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Review Article

Khajur (*Phoenix dactylifera* L.): Medicinal importance in perspective of Unani medicine and pharmacological studies

Barjees Jalal ¹, Shugufta Hamid ², Mahboob Alam ^{2*}, Nasir Nazir Wani ¹ & Khalid Rahim Wani ³

1. M.D. Scholar, Department of Ilmul-advia (Pharmacology), Regional Research Institute of Unani Medicine, University of Kashmir, Srinagar, Jammu and Kashmir, India

2. M.D. Scholar, Department of Moalajat (Medicine), Regional Research Institute of Unani Medicine, University of Kashmir, Srinagar, Jammu and Kashmir, India

3. Assistant Professor, Department of Ilaj bit Tadbeer (Regimenal Therapy), Kashmir Tibbia College Hospital and Research Centre, Shilvath, Bandipora, Kashmir, India.

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*Address for Correspondence:

Mahboob Alam, M.D. Scholar, Department of Moalajat (Medicine), Regional Research Institute of Unani Medicine, University of Kashmir, Srinagar, Jammu and Kashmir, India

Abstract

The date palm (*Phoenix dactylifera* L.) is recognized as one of humanity's earliest cultivated plants, having served as a food source for over 6000 years. It holds a prominent status as the most favoured fruit in the Middle East and North Africa. Date fruit has a long history of consumption and traditional medicinal use. Whether eaten fresh or dried, dates offer a rich source of energy due to their exceptional nutritional content and extended shelf life. They provide an economical means of obtaining essential nutrients including carbohydrates, proteins, vitamins, minerals and dietary fibers. Furthermore, date fruit exhibits a diverse range of pharmacological effects including antimicrobial, anti-inflammatory, anti-diabetic, anticancer, antihyperlipidemic and many more. It is also beneficial in disorders of paralysis, sexual debility, fever etc. Date palm fruits offer a natural and safe alternative or complement to synthetic drugs in managing numerous health conditions.

Keywords: Dates, *Phoenix dactylifera*, Arecaceae/Palmae, *Khajur*, Unani Medicine.

INTRODUCTION:

Date, also known as *Phoenix dactylifera* (PD) is a flowering plant that is farmed primarily for its fruit. It is a member of palm family-Arecaceae. Having its origination from Mesopotamia, it has become a staple food for the people in the Middle East and North Africa. Furthermore, it is currently eaten as food in many regions of the world, particularly in Europe. In Islam, it is customary to break the fast with date fruit first during Ramadan. Dates hold religious significance for Muslims worldwide, as they are frequently referenced in the sacred Qur'an. Because of its high dietary value, large harvests and lengthy lifespan, the date palm is referred to as the "tree of life."^{1,2,3,4,5}

It contains glucose, fructose and sucrose which makes it naturally sweet. Dates provide cholesterol free fat, vitamins (A, B, C, E, & K) along with minerals (such as selenium, potassium, calcium, magnesium, manganese, and iron) fibre etc. In addition to being a rich source of

energy, date fruit contains a variety of antioxidants such as polyphenols (p-coumaric, ferulic acid, sinapic acid, procyanidins etc.), carotenoids, flavonoids and ascorbic acid.^{3, 6, 7, 8}

Additionally, research revealed that at various stages of maturation, palm date fruits contain thirteen flavonoid glycosides, including luteolin, quercetin and apigenin.^{9,10} Moreover, dates contain anthocyanins, tannins, procyanidins, sterols, isoflavones and other beneficial compounds. They can be utilized as functional foods to treat various infections and oxidative stress-related diseases.¹

Numerous pharmacological benefits are contained in date fruits like antibacterial, anti-inflammatory, anti-diabetic, anti-ulcer, anticancer, antidiarrheal, antihyperlipidemic, hepatoprotective, nephroprotective etc. They are used to treat infertility, improve the quality and fertility of oocytes, paralysis, treat respiratory

conditions, urinary problems, constipation, impotence, fever, infections etc.¹¹

Various types of dates are found worldwide mainly *Khodry, Khalas, Ruthana, Sukkary, Sefri, Segae, Ajwa, Hilali* and *Munifi* and each type of dates has shown medicinal value in various type of disease prevention. Dates and their constituents show a role in disease prevention through antioxidant, anti-inflammatory and anti-bacterial activity.

Ajwa, types of dates that is only cultivated in Saudi Arabia/Al-Madinah Al-Munawara has significant value in several types of diseases and also show protective role in hepatic toxicity.¹²

This review article highlights the nutritional composition and therapeutic uses of date fruit, as mentioned in classical Unani texts and proved by various pharmacological evidences.

MATERIALS AND METHOD:

All materials available on printed, electronic and online were used to prepare this review. For its description, identification, temperament, pharmacological investigations, actions, therapeutic uses etc. both Modern, Unani books were consulted and published articles and research papers were searched from PubMed, Google scholar, Science direct, Scopus etc. The

detail about the plant and its parts were searched by the key words; dates, *Phoenix dactylifera*, *Arecaceae/Palmae*, nutritional value, therapeutic uses, etc.

The detail of various aspect of the plant is as follow:

Distribution: The plant is native to North Africa, Egypt, Syria and Arabia. It is also cultivated in Spain, Italy, Greece and W. Asia. In India, it is found in Punjab (chiefly in Multan district), Sind, Rajasthan, Bengal and Gujrat.^{13, 14, 15, 16}

Botanical description: Being a dioecious plant, date palms have staminate (male) and pistillate (female) blooms that occur on two distinct palms. It is a tall tree attaining a height of 30-36m. The trunk is covered with the persistent bases of petioles and the foot is often surrounded by a dense mass of root suckers. Leaves are grey and long, pinnae 20-40 cm long and regularly distichous. Petiole is grey in color, laterally compressed and almost flat. Male panicles are white, compact with the length of 15-23 cm on short peduncle, flowers are 6-8mm long, sweet -scented with sheaths on outer side. Peduncles of female's inflorescence are 8-13 mm broad and spikes are 30-60 cm long. Fruit is oblong, 2.5 -7.5 cm long. These are generally reddish or yellowish brown when ripe, pulp is fleshy and sweet in taste. Seed is cylindrical in shape.^{12, 15, 17}



Figure 1: Date fruit



Figure 2: Date fruit

TABLE 1: TAXONOMICAL CLASSIFICATION:¹⁸

Kingdom	Plantae
Division	Magnoliophyta
Class	Liliopsida
Order	Arecales
Family	Arecaceae
Genus	Phoenix
Species	<i>P. dactylifera</i>
Synonyms	Date palm

Description in Unani literature: The plant of *Khajur* (PD) is 40 feet in height. Branches are soft and are composed of fibres, the length of which varies between 2 to 6 feet. It consists of fasciculate fibrous root system with primary roots having the length of around 4m which may range to 10m in light soils. Date fruit is berry-like which comprises of membranous endocarp around the seed. The fruits of date tree are initially green with the length of one inch which turn reddish yellow on maturity. The fruit pulp is edible and sweet in taste. A special type of glue comes out of date tree which is delicate in nature.^{12, 13}

Development of date fruit: According to Arabs, date fruit develops in seven stages.

TABLE 2: DEVELOPMENT OF DATE FRUIT: 17, 19, 20, 21

Stage 1	Tal'	It is the stage, when fruit first begins to develop. It occurs during the flowering stage.
Stage 2	Balah	It is the stage when the fruit is unripe.
Stage 3	Khalal	Fruit is initially green and tastes significantly sweeter.
Stage 4	Basr	Fruit gets soft and tender.
Stage 5	Qasb	Ripening of fruit occurs at this stage.
Stage 6	R'aṭḥ	At this stage, dates are pulpy and closer to <i>tamr</i> .
Stage 7	Tamr	At this stage, fruit becomes pulpier and sweet. Dates are considered of highest quality when it is ripe, sweet in flavor and has a yellowish exterior.

Mutaradifat (Vernacular names): *Khajur* belongs to family Palmae/Arecaceae. The plant has different vernacular names in Unani Medicine which are mentioned below:^{14, 15, 21}

Arabic: Tamr, Busr, Balah, Nakhl/Nakhleh

Bengali: Sohara

Chinese: Hai zao, Ye zao

English: Date palm

French: Palmier Dattier

German: Dattelpalme

Greek: Phoinix

Gujrati: Kharek, Kharika

Hindi: Khajur, Chuhara, Chohara

Italian: Dattero, Palma

Kannada: Karinchula, Khajura

Kashmiri: Khazir

Malayalam: Bunga Raya

Marathi: Kharika, Kharik, Khajur

Persian: Khurma

Punjabi: Khajur

Portuguese: Palmeira, Tamareira

Rumanian: Curmal

Russian: Phinikove, Dyerevo

Sanskrit: Pind Kharjura, Kharjura

Spanish: Datilera, Palma datilera, Palmera

Swedish: Palmtrae

Tamil/Siddha: Perichchankay, Ita

Telugu: Gajjuramu, Ita, kharjuramu

Turkish: Karmah

Urdu: Khurma, Khajoor, Chuarrah

Ajza-i-Musta'mala (Parts used): Fruit/pulp, seed and gum.¹⁴

Mizaj (Temperament):

Fruit: Hot in 2nd degree and dry in 1st degree. According to some Unani scholars, the temperament is cold and wet while others have the opinion that the fruit is *Mu'tadil* and inclined towards hot temperament.¹³

Flower: Cold and Dry in 2nd degree.¹³

Miqdar Khurak (Dose): Fresh fruit: 10-15g, dried fruit: 10-15g¹⁴ 5-7 no^{5, 13} 7 as per the need & strength.²²

Afal (Action):

TABLE 3: ACTIONS (Af'al) OF DATE FRUIT 5, 14, 15, 16, 21, 23

<i>Kaseer al-Taghdiya</i>	Highly nutritious
<i>Mohallil-i-Warm</i>	Anti-inflammatory
<i>Musammin-i-Badan</i>	Increases body weight
<i>Muqawwi Basr</i>	Improves vision power
<i>Muqawwi-i-Meda</i>	Strengthens the stomach
<i>Muqawwi-i-Jiger</i>	Hepatotonic
<i>Muqawwi-i-Qalb</i>	Cardiotonic
<i>Muqawwi Gurdah</i>	Nephroprotective
<i>Muqawwi A'sab</i>	Nervine tonic
<i>Muwallid-i-dam</i>	Haematogenic/ haematopoietic/ blood producing
<i>Muqawwi-i-Bah</i>	Aphrodisiac
<i>Mudammil-i-Qurūh</i>	Wound healer
<i>Mushil</i>	Purgative
<i>Kāsir-i-Riyāḥ</i>	Carminative
<i>Bawāsir Dāmiya</i>	Bleeding piles
<i>Munaffith-i-Balgham</i>	Expectorant
<i>Tabrīd</i>	Cooling of body or part of body
<i>Muqawwī</i>	Tonic
<i>Mulayyin</i>	Laxative
<i>Mudirr-i-Bawl</i>	Diuretic

TABLE 4: PARTS OF DATE FRUIT USED WITH THEIR ACTIONS: 15, 21

Part of the plant	Af'āl (Action):
Leaves	Aphrodisiac (<i>Muqawwi-i-Bah</i>) and good for liver (<i>Muqawwi-i-Jiger</i>).
Flower	Purgative (<i>Mushil</i>), expectorant (<i>Munaffith-i-Balgham</i>), liver tonic (<i>Muqawwi-i-Jiger</i>), useful in fever (<i>Dafe Hummā</i>) and blood complaints (which includes <i>Muwallid-i-dam</i> , <i>Bawāsīr Dāmiya</i> , etc).
Fruit	Aphrodisiac (<i>Muqawwi-i-Bah</i>), strengthens kidneys (<i>Muqawwi Gurdah</i>), enriches blood (<i>Muwallid-i-dam</i>), beneficial in paralysis (<i>Fālij</i>), chest and lung issues (<i>Su'āl</i> , <i>Iltihāb al-Shu'ab</i> , <i>Ḍiq al-Nafas</i>).
Dry fruit	Diuretic (<i>Mudirr-i-Bawl</i>), aphrodisiac (<i>Muqawwi-i-Bah</i>), enriches blood (<i>Muqawwi-i-Bah</i>) and beneficial in bronchitis (<i>Iltihāb al-Shu'ab</i>).
Seed	Applied to wounds (<i>Mudammil-i-Qurūh</i>) and lessens inflammation (<i>Mohallil-i-Warm</i>).

Iste'malat (therapeutic uses):**TABLE 5: THERAPEUTIC USES OF DATE FRUIT:** 10, 15

<i>Fālij</i> (Paralysis)	<i>Laqwa</i> (Facial paralysis)	<i>Ṣudā'</i> (Headache)
<i>Nisyān</i> (Amnesia)	<i>Bayāḍ-i-Chashm</i> (Corneal opacity)	<i>Qay'</i> (Vomiting)
<i>Qabḍ</i> (Constipation)	<i>Ishāl</i> (Diarrhoea)	<i>Nazla</i> (Catarrh)
<i>Su'āl</i> (Cough)	<i>Iltihāb al-Shu'ab</i> (Bronchitis)	<i>Ḍiq al-Nafas</i> (Bronchial asthma)
<i>Kathrat-i-Ḥayḍ</i> (Polymenorrhoea)	<i>Iltihāb-i-Mahbil</i> (Vaginitis)	<i>Sozāk</i> (gonorrhoea)
<i>Judhām</i> (Leprosy)	<i>Sill</i> (Tuberculosis)	<i>Ta'diya</i> (Infections)
<i>'Aṭash Mufrit</i> (Polydipsia)	<i>Ḥummā</i> (Fever)	<i>Faqr al-Dam</i> (Anaemia)
<i>I'yā'</i> (Fatigue)	<i>Waja'al-Zahr</i> (backache)	<i>'Uṭāsh</i> (thirst)
Alcohol intoxication	Hormonal regulator	

Tarkib-i-Iste'mal (Method of administration)**Amrāḍ -i-Ras-o-A'sab wa Dimagh (Diseases of Head, Nerve and Brain)**

- **Laqwa (Bell's palsy):** Date fruit is useful in *Ḍu'f-i-Asab*, paralysis and bell's palsy. Date fruit is traditionally considered as tonic in CNS disorders.^{8,12}

Amrad-i-Ri'a (Diseases of lung):

- Date fruit is beneficial in *Balghami* and *Barid Marḍ*.^{6, 17,8}
- They are very useful in asthma, bronchitis, cough, catarrh. *Dhāt al-Janb* and *Dhāt al-Riyā* (Pleurisy and pneumonia)^{15, 21}

Amrad-i-Hadm (Diseases of gut)

- **Ḍu'f-i-Meda (Stomach weakness):** Date fruit is useful in *Ḍu'f-i-Meda* as it is considered as tonic.
- **Ishāl (Diarrhoea):** Dates help to cure diarrhoea. *Joshanda-i-Khurma* helps to treat diarrhoea particularly in children.^{15, 24}
- **Bawāsīr Dāmiya (Bleeding piles):** Use of date fruit with *Sharab-i-Afis* is useful in bleeding piles.²²

Amrāḍ-i-Nizam-i-Bawl (Diseases of urinary system)

- **Ḥaṣāt-i-Kulyā (Renal calculus):** A decoction of khurma is useful in renal stone. Sharab of Khurma also has lithotriptic action.^{17,19}

Awarām and Qurūh (Swellings and wounds): When topically used, the ash from Khurma is beneficial for tissue epithelization and the healing of severe ulcers. Putrefied ulcers can be healed by local use of Khurma mixed with charbi.^{12, 17}

Amrad-i-Mardāna (Male sexual diseases)

- **Muqawwi-i-bāh (Aphrodisiac):** It acts as aphrodisiac when taken with fresh milk.^{17, 19, 21}

Amrad-i-Niswān (Gynaecological diseases)

- **Delivery and labor relaxation:** *Joshanda-i-Khurma* (date fruit decoction) with rice aids in weight gain, while parturient women benefit from using Khurma with *Sharab-i-Afis* to relieve heavy menstrual and puerperium bleeding.²²

Miscellaneous:

- **Waja' al-Mafāsīl (Joint pain):** *Ḍimad* of Khurma strengthens the loose joints.^{12, 17}
- **Headaches, hemicrania and opacity of cornea:** A paste of seeds triturated with water is applied over eyelids for opacity of cornea, relieves headaches and hemicrania.¹⁶

- **Alcohol intoxication:** Water in which fresh dates are steeped for a while is a drink given to relieve alcohol intoxication.¹⁶
- **Fevers and smallpox:** Milk infused with fresh dates is a nourishing and restorative drink especially during convalescence from fevers and smallpox.¹⁵
- **Haemopoietic activity:** Date fruit possess hemopoietic activity. It has high nutritive value and acts as tonic when taken with milk.^{12, 17, 19}

Mazarrat (Toxicity, side effect and adverse effect): For persons having hot temperament, headache, stomatitis, conjunctivitis, cough, renal stone, harmful for teeth, liver and spleen, putrefies humors and are heavy and late to digest.^{13, 17, 18, 21}

Musleh (Correctives): *Aab-i-Anar, Sikanjbeen, Rogan-i-Khashkhaash, Badam, Honey, Sugar, Kahu.*^{22, 13, 17}

Badal (Substitutes): *Maweez Munaqqa, Kishmish*^{13, 22}

Compound formulations: *Majūn Arid Khurma*⁵

TABLE 6: COMPOUND FORMULATION INCLUDING INGREDIENTS, DOSE, METHOD OF ADMINISTRATION, ACTION AND USES.^{5, 25}

S.No.	Name of the compound	Parts used	Dose and method of administration	Action and uses
1	<i>Majūn Arid Khurma</i>	Fruit	9 masha to 1 tola / orally	It is used as aphrodisiac in sexual weakness and treats premature ejaculation (<i>Sirut-ul-Anzal</i>)

CHEMICAL CONSTITUENTS:

Carbohydrates, glucose, fructose, sucrose, protein, fibre. It is also rich in vitamin A, B₁, B₂, B₃, B₆, C, E and K along with minerals like calcium, magnesium, manganese, phosphorus, potassium, sodium, zinc, sulphur, chlorine

etc. Carotenoids, beta-carotene, polyphenols, phenolic acids, flavonoids, isoflavons, lignans, tannins, sterols, phytoestrogen, ascorbic acid, methanol extract, anthocyanins etc. also form a part of chemical constituents of date fruit.^{3, 6, 26}

TABLE 7: CHEMICAL CONSTITUENTS OF DATE FRUIT²⁷

Carbohydrates	Glucose, fructose, mannose, maltose, sucrose, starch, cellulose
Flavanols	Catechin, epicatechin
Cinnamic acids	Ferulic acid, sinapic acid, coumaric acid and their derivatives 5-ocaffeoylshikimic, dactyliferic acid.
Free phenolic acid	Protocatechuic acid, vanilic acid, caffeic acid, syringic acid, p-coumaric, acid, ferulic acid, o-coumaric acid.
Steroids	Cholesterol, stigmasterol, campesterol, α -sitosterol.
Enzymes	Phytase, invertase, peroxidase, anthocyanins in fresh dates
Flavonoid glycosides	Luteolin, methyl luteolin, quercetin, methyl quercetin

PHARMALOGICAL STUDIES:

Effect on CNS: Methanolic extract of date fruit significantly reduces serotonergic and dopaminergic transmission while increasing cholinergic transmission in Swiss albino rats exhibiting notable anxiolytic, analgesic, and antipsychotic properties.²⁷

Effect on Renal system: In a rat model of gentamicin-induced nephrotoxicity, an extract from the flesh and pits of *P. dactylifera* significantly reduced the levels of plasma creatinine and urea, which both produced and mitigated proximal tubular damage.^{3, 28, 29}

Effect on Respiratory system: In individuals suffering from allergic rhinitis, date fruit immunotherapy raised serum and nasal IL-10 levels.³⁰

Effect on male infertility: Dates have proven to be effective in addressing infertility. DPP (date palm pollen) extract has been demonstrated in an animal model study to contain cholesterol, carotenoids and estrone which is known to reveal gonadotrophin action in rats. DPP concentrations up to 120 mg/kg have been shown to have the best effects on sperm parameters and DPP suspension raises testosterone and estradiol levels in plasma.^{24, 31}

Effect on delivery and labor: Study results proved that women who consumed 76 g of date fruits starting in the 37th week of pregnancy before labor began to experience a shorter labor duration because dates significantly influenced cervical dilatation and decreased the time between induction and delivery. Date fruit contains both

saturated and unsaturated fatty acids including oleic and linoleic acids which are vital for the synthesis of prostaglandins and are good source of energy as well. Uterine contractions during term are brought about by an increase in progesterone levels in later pregnancy.^{31, 32, 33}

Antimicrobial activity: A phytochemical study found that *P. dactylifera* L. extract contains methanol and acetone which have antimicrobial activity. The extracts of *P. dactylifera* inhibit the growth of both Gram positive and Gram-negative bacteria, including *Klebsiella pneumoniae*, *E. Coli*, *E. fecalis*, *F. oxysporum*, *Fusarium* sp., *F.v solani*, *A. alternata*, and *Alternaria* sp.^{3, 26, 29, 32, 34}

Haemopoietic activity: Increase in RBC, Hb, PCV, platelets and reticulocytes are indicative of hemopoietic activity in both aqueous and methanolic extracts of *P. dactylifera* L. fruit.²⁷

Anti-inflammatory and anti-ulcer activities: Date fruit has anti-inflammatory properties. A recent study on Ajwa dates revealed that the cyclooxygenase enzymes COX-1 and COX-2 involved in lipid peroxidation are inhibited by ethyl acetate, methanolic and aqueous extracts of Ajwa dates. When animals are given a methanolic extract of date fruit, the phenolics and flavonoids present in the date plant have remarkable anti-inflammatory effect. They reduce foot swelling and plasma fibrinogen via modulating the expression of cytokines. Rats with ethanol-induced gastric ulcers showed improved ulcer index, histological indices such as necrosis, bleeding, congestion and edema in the stomach mucosa as well as biochemical levels of certain enzymes such as gastrin in plasma, histamine and mucin in the stomach mucosa were improved.^{27, 29}

Anti-diabetic activity: An experimental study showed that oral administration of date fruit extract improved body weight via decreased water intake and caused hypoglycaemia in alloxan-induced diabetic rats probably by increasing the output of insulin and inhibit absorption of glucose and this property is attributed to the presence of various active compounds such as flavonoids, steroids, phenol and saponins etc. Another study showed that consumption of dates may be of benefit in glycemic and lipid control of diabetic patients.^{10, 29}

Anti-cancer activity: The presence of phenolic compounds such as flavonoids, in *P. dactylifera* L. is responsible for its anti-cancer action. Previous research has indicated that dates contain beta D-glucan which exhibits antitumor action. According to research using an animal model, glucans have an anticancer effect that is dosage dependent and reaches its peak in tumors at a dose of 1 mg/kg.^{3, 26, 29, 31}

CONCLUSION:

The present review reveals that there is the scope of Unani single drugs *Khajur* in management of paralysis, amnesia, bronchial asthma, anaemia, diarrhoea, leprosy, gonorrhoea, thirst, fatigue and acts as an efficient hormonal regulator. It can also be utilized as a potent conventional traditional Unani drug due to its diverse pharmacological activity and suggest that further

phytochemical, clinical and advance research should be done on this medicinal plant for the benefit of human race.

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Drafting of Manuscript: Barjes jalal, Shugufta Hamid Mahboob Alam, Nasir Nazir Wani & Khalid Rahim Wani

Critical Revision: Barjes jalal, Shugufta Hamid Mahboob Alam, Nasir Nazir Wani & Khalid Rahim Wani

ABBREVIATION:

CNS (central nervous system), **PD** (Phoenix dactylifera), **RBC** (Red blood cells), **Hb** (Haemoglobin), **PCV** (Packed cell volume)

Availability of Data: All materials available on printed, electronic, and online were used to prepare this review. Both Modern, Unani books were consulted and published articles and research papers were searched from PubMed, Google scholar, Science direct, Scopus etc.

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