

## Potential Health Benefit of Dates Based on Human Intervention Studies: A Brief Overview

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### Abstract

Date palm tree (*Phoenix dactylifera* L.) is an important crop or khajoor in the local language which is cultivated in many countries. Different types of dates are present but Ajwa khajoor is very beneficial in cardiovascular activity, heart disease, antimicrobial, nephroprotective, antioxidant, anti-inflammatory activity, provide relaxation during pregnancy, reduce risk of tooth decay, improve bone health, and also provide mental clarity. Prophet Muhammad (Peace Be upon Him) said that the best assets are date palm, dates cure several disorders, and he suggested Muslims to eat the date and have a tendency the date palm. Dates play key role in anti-cancer activity, anti-tumor, cardio-protective activity, and neuroprotective activity. Dates fruits and seeds are considered essential nutrients and medicines. They can be used in a variety of cosmetic and beauty products. Many cosmetic products contain high levels of chemical compounds, commonly found in synthetics such as hydroquinone. Date seed oil has been shown to have a positive effect on human skin and hair, as well as a few products (body creams, soaps, hair products, and sunscreens) are sold. Seed oils have high oxidative properties, extended storage capacity, and can protect the skin from UV rays and repair it. Bioactive compounds, such as flavonoids and phenolics, can prevent hair loss and promote hair growth. The extracts from dietary seeds are rich in phytosterols, essential fatty acids, and nutrients needed to maintain healthy scalp, promote normal hair growth, and support nourishing functions of sebaceous glands and hair follicles. It is important to all synthetic skincare products and medically very beneficial.

**Keywords:** Ajwa Dates; Coronary artery disease; Cardiovascular Disease (CVD); Labour Progression, Anti-cancer; Neurodegenerative.

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### INTRODUCTION

Date palm (*Phoenix dactylifera* L.), or khajoor in the local language, is called the tree of divine guidance and provides many people with a livelihood. The presence of date dates in the excavation of Mohenjo Daro (archaeological site in Larkana, Sindh province) indicates that palm trees were planted in Sindh early in the early 5,000s [1]. In the last century and during the colonial period of the Indian subcontinent, several Arabian date palm cultivar shoots were imported in 1910-1912 from Basra (Iraq) by the British Indian Government and planted in Multan and Muzaffar Garh (Punjab). These plants were Halawy, Khadrawy, Sayer, Zahidi, and Dayri [2]. The palm tree offers many benefits to rural Pakistan communities. People eat dates as a powerful diet. During Ramadan, Muslims fast daily for days.

The wood from the tree is used to make homes and to make art objects and is chopped and burned to cook. Palm leaves are used to make handicrafts and pamphlets to weave fruit baskets and mats. Pakistan is the seventh largest producer of dates with a total production of 557,279 mt in 2011 and is rated among the world's largest palm producers from various cultivars, planting more than 93,088 ha. On average the yield date is 59,866 hg ha – 1 (hectare per hectare) in 2011 which is very low compared to Egypt, the world's largest producer, 329,773 hg ha [3]. Major countries importing both dried and fresh dates from Pakistan are India, USA, UK, Canada, Germany, Denmark, Malaysia, and Indonesia (FAOSTAT 2013). The main plants are the Begum Jangi of Balochistan, Aseel of Sindh, and the Dhakki of Dera Ismail Khan [4].

The most productive dates are Kech (Turbat management center) and Panjgur (Balochistan), Khairpur and Sukkur (Sindh), Jhang, Dera Ghazi Khan (Dera Ismail Khan), Muzaffar Garh, Multan and Bahawalpur (Punjab), and Dera Ismail Khan (Khyber Pakhtunkhwa). [5, 6] Date palm growing requires temperatures above 20 degrees Fahrenheit (-6 C.) to survive. Pollination takes place at 95 degrees (35 C.) and fruits need dry, hot temperatures with warm nights. Dates grow large, up to 120 feet (36 m.), and can live for 100 years [2, 3]. With more than 98,000 hectares of palm trees all over Pakistan makes it the fifth largest in the world by producing 0.7million tons, with most of the fields found in Sindh and Balochistan. (Date, 2011).Khairpur District is located north of Sindh [6].

The Baluchistan region has a tropical dry climate during the off-season. Rain of the year less than 100 mm and the wind speed is very high and full of dust. Palm day fields are distributed in areas where groundwater is shallow (15 feet), in particular around Hamun-e-Mashkel and the border with Iran there [7]. The Tahlab River joins the Hamun-e-MashkelIt is like a big festival which can be seen everywhere in the area. The farmers are picking the “Rutab” fruit of different cultivars, harvesting the “Khalal” fruit for making “Chohara1” by boiling then curing them on mats made from the fronds of palm tree, and trucks transferring the crop within the area [8].

Prophet Muhammad (Peace Be Upon Him) said that the best assets is date palm, dates cure several disorders, and he suggested Muslims to eat the date and have a tendency the date palm The importance of dates has been documented in the Qur’an in Surah Maryam. One significant role of dates comes as when Mary gave birth to the Prophet Jesus (may peace be upon Him) under a palm tree, she heard a voice telling her: “Shake the trunk of the palm tree towards thee: it will drop fresh, ripe dates upon thee [9]. Eat, then, and drink, and let thine eye be gladdened!” (Qur’an 19: 25-26). Ajwa is a types of dates, cultivated only in Saudi Arabia/Al-Madinah Al-Munawara and have significant value in diseases cure. The health benefit of Ajwa dates has been documented in hadith as Saud (R.A) narrated that, I heard Allah’s Apostle saying, “If Somebody takes seven Ajwa dates in the morning, neither magic nor poison will hurt him that day [10].

### Types of Dates Palm

There are 160 varieties of dates palm in the country. The popular varieties are: Ajwa, safawi, mabroom, khudari Sagai, sukkary, Aseel, Zahidi, Fasli, Maazwati, Dhakki, Kharbalian, Begum Jangi, Dagh, Goakna, Tota, Karwan, Hillavi, Khudrawi and Mozawati Gulistan, Jowansur, Lango, Sabzo, Kharuba, Karb [11].

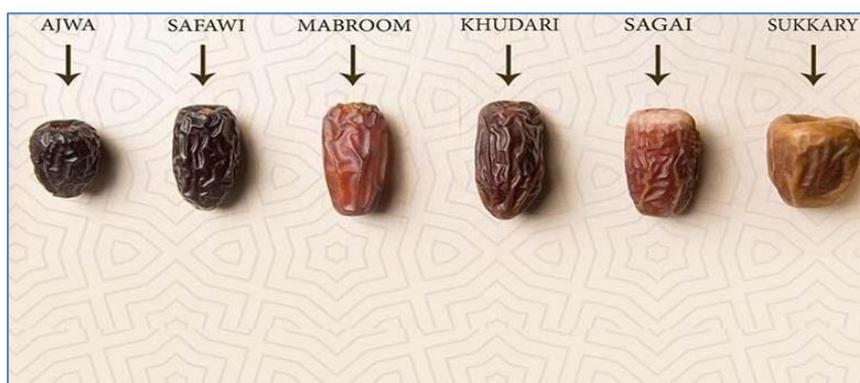


Fig-01: Types of dates [12]

Table-01: Location and varieties of some dates fruits

Origin	Date varieties	References
Morocco	Medjool, Khalt, Jihel, Bousekri, Boufeggouss and Bousthammi	[13, 14]
Tunisia	Kenta Smiti, Bekrari, Mermella, Garn ghzal, Nefzaoui, Baht, Korkobbi, Bouhattam, Rotbi, Deglet Noor, Kentichi and Allig	[15,16]
Saudi Arabia	Ajwa, Reziz, Khudari	[17,18,19]
Egypt	Zaghlood	[20]
United Arab Emirate (UAE)	Buchibal, Naghal, Khunaizy, Khulas, Gush rabei, Hilali ahmr, Barhi, Lulu, Fard, Naghal Hilali,	[21, 22]
Oman	Fardl, Khalas and Khasab, Mabseeli, Um-sellah, and Shaha	[23, 24]
Nigeria	Red soft type Tempo 2 and Tempo 3 (Zabia)	[25]

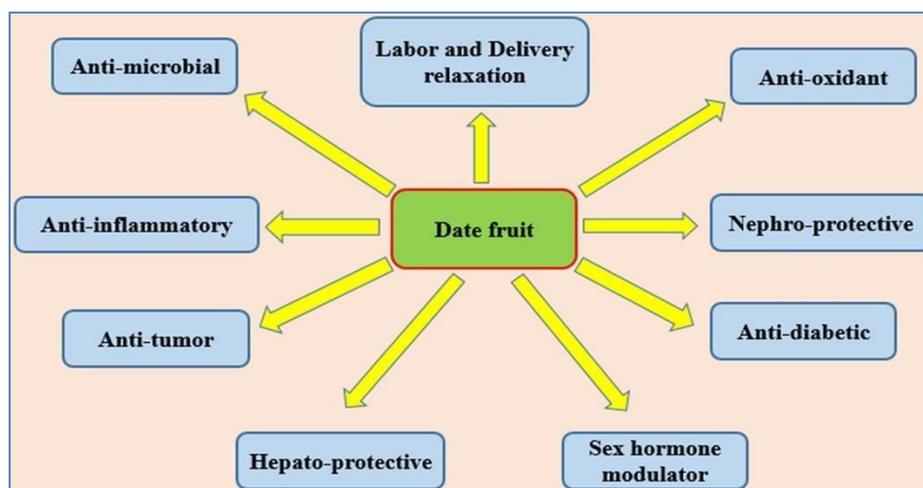
### Beneficial effects of dates

A delicious fruit of the palm tree dates popular all over the world as a super food. These fruits are rich

in essential nutrients, vitamins and fiber that provide many health benefits to the body and mind. There are more than 600 types of dates with different shapes and

tastes, but the Ajwa date type is the most prominent in the world. Ajwa's date is a popular day-to-day variety, grown only in Medina, Saudi Arabia. From dark brown to almost black, these dates are pleasantly soft and have a prune-like fruit and are usually dry varieties. Known as the 'Holy Day', the Ajwa dates occupy a special place in Islamic culture. Scientific research has confirmed the importance of this fruit that provides a high level of nutrition [26, 27]

Shifa Mabroom dates are very soft, very nutritious, and very rich in taste, naturally rich in antioxidants and minerals, Mabroom is chewy and delicious. Mabroom dates are widely grown in the Kingdom of Saudi Arabia. They have thick skin and a dark brown color and have many benefits including high fiber, high in antioxidants; improve brain health, good hair etc [28].



**Fig-02: Pharmaceutical activities of date's fruits in disease control [29]**

#### Antioxidant activities

Antioxidants play a pivotal role in food systems, human body cells and tissues by protecting against oxidative damage of toxic molecules called free radicals [30]. Those free radicals are closely related with some known diseases such as cancer, heart disease, Parkinson's and Alzheimer's disease [31]. The antioxidant activity of extracts from Ajwa date variety to be 74.19 mg/mL of gallic acid equivalent based on lipid per-oxidation and DPPH assays. The mechanism of these assays is such that extracts from Ajwa date scavenge the free radicals that are responsible for lipid oxidation [32, 33]. Dates are a good source of antioxidants due to the carotenoids and phenolics with quantity 3942 mg/100 g and antioxidants constituents 80400  $\mu\text{mol}/100\text{ g}$ . Chemical formulated antioxidants e.g propyl gallate (PG), butylated hydroxyl toluene (BHT), butylated hydroxyl anisole (BHA), and tertiary butyl hydro quinone (TBHQ) are applied as antioxidants against lipid peroxidation [33]. Dates are good source of antioxidant like tannins, carotenoids, sterols and polyphenols [34].

#### Anti-Diabetes activity

Date has flavonoids saponins steroids and phenol these compound have the ability to prevent diabetic activity and cause betterment in the diabetic neuropathy on streptozocin induced diabetic rate [35]. Another major concern for scientists is whether daily use increases the risk of chronic diseases such as diabetes. Most scientists and the general public believe that patients with diabetes should reduce or avoid the

use of DPFs because of their high content of monosaccharides such as glucose and fructose. However, the use of DPF has not been found to have adverse effects on serum glucose or is associated with the spread of type 2 diabetes [35]. Indeed, components of DPF can contribute to the treatment of diabetes and delay the development of diabetes-related complications [37].

The role of DPF members in managing diabetes is not yet fully understood. However, studies of other sugars have shown that granulated sugar shows the potential for antidiabetes, suggesting that daily sugar is considered the best natural sugar for diabetic patients [38]. This antidiabetic effect may be due to the presence of phenolic compounds glucosidase and Amylase activity. The dates contain large amounts of natural sugars, such as glucose, fructose and sucrose, which rapidly increase energy levels. The benefits of Ajwa dates for people with diabetes are that they have a low glycemic index, which means that eating Ajwa dates does not cause a significant increase in blood sugar.

Mabroom dates are also rich in sugar, so they are not suitable for diabetics. However, if you have diabetes and want to enjoy a fragrant and delicious bedroom you can add a bit of honey or a dash of lemon juice to your day. This will make your drinking experience more enjoyable and at the same time, can lower your blood sugar. Date also inhibits absorption of glucose and amplifies the output of insulin [39]. Date

manage the fusion of pancreatic tissue due to this insulin production increase and inhibit the intestinal absorption of glucose [40]. Al awja type of date consist of fructose sugar fructose sugar has lowest glycemic index amongs natural sugar, this sugar is every effective role in maintaining glycemia in diabetic patients [41].

#### **Anti-Microbial Activity**

Date has phoenix dactylifera which effect on antimicrobial on klebsiella pneumonia and Escherichia coli due to this ability it reduce the side effect of use of drugs as methylprednisolone [42]. Some cultivars of Saudi DPF have been tested for antimicrobial properties, and it has been found that different plant species exhibit different antibacterial activity [43]. The sub-mechanism of DPF antimicrobial activity may be incorporated into the DPF of phenolic components, which play a key role in activating the immune system beyond their ability to disrupt bacterial membranes, or to disrupt bacterial enzymes [44]. In addition, DPF components play an important role as anti-inflammatory agents due to their strong ability to act as free radical scavengers. The use of natural products, such as DPF extract, is an effective way to prevent or treat bacterial infections. Ajwa dates serve as an excellent source of antioxidant. Selenium and other essential nutrients may be able to prevent cancer from occurring.

#### **Pregnancy and Delivery Relaxation**

Date has natural sugar and it is observed that the uterus urgently requires a sufficient amount of natural sugar during contraction and repling out of baby at time of delivery, so dates stimulate the uterus by regulating contractions and facilitate delivery [45]. One of the most interesting health problems associated with the use of DPF is that it has been shown to have contraceptive properties in the uterus during the last trimester of pregnancy [46]. DPF components also have an oxytocin-like effect that stimulates the myometrial cells of the uterus, increases uterine sensitivity, reduces the need for labor intake and expansion, and causes natural and spontaneous reproduction [47, 48].

The use of six DPFs per day during the last weeks of pregnancy is associated with an increase in cervical dilation and uterine contractions. It is recommended to include five to seven DPFs in the daily diet during the last weeks of the third trimester of pregnancy to simplify the birth process and shorten the activity [48]. It is thought that Ajwa health benefits extend to pregnant women as well. Eating Ajwa dates regularly during pregnancy activates the uterine muscles and helps the uterus to move during childbirth. These days also reduce postpartum hemorrhage [48].

#### **Reduce risk of tooth decay**

Dates are rich in the element fluorine, a relative of fluoride, that enamel-friendly compound that can actually help reverse early tooth decay. Rich in iron Apart from the fluorine that keeps your teeth

healthy, dates also contain iron, which is highly recommended for those who suffer from iron deficiency. Phytochemicals in these fruits appear to inhibit the growth of certain types of bacteria that mess with your mouth, and they help prevent it from sticking to teeth [49].

#### **Improves Bone Health**

Dates are rich in selenium, manganese, copper, and magnesium, and all of these are required when it comes to keeping our bones healthy and preventing conditions such as osteoporosis. Osteoporosis causes bones to become weak and brittle that a fall or even mild stresses. Bones are constantly losing and replacing minerals [50]. Dates fruit contain nutrients including potassium, magnesium, foliate, selenium, fiber, and vitamin C beneficial for bones and provide energy. [51].

#### **Anti-Cancer Activity**

Date has ability to reduce cancer activity as it has extracted glycan's. Phenols present in dates are good to control cancer activity in human body [50]. Date palm trees are adapted to grow in arid areas, such as arid and desert areas. This adaptation may explain the high antioxidant activity expressed by DPFs. The antioxidant properties of DPF play an important role in protecting humans from oxidative stresses by acting as free radical scavengers [52].

Free radicals are the most active components and are involved in the action of cancerous substances, leading to cellular oxidation, causing damage to human cells [54]. Antioxidants in DPFs play a role in preventing oxidation reactions and removing any free radical link by absorbing and eliminating these radicals [53, 54]. This natural action of antioxidants protects the human body from oxidative-related diseases, such as neurodegenerative diseases and cancer [55]. Additionally, DPF components exhibit antitumor activity, which has been shown to be associated with the presence of glucan [55]. In addition, components of DPF exert antimutagenic effects by disrupting mutagenicity [53, 56]. This type of activity refers to the presence of organisms present in DPFs, such as phenolic acid, anthocyanin -carotene and selenium [56]. It is known that mebroom dates have antibacterial and antifungal properties that can prevent the growth of cancer. These are some of the health benefits of mebroom date [57].

#### **Nephro-protective Activity**

There are vitamins E, ascorbic acid mineral selenium, quercetin & melatonin fractions presents in date. These components of date have ability to nephron protective activity [58]. Cancer is a multi-faceted disease and a global economic burden. Modifications in the normal functioning of the genes are a major factor in the development and progression of cancer [59, 60]. There are many chemo preventive agents used to treat various types of diseases including cancer. But these

drugs show a negative effect by altering the normal genetic action. Herbal extracts such as flavanoid and phenol play an important role in cancer control through genetic control without side effects [61, 62]. Fruits of date dates have shown antitumor activity but their function of dates and places.

Animal model studies have shown that glucans, dietary genetics have shown a dose-dependent anticancer activity that works best with a dose of 1 mg / kg plant [63]. Another important study also showed that glucan date anti-tumor activity [45]. Ajwa studies have shown a protective effect and reduced Ochratoxin and pore toxic effects that could lead to kidney failure [65, 66]. The antigen toxicity of date pits is due to its ability to remove alkyl radical or inhibit the aromatized activity of cytochrome P-450 or inhibition of the reaction between methane diazonium ion and DNA [64].

### Cardio Protective Effects of Dates

Heart attacks are increasingly common these days. Regular consumption of Ajwa dates keeps blood vessels strong, strengthens the heart and improves heart function. The benefits of Ajwa cardiovascular days can be confirmed by the fact that it contains Vitamin B which plays an important role in removing harmful levels of homocysteine in the blood. Magnesium available these days helps maintain heart rhythm. Drinking mebroom regularly helps us protect our cardiovascular system [65, 18]. This is because the sweet liquid is full of iron and other minerals that can help improve heart health. It is also rich in calcium, magnesium, and proanthocyanidin cateehin nthocyanins sodium, which can help boost heart function. Date have phytochemical caffeic acid, and selenium all these compounds posses Cardio protective activity [16].

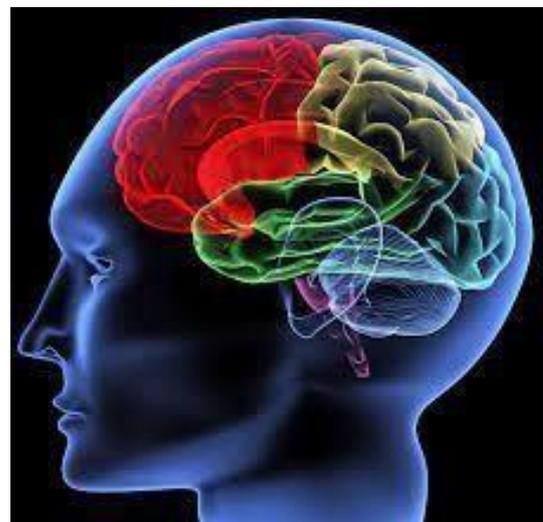
Palm fruit treatment releases moderate changes of isoproterenol in the heart muscle and improves tissue lesions in a dose-dependent manner. Pre-treated palm fruits produce reduced necrosis, edema, and restored cardiomyocytes formation and maintenance of cardiac muscle fiber morphology. [65] Due to the presence of chemical phytochemicals, the date palm causes a significant decrease in low-density lipoproteins, very low-density lipoproteins and the development of high density lipoprotein-enhancing antioxidant enzymes such as paraoxonase 1 arylesterase, [66] glutathione and superoxide dismutase in serum production of radicals. The absorption of cholesterol present in the small intestine by preventing the attachment of cholesterol by micellar bindings. In addition, these bioactive compounds inhibit the formation of cholesterol by cholesterol biosynthesis by limiting the genetic expression of the HMG-CoA reductase enzyme [65].



**Fig-03: Cardioprotective effect [67]**

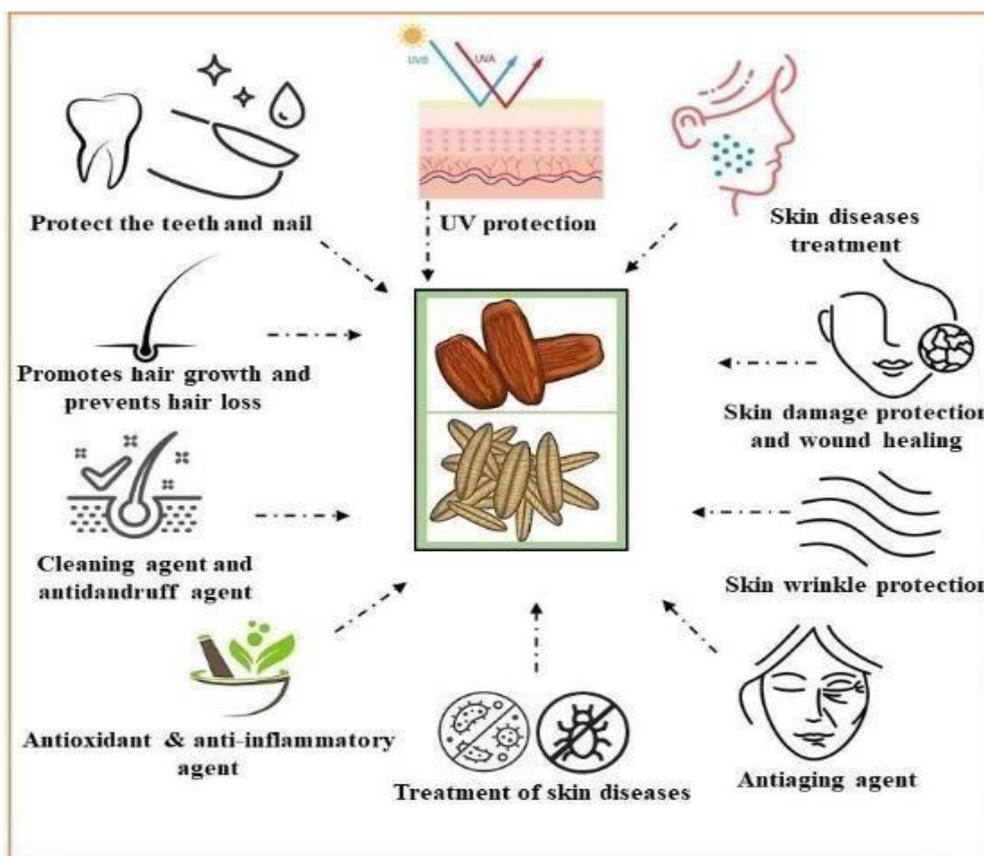
### Neuroprotective Effects of Dates

This release inhibited neuronal necrosis as evidenced by histopathological detection in hypoperfused brain. Date palm fruits provide possible protection against inflammation and oxidative stress in the brain [68]. Dates components (hydroxycinnamates, gallic acid, ferulic acid, monohydroxybenzoic acids, flavones and  $\alpha$ -synuclein, and anthocyanin) inhibit proinflammatory cytokines, amyloid beta peptides and  $\alpha$ -synuclein, and increase brain ATP concentrations, leading to the prevention of neurodegenerative diseases [69]. Date fruit has antioxidant activity. Antioxidant is good for Cerebro protective activity. As it is useful in maintain brain ischemia. Mebroom days are known for developing mental functions. You may feel confused and have levels of concentration if you are depressed for a long time. You may also experience a lack of clarity in what you do. With the help of sweet juice, you can reduce the effects of stress and anxiety and at same time improve your mental clarit.so, with a typical mebroom day diet; you can achieve a better mood and feel better [70].



**Fig-04: Neurodegenerative effects [71]**

## Cosmetic Applications Dates Palm and Seeds



**Fig-05: Dates beneficial for cosmetic products [74].**

Dates fruits and seeds are considered essential nutrients and medicines. In addition, they can be used in a variety of cosmetic and beauty products. Many cosmetic products contain high levels of chemical compounds, commonly found in synthetics such as hydroquinone [72]. In addition, gemstones are used in the production of cosmetics. Thus, cosmetic products based on nanotechnology have been attracting consumers; this method can be used in the construction of a new cosmetic list [73].

Natural products have recently been used in cosmetics to treat various skin diseases and to protect against UV rays (Figure). UV rays can cause sunburn, wrinkles, premature aging, and cancer; therefore, there is a need for a permanent solution to UV radiation and to prevent its negative effects [75].

### Skin Cosmetic

Date and seed waste contains organic compounds such as flavonoids, phenolic, and phenolic acids, which play a key role in preventing the production of free radicals that are a major cause of skin damage. Cosmetic products from natural sources have been found to contain many phyto-constituents and their demand has grown rapidly in recent years [76, 77]. Date seed oil has been shown to have a positive effect on human skin and hair, as well as a few products (body

creams, soaps, hair products, and sunscreens) are sold [78, 79]. Seed oils have high oxidative properties, extended storage capacity, and can protect the skin from UV rays and repair it [80, 81]. Ascorbic acid and vitamin E in daily extracts improve skin moisture by stimulating dermal fibroblasts and increasing collagen levels; and are strongly associated with anti-aging [78, 82]. The presence of phenol core acts as an important sensor for active species and reduces lipid peroxidation. Interestingly, phenolic derivatives are important in the cosmetics industry for the development of ecofriendly products, especially medicinal products rich in natural ingredients, and for preventing premature aging of the skin [83].

### Hair Cosmetic

These natural stressors can also affect hair growth and damage hair color in humans. Although nutrient-rich foods may prevent oxidative damage caused by external stress and pollution, plant extracts have been used in hair care to promote hair growth and condition regulation, act as a cleansing and antidandruff agent, and prevent hair loss [84]. Bioactive compounds, such as flavonoids and phenolics, can prevent hair loss and promote hair growth. Flavonoids can increase hair length and follicle size and increase the growth phase [85]. Coconut water increases hair density and growth in male and female volunteers, and

reduces the sensitivity to itching [86]. Many extracellular herbs have been used in hair care to promote hair growth and conditioning, acting as a cleansing and antidandruff agent, and prevent hair loss [87]. Similarly, extracts of cinnamic acid and water-soluble vitamins and lipids have been reported on different dates [72, 88]. Vitamins B and E are recommended to strengthen hair and nails, and are found in many cosmetics and hair health products. Vitamin E promotes the growth of skin cells in the skin and acts as a healthy condition for hair. In addition, Vitamin E protects nails from aging and can be used to maintain moisture level, giving nails a healthier look [89, 90].

### Nail Cosmetics

The seeds of the dates and the fruit ingredients are good sources of vitamins B, C, and E [91]. Vitamin C protects hair and nails from free radicals produced by radiation and pollution. Sunflower seeds are also used as an ingredient in eye shadows in traditional cosmetics [82, 92]. It also helps keep nails healthy by tightening the skin, connective tissue, and walls of blood vessels. The extracts from dietary seeds are rich in phytosterols, essential fatty acids, and nutrients needed to maintain healthy scalp, promote normal hair growth, and support nourishing functions of sebaceous glands and hair follicles [93, 94]. It is important to note that all synthetic skincare products are made of paraben oil, which can cause allergies and rashes on sensitive skin [95].

### CONCLUSION

Dates can have beneficial effects on the physical health marker. Most of the results have been seen in response to total fruit or extracts, which provide a strong reason for conducting random clinical trials and Therapeutical, meditational and cosmetics products epidemiological investigations. Prophet Muhammad (Peace Be Upon Him) said that the best assets is date palm, dates cure several disorders, and he suggested Muslims to eat the date and have a tendency the date palm Consumption of date products or their components of polyphenol appears to positively measure plasma lipid levels, indicators of oxidative stress and inflammation, all of which are responses associated with better cardiovascular health. In addition to measuring changes in cholesterol, neurodegenerative, memory clarity or oxidant protective signals, an examination of its functional properties will provide useful information. Polyphenols and physiologic responses may also be helpful.

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