, then he has succeeded. If, however, he must use medications, then it should be simple remedies and not compound ones." It is now clear that the patients were treated through a scheme starting with diet, exercises and water baths; if this failed, drugs were used, and at last, surgery would be used (Figure 2) [Saad, 2014, Zaid *et al.*, 2010, Said *et al.*, 2002, Ibn Albitar 1974, Ibn Rasool Alturkmani 1930, Ibn Sina 1994].

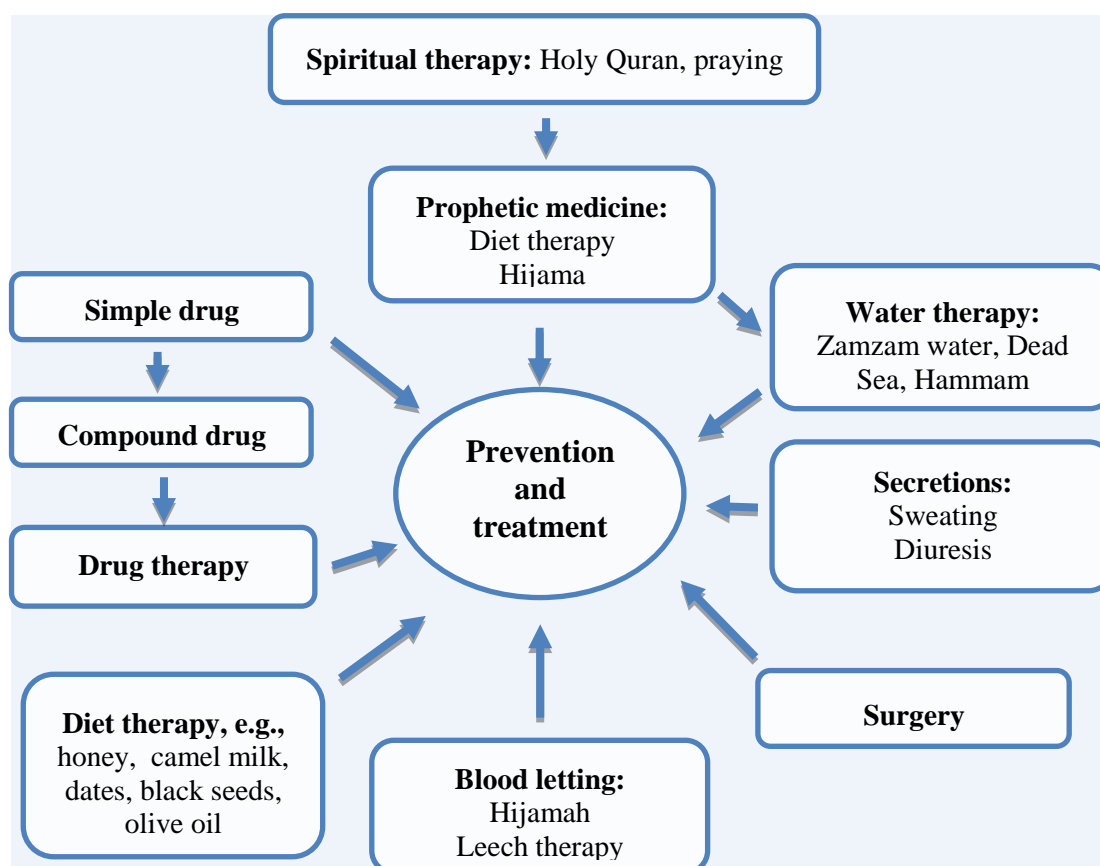


Figure 2. Methods of therapy used in the Greco-Arab and Islamic medicine. Patients were treated through a scheme starting with diet, if this failed, drugs were used. Arab and Muslim physicians used simple drugs first. If these failed, compound drugs, consisting of two or more compounds were used. If these conservative measures failed, surgery was undertaken [Saad and Said 2010, Saad and Said 2011b,d].

Current Status of Diet Therapy in the Arab and Islamic World: Parallel to the observed increased interest in Arab and Islamic traditional diet and medicinal plants in the Middle East, we witness a significant progress in studying the cellular and molecular interactions between intake of healthy diet and their pharmacological and toxicological properties. A very important factor that enhanced the present popularity and widespread use of these natural products is the belief that they are prepared according to the principles of Greco-Arab and

Islamic medicine. As a result, many purveyors and institutions of Arab-Islamic herbal medicine are named after the famous scholars Al-Razi, Ibn-Albitar, Ibn Sina, Al-Antaki or Al-Zahrawi.

The Middle Eastern region contains at least 2,600 plant species of which 700 are mentioned in Greco-Arab and Islamic medical books (e.g., The Canon by Ibn Sina and Al Hawi by Al-Razi) for their use as medicinal herbs or diets. Recent ethnopharmacological studies have demonstrated that more than 450 medicinal plants are still employed in treating human diseases and are sold or traded in market places in the Mediterranean region. Some of these plant species have been investigated and their bioactive ingredients extracted to treat various human diseases. In this regard, researchers from Middle Eastern have published numerous articles and review papers in peer reviewed journals on this subject. For example, an internet search using the term "Arab herbal medicine" reveals more than 400,000 citations in Google and about 15,000 scientific citations are found in Scholar Google. These articles highlight the importance of traditional Arab-Islamic medicine and indicate that the Eastern region of the Mediterranean is distinguished from other regions by a rich inventory of herbal-based medicines. As a result, several herbal-based preparations have been tested in cooperation with physicians and have started to be routinely prescribed in Europe and in Mediterranean countries. Usually, herbal-based remedies are administered by practitioners in a standard decoction prepared by boiling plant parts in hot water, infusion in water or oil, or inhalation of essential oils. Other administration forms include juice, syrup, roasted material, fresh salad or fruit, macerated plant parts, oil, milky sap, poultice, and paste [Saad and Said 2011a, Saad and Said 2010, Said *et al.*, 2002].

Mediterranean Diet: There are now several scientific studies that relate this traditional dietary pattern with the incidence of lower coronary heart disease, various types of cancer, and other diseases compared with North America or North Europe. Several observational and clinical studies have suggested the mechanisms by which this traditional diet may affect coronary risk. In general, traditional Mediterranean diet includes a significantly large amount and variety of fruits, vegetables, wild edible plants, breads, seeds, nuts and olive oil. Therefore, it guarantees an adequate intake of dietary fibre, vitamins, carotenoids, tocopherols, α -linolenic acid, various important minerals, and several possibly beneficial

substances such as polyphenols and anthocyanins [James *et al.*, 1989, Leung and Foster 1996, Slavin 2005].

The Mediterranean diet, in which olive oil is the main source of fat has been associated with a low cardiovascular and cancer mortality. The beneficial effects of olive oil on coronary heart disease (CHD) risk factors are now recognized attributed to the high monounsaturated fatty acids (MUFA) content and other minor compounds found in the olive oil. Evidences from epidemiological studies suggest that a higher proportion of MUFA in the diet is linked with a reduction in the risk of coronary heart disease. There is a large body of clinical data that show that consumption of olive oil can provide heart health benefits such as favourable effects on cholesterol regulation and LDL oxidation. It exerts also anti-inflammatory, antithrombotic, antihypertensive as well as vasodilatory effects both in animals and in humans. The Federal Drug Administration (FDA) of the U.S.A permitted in 2004, a claim on olive oil labels concerning: “the benefits on the risk of coronary heart disease of eating about two tablespoons (23 g) of olive oil daily, due to the monounsaturated fat (MUFA) in olive oil” (Food and Drug Administration. Press release P04-100, 2004).

In addition to MUFA, the Mediterranean diet contains also high levels of dietary fibers. These fibers are complex group of substances, commonly divided into water-soluble and water-insoluble fibers. Water-soluble fibers are hydrophilic macromolecules, which adsorb large amount of water molecules. Hence, they prolong gastric emptying and macromolecules absorption, which results in delayed hunger feelings and decreased energy intake. For instance, soluble fibers improve glucose homeostasis and lipid profile. They have also been associated with short-term reduced energy intake in obese adults. Water-insoluble dietary fibers increase the rate of glucose disappearance and improve carbohydrate handling. It is suggested that the effects of dietary fiber consumption on body weight management may be related to gut hormones, which regulate satiety and energy intake. Ghrelin is a peptide hormone produced and excreted mainly in the stomach in two forms, acylated ghrelin and desacyl ghrelin. Acylated ghrelin acts as an orexigenic signal to the central nervous system, with increased levels during fasting, and suppressed levels postprandially. Ghrelin induced body weight gain in rodents by promoting food intake and decreasing fat utilization. In rodents, ghrelin increased the respiratory quotient, suggesting decreased fatty acid oxidation and increased glycolysis.

According to migrant studies, the Mediterranean diet and lifestyle are behind the low incidence rate of cardiovascular as well as other chronic diseases in Mediterranean region, rather than any genetic or racial factors. For instance, a comparative study between indigenous Arab and Jews new immigrants in Israel reveals that the striking differences between the prevalence of cancer are, in fact, the result of different dietary patterns, which may include nutritional factors that serve as cancer-inducing or cancer-protective mechanisms. Olive oil is the predominant oil used in Arab culture. For instance, the diet of Bedouin tribes in the desert consists of olive oil, milk, wild edible plants, and bread-flour of wheat and little fat –a diet characterized by a very high percentage of carbohydrate calories, a low percentage of fat calories, and an adequate amount of linolenic and linoleic acid [Saad and Said 2011b, James *et al.*, 1989, Leung and Foster 1996, Slavin 2005, Kaminogawa and Nano 2004, Roberfroid 2002, Grivetti and Olge 2000].

Edible wild plants: Wild edible plants are commonly consumed in all Arab countries, especially in the eastern region of the Mediterranean. These herbs have always been a main part of traditional diets and were famous for their health and medicinal benefits long before their nutritious, protective and therapeutic effects were proved by scientific research. Compared with commonly eaten vegetables, they contain high nutritional values (e.g., minerals and vitamins), provide the diet with greater amounts of dietary fibers and beneficial active compounds. Additionally, several of these often-called ‘famine foods’ have proved to be important sources of high-quality protein and essential amino acids when compared with the WHO protein standard, as well as being rich in n-3 and n-6 essential fatty acids. Their antioxidant property, mainly from phytochemicals, was found to be two to three times higher than that of common vegetables. For these reasons, undomesticated greens are recognized as possessing a significant potential for widespread use and development, promoting global food security and nutrition.

Traditional knowledge and experience are a golden source for the exploration and collection of wild plants. Indigenous people are people who developed ways of living, practices and belief systems, which demonstrate their intimate relationship with the mountain environment and deep knowledge about the plants, wildlife, vegetation and ecosystems that surround them. During the last century, safety and efficacy of wild edible plants have gained the interest of the scientific community. Traditional uses, phytochemistry, and pharmacological properties of

these wild plants are discussed in chapter eight. Here we concentrate on their food values and their medical uses [Slavin 2005, Kaminogawa and Nano 2004, Roberfroid 2002, Grivetti and Olge 2000, Jeambey *et al.*, 2009, Saad and Said 2011b,c]. Table 1 summarizes the main pharmacological properties of commonly used herbs in the Arab-Islamic world.

Commonly Used Diet Therapies in the Greco-Arab and Islamic Medicine

As mentioned above, traditional Arab-Islamic diet- and herbal-based medicines are currently increasingly used, mainly in chronic liver disease, diabetes, obesity, infertility, impotence, skin diseases, psychosomatic troubles, and many other diseases. In the following, we will focus on the main diets used in the Mediterranean region [2, 20-22].

Honey: There is no doubt that the use of honey as an internal and external remedy is one of the oldest therapeutic/preventive agents. Honey has been used in wound healing/care since ancient times and is frequently mentioned in early pharmacopeia, although more usually as an ingredient or carrier vehicle rather than a specific treatment [Saad and Said 2011c, Simon *et al.*, 2007, Bogdanov *et al.*, 2008, Jones 2001, Saad and Said 2011d, Albietz and Lenton 2006, Al-Waili 2004, Molan 2006, Al-Waili and Boni 2003, Manuel *et al.*, 2011].

In Arab-Islamic medical system, as in other traditional medical systems, honey is considered as healthy drink and prescribed in the treatment of wounds. AlBasri (Ali Bin Hamzah AlBasri), a 10th century Arab philosopher mentioned uncooked honey for swollen intestine whereas cooked honey was good for inducing vomiting when poisonous drug was ingested. Al Razi, claimed in his Encyclopedia of Medicine (Al Hawi) that: "*Honey is the best treatment for the gums. To keep the teeth healthy mix honey with vinegar and use as mouth wash daily. If you rub the teeth with such a preparation, it will whiten the teeth. Honey does not spoil and could also be used to preserve cadavers*" Likewise, Ibn Sina mentioned in his Canon: "*Honey is good for prolonging life, preserve activity in old age. If you want to keep your youth, take honey. If you are above the age of 45, eat honey regularly, especially mixed with chestnut powder. Honey and flour could be used as dressing for wounds. For lung disease, early stage of tuberculosis, use a combination of honey and shredded rose petals. Honey can be used for insomnia on occasions*".

Table 1. Commonly used edible plants in the Mediterranean region and their evidence-based medical effects [Saad and said 2011a,b,c,d].

Diet	Antioxidant	Hypotensive	Anti-diabetic	Anti-microbial	Anti-cancer	Hypolipidemic	Vasoconstrictive	Cardiovascular	Sexual functioning	Hepatoprotective	Nervous system	Anti-obesity	Immunomodulatory	Arabic Name
<i>Ammi visnaga</i>				+			+							خلة
<i>Cuminum cyminum</i>				+	+	+						+		كمون
<i>Cyperus rotundus</i>		+		+						+				سعد (سعيدة)
<i>Eruca sativa</i>	+		+	+	+									جرجير
<i>Ferula asafoetida</i>				+		+			+	+				زلوع
<i>Majorana syriaca</i>	+			+										زعر
<i>Melissa officinalis</i>	+			+							+			مليسا
<i>Origanum majorana</i>	+	+		+							+			مردقوش
<i>Ruscus aculeatus</i>							+							عرف الديك
<i>Salvia fruticosa</i>	+			+							+			ميرمية
<i>Silybum marianum</i>	+		+			+				+				خرفيش جمال
<i>Cichorium intybus</i>	+		+			+				+			+	هندباء
Dates	+												+	تمر
<i>Foeniculum vulgare</i>	+			+		+							+	شومر
<i>H. triquetrifolium</i>	+										+		+	دادي
<i>Nigella sativa</i>	+	+	+	+	+	+	+	+		+		+	+	حبة البركة
<i>Olea europaea</i>	+	+	+	+	+	+	+	+		+		+	+	زيتون
<i>Portulaca oleracea</i>			+	+									+	فرفحينة
<i>Punica granatum</i>	+				+			+				+	+	رمان
<i>Ruta chalepensi</i>				+			+				+		+	فبجن
<i>Trigonella foenum greaecum</i>			+			+			+	+			+	حلبة
<i>Urtica dioica</i>	+		+	+						+			+	قريص
Camel milk	+		+		+		+						+	حليب النوق
Honey	+			+	+			+	+				+	عسل

Honey is composed of a complex mixture of carbohydrates, water, and a small amount of proteins, vitamins, minerals, and phenolic compounds. The carbohydrates are the main constituents, comprising about 95% of the honey dry weight. The rapid absorption of

monosaccharide which honey contains (e.g., Fructose, glucose and maltose) makes it as a desirable source of quick energy, a practical food and, at the same time, an effective heart stimulant [Saad and Said 2011d, Albietz and Lenton 2006, Al-Waili 2004, Molan 2006, Al-Waili and Boni 2003, Manuel *et al.*, 2011].

The humble bee makes honey from countless varieties of plant flowers and it is logical to assume that honey contain many substances of food and medicinal value that modern medicine has yet to discover. Therefore, the composition of honey depends greatly on the botanical origin. Thus, its classification as unifloral or polyfloral. For example, Sidr Honey is said to be the single most expensive honey in the world. It comes from Jemen, where it is harvested only twice per year. It is produced by bees who feast only on the pollen of the Sidr tree, considered by many to be a holy tree and is one of the most resilient, ancient tree varieties in the Hadramaut Mountains in Jemen. This unifloral honey is reputed to have many medicinal benefits and has an unusually high level of antioxidants. Most of the phenolic compounds of natural honey, as well as in propolis and royal jelly, are present in the form of flavonoids. Several phenolic compounds, especially flavonoids, are associated with multiple benefits on human health, including anti-inflammatory, antioxidant, anti-allergic, anti-thrombotic, anti-diabetogenic, hypoglycemic, normolipidemic, hepatoprotective, anti-viral and anti-carcinogenic activities. Due to these properties, flavonoids have been recognized as nutraceutical compounds.

Over the last four decades, many scientific studies have demonstrated that honey has microbial activities *in vitro*, and a small number of clinical case studies have shown that application of honey to severely infected skin wounds is capable of clearing infection from the wound and enhancing tissue repair. The physicochemical properties (e.g., osmotic effects and pH) of honey also aid in its antibacterial actions. Other reports have indicated that honey may possess anti-inflammatory activity and stimulate immune responses within a wound. The overall effect is to reduce infection and to enhance wound healing in burns, ulcers, and other cutaneous wounds. Recent research has tended to concentrate on the antibacterial and wound healing effects. The antibacterial activity varies depending on the source of the honey. This fact was known long ago, both Aristotle, Dioscorides, as well as Arab-Islamic physicians recommended that honey collected in specific regions and seasons and, presumably from different floral sources, be used for the treatment of particular disease. Honey has been

reported to have an inhibitory effect to around 60 species of bacteria including gram-positives and gram-negatives, aerobes and anaerobes. An anti-fungal action has also been reported for some yeasts and species of *Aspergillus* and *Penicillium* as well as all the common dermatophytes. Honey is hygroscopic, its high monosaccharides content hinders the growth of microbes, but the sugar content alone is not the sole reason for honey's antibacterial properties. Over 100 substances are candidates for the particular antibacterial property of these honeys, but the active ingredient has not yet been identified. Recent research on honey has shed light on the mechanisms underlying its antimicrobial effects, including hydrogen peroxide (the major antibacterial compound in honey), non-peroxide molecules (their concentration is reportedly too low to contribute much antibacterial activity), osmotic effects, and low pH (3.2 – 4.5 that is low enough to inhibit the growth of many microorganisms). In addition to its antibacterial effects, honey seems to induce a wound healing stimulating environment. For example, it appears to draw fluid from the underlying circulation, providing both a moist environment and topical nutrition that may enhance tissue growth.

Anti-inflammatory effects of honey in humans were studied in many *in vitro* and *in vivo* studies. For example, the ingestion of honey decreased inflammation in an experimental model of inflammatory bowel disease in rats. Honey administration is as effective as prednisolone treatment in an inflammatory model of colitis. The postulated mechanism of action is by preventing the formation of free radicals released from the inflamed tissues. Indeed, honey has been found to contain significant antioxidant activity including glucose oxidase, catalase, ascorbic acid, flavonoids, phenolic acids, carotenoid derivatives, organic acids, and amino acids. A significant correlation was found between the antioxidant activity, the phenolic content of honey and the inhibition of the *in vitro* lipoprotein oxidation of human serum. The reduction of inflammation could also be due to the antibacterial effect of honey or to a direct anti-inflammatory effect. The latter hypothesis was supported in animal studies, where anti-inflammatory effects of honey were observed in wounds with no bacterial infection.

As any other diet, honey can be contaminated by various types of toxins, e.g. by microorganisms, heavy metals, pesticides, and antibiotics. The main problem in recent years was the contamination by antibiotics, used against the bee brood diseases, but at present, this problem seems to be under control. In the European Union, antibiotics are not allowed for

that purpose, and thus a honey-containing antibiotic is not permitted to be traded on the market. In conclusions, honey has to be recommended as part of an overall holistic approach to health and should be incorporated into one's everyday diet [Saad and Said 2011d, Albietz and Lenton 2006, Al-Waili 2004, Molan 2006, Al-Waili and Boni 2003, Manuel *et al.*, 2011].

Camel Milk: Camel milk is different from other ruminant milk; it exhibits low cholesterol, low sugar, high minerals (sodium, potassium, iron, copper, zinc and magnesium), high vitamin A, B2, C, and E, low protein and high concentrations of insulin. Camel milk is considered in the Arab-Islamic medicine to have a wide medicinal spectrum. It has no allergic properties and it can be consumed by lactase deficient persons and those with weak immune systems. The Prophet Mohammad (PBUH) mentioned that camel's milk and urine have medical benefits, so Islam encourages and permits the drinking of camel milk and camel urine is permitted in case of necessary medical treatment. Bedouins treat many diseases and disorders with camel milk. This range from osteoporosis, rickets, hepatitis, digestive ulcers and disorders, spleen problems, tuberculosis, asthma, flu, and other respiratory diseases to controlling heartbeat, hypertension and diabetes [Saad and Said 2011c, Korish 2014, Alhaider 2014].

Recent studies have confirmed the anti-diabetic properties of camel milk in test animals and patients. However, the mechanism(s) by which camel milk affects glucose homeostasis is yet unclear. Korish (2014) investigated the changes in the glucose homeostatic parameters, the incretin hormones (Incretins are hormones that are released from the gut into the bloodstream in response to ingestion of food, and they then modulate the insulin secretory response to the products within the nutrients in the food), and the inflammatory cytokines in the camel milk - treated diabetic animals (Streptozotocin-induced diabetes mellitus). Camel milk treatment was administered for 8 weeks. Camel milk treatment to the diabetic animals resulted in significant lowered fasting glucose level, hypolipidemia, recovery of insulin secretion, weight gain, and no mortality during the study. Additionally, camel milk inhibits the diabetes-induced elevation in incretin hormones, TNF- α and TGF- β 1 levels. Thus, the increase in glucose-stimulated insulin secretion, modulation of the secretion and/or the action of incretins, and the anti-inflammatory effect are anticipated mechanisms to the anti-diabetic effect of camel milk and suggest it as a valuable adjuvant anti-diabetic therapy [Korish 2014, Alhaider 2014].

Camel milk and urine has traditionally been used to treat cancer, but this practice awaits scientific scrutiny, in particular its role in tumor angiogenesis, the key step involved in tumor growth and metastasis. Alhaider and his colleagues (2014) investigated the effects of camel milk and urine on key components of inflammatory angiogenesis in the murine cannulated sponge implant angiogenesis model. Results obtained in this study show that camel milk and urine systemic treatment attenuated the main components of the fibrovascular tissue, wet weight, vascularization (Hb content), macrophage recruitment (NAG activity), collagen deposition and the levels of vascular endothelial growth factor (VEGF), Interleukin (IL)-1 β , IL-6, IL-17, tumor Necrosis Factor (TNF)- α and transforming growth factor (TGF- β) in a dose dependent manner. In addition, camel milk and urine treatment reduced VEGF expression and microvessel density *in vivo*. Thus, the observed regulatory functions of camel milk and urine on multiple parameters of the main components of inflammatory angiogenesis give insight into the potential therapeutic benefit underlying the anti-cancer actions of camel urine [Alhaider 2014].

Olive Oil: In Islam, olive oil is mentioned in the Quran and Hadith (Statements by the Prophet). Prophet Muhammad (PBUH) said, "*Eat olive oil and massage it over your bodies since it is a holy (mubarak) tree*". He also stated that olive oil cures 70 diseases. In the Arab-Islamic world, olive oil has been commonly used in cooking, cosmetics, pharmaceuticals, and soaps and as a fuel for traditional oil lamps.

The composition of olive oil varies, depending on the cultivar, climate, ripeness of the olives at harvesting, and the processing system for the type of olive oil: virgin, common (ordinary), or pomace. Olive oil contains high amounts of monounsaturated fatty acid (MUFA) (MUFA are fatty acids that have a single double bond in the fatty acid chain) mainly of the mixed triglyceride esters of oleic acid and palmitic acid and of other fatty acids [Bogdanov *et al.*, 2008, Jones 2001, Saad and Said 2011d].

Olive oil, however, besides having a high MUFA level, the oleic acid, contains multiple pharmacology active components. Olive oil phenolics have shown to have antioxidant properties, higher than that of vitamin E, on lipids and DNA oxidation. They are prevent endothelial dysfunction by decreasing the expression of cell adhesion molecules, and increasing nitric oxide (NO) production and inducible NO synthesis by quenching vascular

endothelium intracellular free radicals. In addition, olive oil phenolic compounds inhibited platelet-induced aggregation and have been reported to enhance the expression the gene of the antioxidant enzyme glutathione peroxidase. Other potential properties include anti-inflammatory and chemopreventive activity. In animal models, olive oil-derived phenolics retained their antioxidant properties *in vivo* and delayed the progression of the atherosclerosis. So far, most of the cardioprotective effect of olive oil in the context of the Mediterranean diet has been attributed to its high MUFA content. Taken collectively, one key conclusion is that olive oil is more than a MUFA fat. The phenolic content of an olive oil can account for greater benefits on blood lipids and oxidative damage than those provided by the MUFA content of the olive oil. Therefore, it beneficial use of olive oil rich in phenolic compounds as a source of fat in order to achieve additional benefits against cardiovascular risk factors. In addition, olive oils with high phenolic content are in general more bitter and greener than those with low phenolic content, and for some individuals the taste could be too stronger [Saad and Said 2011b,c, Covas 2008, Fito 2007, Goulas *et al.*, 2009]. The evidence-based therapeutic properties of olive oil are given in Table 1.

Dates: The fruits of the date Palm, *Phoenix dactylifera*, are an important traditional crop in most Arab countries and are mentioned in 20 places in the Qur'an. Prophet Muhammad (PBUH) is reported to have said: "*if anyone of you is fasting, let him break his fast with dates. In case he does not have them, then with water. Verily water is a purifier*". In another hadith he said, "*Whoever takes seven 'Ajwa dates in the morning will not be effected by magic or poison on that day.*" Dates have high tannin content and are used medicinally as a deterrent (having cleansing power) and astringent in intestinal troubles. Dates are traditionally used as an infusion, decoction, syrup, or paste to treat sore throat, colds, bronchial catarrh, and taken to relieve fever and number of other complaints. One traditional belief is that it can counteract alcohol intoxication [Saad and Said 2011c, Al-Shahib and Marshall 2003, Al-Rawahy 2007, Al-Farsi *et al.*, 2005].

Dates contain a high percentage of carbohydrates (total sugars, 44-88%), mainly fructose and glucose. In addition, they contain fats, minerals, proteins, vitamins and a high percentage of dietary fiber (8.0 g/100 g), insoluble dietary fiber is the major fraction of dietary fiber in dates. The fatty acids occur in both flesh and seed as a range of saturated and unsaturated acids, the seeds contain 14 types of fatty acids, but only eight of these fatty acids occur in

very low concentration in the flesh. Unsaturated fatty acids include palmitoleic, oleic, linoleic and linolenic acids. In addition to minerals, dates contain vitamin C, and vitamins B1 thiamine, B2 riboflavin, nicotinic acid (niacin) and vitamin A. Dates are a good source of antioxidants, mainly carotenoids and phenolics [Al-Shahib and Marshall 2003, Al-Rawahy 2007, Al-Farsi *et al.*, 2005].

As aforementioned, constituents of dates include dietary fibers, which are important for the health of the digestive tract. Dates also contain useful quantities of antioxidants. Antioxidants are thought to play an essential role in the prevention of cardiovascular disease, cancers, and neurodegenerative diseases, such as Parkinson's and Alzheimer's diseases, as well as inflammation and continuous ageing. A dietary antioxidant is defined as a substance in foods that significantly decreases the adverse effects of reactive species, such as reactive oxygen and nitrogen, on normal physiological function in humans. Antioxidants markedly delay or prevent oxidation of the substrate when they are present in foods or in the body at low concentrations. Natural antioxidants consist primarily of plantphenolics, vitamin C, carotenoids, and selenium. Examples of common plant phenolic antioxidants include flavonoid compounds (anthocyanins), cinnamic acid derivatives, coumarins, and tocopherols (vitamin E). The average contents of phenolics ranged from 193.7 mg/100 g for fresh dates to 239.5 mg/100 g for dried dates [Saad and Said 2011c, Al-Shahib and Marshall 2003, Al-Rawahy 2007, Al-Farsi *et al.*, 2005]. The evidence-based pharmacological effects of dates are summarized in Table 1.

Black Seed, *Nigella Sativa*: The seeds, also known as black cumin or "Habatul-Barakah" in Arabic, have long been prescribed in Greco-Arab and Islamic medicine as well as in Indian and Chinese traditional medicine for prevention and treatment of a wide range of diseases, including bronchial asthma, headache, dysentery, infections, obesity, back pain, hypertension and gastrointestinal problems. The black seed were mentioned by the prophet Mohammad (PBUH), who once stated, "*The black seed can heal every disease, except death*". Later on, Ibn Sina (Avicenna) refers to black seed in his *Canon of Medicine*, as the seed that stimulates the body's energy and helps recovery from fatigue and dispiritedness. The black seed is traditionally used in eastern Mediterranean as an enhancer of milk production during breastfeeding. Black seed is an excellent form of added nutrition for both mother (black seeds mixed with toasted flour, toasted sesame, and honey and prepared as cakes) and the growing

child while its immune system boosting properties serve as a natural, safe way to build resistance against illness. In addition, as studies have shown, black seed helps increase milk production during breastfeeding [Saad and Said 2011b,c,d]. In the Unani Tibb system of medicine, seeds are regarded as a valuable remedy for a number of diseases. The seed's oil has been used to treat skin conditions such as eczema and boils and to treat cold symptoms. The aforementioned statement by the prophet Mohammad describing black seed, as "having a remedy for all illnesses" may not be so exaggerated as it at first appears. Recent research has provided evidence, which indicates that black seed contains an ability to significantly boost the human immune system - if taken over time. Therefore, one important is that black seed should be regarded as part of an overall holistic approach to health and should be incorporated into one's everyday diet. In this way, nutritional values and therapeutic properties contained in the black seed can help in maintaining a healthy condition and supplying the immune system with the optimum resources it needs to help prevent and treat diseases.

Black seeds contain pharmacological active compounds, namely, thymoquinone, dithymoquinone, thymohydroquinone, and thymol. These compounds are the main active compounds responsible for the therapeutic effects of black seeds. In addition, black seeds are rich in nutritional values. Monosaccharide (glucose, rhamnose, xylose, and arabinose), a non-starch polysaccharide component (which is a useful source of dietary fiber), and the seeds are rich in fatty acids, particularly the unsaturated and essential fatty acids, e.g., alpha Linoleic acid (omega 3) and Linoleic acid (Omega 6). In addition, seeds contain eight of the nine essential amino acids. Both, essential fatty acids amino acids cannot be synthesized within our body and are thus required from our diet. Black seeds contain carotene, which is converted by the liver into vitamin A, the vitamin known for its anti-cancer activity. The black seed is also a source of calcium, iron, sodium, and potassium. Required only in small amounts by the body, these elements' main function is to act as essential cofactors in various enzyme functions.

Therapeutic potential and toxicological properties of the seeds have been extensively studied. A Medline search using "*Nigella sativa*" and "medicine" reveals more than 700 citations, including anti-oxidant, anti-inflammatory, anti-microbial, hypotensive, anti-nociceptive, choleric, uricosuric, choleric, anti-diabetic, and anti-histaminic, immunomodulatory, anticancer, and anti-fertility effects (Table 1) [Salem 2005, Goreja 2003].

Figs: The fruits of the Common Fig, *Ficus carica*, are commonly used as food and for medicinal properties in Greco-Arab and Islamic medicine as well as in Ayurvedic and Traditional Chinese Medicine. The Prophet Muhammad (PBUH) mentioned figs and then stated, "If I had to mention a fruit that descended from paradise I would say this is it because the paradisiacal fruits do not have pits...eat from these fruits for they prevent hemorrhoids, prevent piles and help gout". Figs contain large amount of dietary fibers, as well as potassium and vitamin B6.

Fig trees of several different species show anti-inflammatory effects as well as cancer preventive/treatment from their bark, roots, leaves, fruits and latex. Evidence of such uses originated in ancient and medieval times, with classical writers of those periods claiming the efficacious use of these parts in carcinomas, inflammatory swellings, "hard swellings," and tumors in general. Usually, fig tree products for cancer and other tumors and swellings were used externally, even when the tumor or swelling was internal, such as intestinal ailments, and often combined with other ingredients such as blue flag (*Iris versicolor* L.), barley and fenugreek. Both latex and fruits were, however, also employed orally.

Pharmacological and chemical studies have demonstrated anti-oxidant, anti-neoplastic and anti-inflammatory activity of both the crude extract and pure compounds (Table 1). Of particular promise, due to their potent cytotoxic activity against a number of cancer cell lines, are the phenanthroindolizidine alkaloids and the triterpenoids with a C-18 carboxylic acid functional groups. In fact, these alkaloids, which have also been found in a small number of other plant genera, are currently under active investigation as potential therapeutic leads. In addition to these cytotoxic compounds, several flavonoids, including anthocyanins, as well as other phenolic compounds, demonstrated antioxidant and anti-inflammatory activities. Furthermore, lectins in the seeds may function as immune modulators. The sterols found in figs may also help bolster immunity, as well as inhibiting inflammation and invasion while promoting apoptosis and differentiation. Coumarins, in many cases, are selectively cytotoxic to cancer cells, and also have antioxidant activity and may interfere with formation of the lipoxygenase product 5-HETE to suppress inflammation [Lansky *et al.*, 2008, Canal and Torres 2003, Saeed and Sabir 2002].

The Pomegranate, The fruit of *Punica granatum* (Rumman in the Arabic) can be divided into three structural compartments: seed, juice, peel. Pomegranate molasses (known as dibs rumman in Arabic) is an essential Middle Eastern ingredient. The uses for this thick,

tangy, piquant syrup are many. The pomegranate has long been used in traditional Arab-Islamic medicine to treat a variety of ailments, including sore throat, inflammation and rheumatism. These uses of the pomegranate are common throughout the Mediterranean region, Iran, and India, where the fruit is common. Additional traditional uses include treatment of diarrhea and colic and to remove intestinal worms in children. The fruit is also used for treating bladder disturbances, strengthening gums and soothing mouth ulcers.

Pomegranates, along with dates and olives, are also mentioned in the following verse from the Holy Qur'an, which speaks of the dues that have to be paid upon each harvest, as well as the evil of wastefulness, *"And it is He Who produces gardens trellised and untrellised, And date-palms, and crops of different shape and taste and olives, and pomegranates, similar (in kind) and different (in taste). Eat of their fruits when they ripen, but pay the due thereof on the day of its harvest, And waste not by extravagance. Verily, He likes not those who waste by extravagance"*.

The most abundant polyphenols in pomegranate juice are the hydrolyzable tannins called punicalagins, which are powerful anti-oxidants. Punicalagins are absorbed into the human body and may have dietary value as antioxidants; other phytochemicals include beta-carotene, and polyphenols catechins, gallo catechins, and anthocyanins such as prodelphinidins, delphinidin, cyanidin, and pelargonidin. The fruit contains also Vitamin C at 0.47 mg/100 g. The pharmacological uses of the pomegranate, as was seen with the two other plants of the Qur'an, dates and olives, are numerous. These include anti-oxidant, hormone replacement therapy, resolution of allergic symptoms, cardiovascular protection, oral hygiene, ophthalmic ointment, weight loss soap, and as an adjunct therapy to increase bioavailability of radioactive dyes during diagnostic imaging. Pomegranate mediated antioxidant activity can be considered a means of lowering the threshold for inflammation. Antioxidant activity, as well as suppression of inflammation, may contribute to chemotherapeutic and chemopreventive utility against cancer [Saad and Said 2011a,b,c Saad and Said 2010, Said *et al.*, 2011, Salhi-Hannachi *et al.*, 2006, Lansky and Newman 2007]. The evidence-based therapeutic properties of pomegranate are summarized in Table 1.

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