

AJWA: A CURATIVE FOR DIABETES**Saleeha Israr, Muhammad Waqar Ali, Nadia Hanif, Rida Rafiq and Wajiha Gul***

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Corresponding Author*Dr. Wajiha Gul**Department of
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Diabetes is a lifelong condition that can affect anyone, from any walk of life. Many medicines are available for its treatment. However several natural remedies can also be acquired to get positive results. Ajwa dates (*Phoenix dactylifera*) along with its many other properties have also proved to be a promising agent in producing an anti-diabetic effect. The synthetic allopathic anti-diabetic drugs along with curing the disease produce several side effects like impaired renal and hepatic function, weight gain, skin rashes, stomach upset and many more. In comparison, these dates are more effective than the allopathic medications because of their bioactive phyto-constituents and therefore shown therapeutic potential. Many researchers have found that as compared to the date seeds alone, the date seeds extract when given in combination with insulin, produces an excellent anti-glycemic effect.

Date seed extract is an excellent source for reducing the blood glucose levels and also have shown better results for the complications of diabetes. Ajwa can prove to be a better anti-diabetic agent as compared to the anti-diabetic drugs available in the market without any ADRs.

KEYWORDS: Diabetes, ajwa dates, anti-diabetic, natural remedies, *Phoenix dactylifera*.**INTRODUCTION**

Ajwa date, (*Phoenix dactylifera*) belongs to the Arecaceae family and is widely cultivated in arid areas for nutritional, environmental, economic, and ornamental reasons. It is also utilized as a staple food in many Asian and African countries.^[1] Because of its health benefits it is also known as the 'fruit of paradise'. This date variety is one of the most expensive dates with a fine and pleasant taste and also has got great religious, social and medicinal importance.^[2,3]

Ajwa dates have also got religious importance in Islam, and its benefits are mentioned in Quran and Hadith (Al-Quran 16:11; Hadith Sahih al-Bukhari 5445). It is one of the oldest cultivated plant has been a part of daily food for around 6000 years.^[4] The phytochemical properties of Ajwa have placed it on the top among all the other date varieties.^[2] These dates are rich in sugars, vitamins, proteins, dietary fibers, fats, and minerals including phytochemicals like flavonoids, glycosides, and polyphenols.^[5] It has many medicinal properties like an antihypertensive, antidiarrheal, cardioprotective, gastrointestinal, sexual improvement, anti-inflammatory, anti-oxidant, anti-diabetic, and nephroprotective.^[6,7] Some of the medicinal benefits of Ajwa are mentioned in Table 1.

Diabetes mellitus (DM) is a chronic disorder of glucose metabolism with serious clinical consequences. The multi-system complications of DM include microvascular (nephropathy, neuropathy, and retinopathy) and macro-vascular (stroke, ischemic heart disease, with the highest percentage in developing countries in Asia as an increase in population is among the contributing factor to the high burden of diabetes.

Table 1: Medicinal benefits of Ajwa date.

Pharmaceutical properties	References
Anti-aging	[8]
Anti-cancer	[9-14]
Antibacterial, antifungal, antiviral	[12, 15-19]
Anti-diarrheal	[20]
Antihemolytic	[21]
Antihyperlipidemic	[22, 23]
Anti-inflammatory	[12, 24-26]
Anti-oxidant	[12, 21, 27-31]
Anti-ulcer	[32]
Hepatoprotective	[23, 33]
Improves brain function	[34, 35]
Nephroprotective	[36-38]
Rich in dietary fibers	[11]

The premature morbidity, mortality, reduced life expectancy, and burden of financial and other costs to the patient, their career, and health service makes it an important health condition. The number of people with diabetes has more than doubled during the last 20 years, with the rapid increase in the emergence of type II diabetes in the population.^[39] According to WHO there is a chance of increase of 37% and 114% population and patient with diabetes within the period of 2000 to 2030 respectively with India and China having the highest figure (79.4 million and 42.3 million, respectively).^[40,41] Diabetes hinders the process

by making it difficult for the body to use sugar for fuel. A group of researchers found that the combination of date seed extract and insulin is not only safe for the liver and kidney but it also minimizes the adverse effects of diabetes on body organs.^[42] Controlling blood sugar is the main target of diabetic patients. In diabetes either there is no more production of insulin or if produced is of quantity lesser than required. Sugar is not transported to the cells and the accumulation in the bloodstream and if left untreated may harm the whole body. Type II diabetes can't be treated just by taking antidiabetic medications or by changing one's lifestyle. Sometimes more than one drug is required to treat the disease.

The prevalence of DM has rapidly increased in the native and immigrant Asian population. The disease develops at a younger age in Asian people as compared to the white population and therefore the morbidity and mortality rates are higher in the young Asian generation. This also increases the increased lifetime risk of cardiovascular diseases.^[43] There is a serious need to take certain steps to develop awareness in people regarding the harmful effects of diabetes. Developing countries must increase the national capacity for early diagnosis, effective management, and improvement in basic preventive factors to deal with the rise of this disease.

Diabetes mellitus is thought to be a globally epidemic disease of multifactorial etiology and certain risk factors like environmental, genetic and dietary factors and compromised lifestyle. The two main types of diabetes mellitus include: type-1 and type-2 (American Diabetes Association 2010) while other types are gestational, neonatal, metabolic syndrome and autoimmune diabetes (International Diabetes Federation, 2014). Diabetes mellitus is further associated with complications such as atherosclerosis, microvascular disease of eyes, kidneys and diabetic ulcers. Treatment regimen of diabetes includes insulin therapy, diet and exercise. Insulin therapy containing drugs could cause the organ toxicity which includes hepatotoxicity, nephrotoxicity and permanent damage of many nerves, hence the herbal medicine becomes the choice.

Table 2: Other natural ingredients used in combination with Ajwa for the treatment of diabetes.

Combination used	Comments	References
glibenclamide, black pepper, ajwa seeds	Glucose and AST levels were significantly reduced, however no differences were observed in the ALT and ALP levels	[44]
modified diet	Significant decrease in the levels of FBG and	[45]

supplemented, Nigella sativa, ajwa date,	2PPBG was seen in group a as compared to group b	
Seed extract of Ajwa and Sukkari dates	Significant reduction of blood glucose level was observed in diabetic rats as compared to control rats	[31]
Ajwa pit and pulp	Reduction in the serum urea, serum creatinine, microalbumunuria marker and serum glucose level was found. There was reduction in the urine creatinine and creatinine clearance was observed. Ajwa pit possess more antidiabetic property as compared to the pulp	[46]
Ajwa seed extract and insulin	Rats treated with combination of date seed extract and insulin showed better reduction in mean blood glucose level as compared to those treated only with insulin	[47]
Ajwa pulp and black pepper Ajwa pulp, Ajwa seeds, black pepper and turmeric	The mixture of ajwa seeds and black pepper showed promising effect for the management of diabetes The combination showed antidiabetic activity and the mean serum glucose level was lower as compared to all the other groups	[48]

Ajwa is one of the most expensive and popular dates rich in primary metabolites like metabolites, sugars and proteins. levels of glucose are lower as compared to fructose making it less harmful for people having issues with sugar modulations for example diabetes type II^[31] not only today but in folk medicines too.^[49] Use of ajwa dates for eight weeks not only reduce the serum insulin levels in rats but also is beneficial for glycemic control and insulin level.^[31] It can be taken daily as a part of healthy diet by diabetic patients.^[50] The effect of carbohydrates on blood sugar levels can be measured with the help of glycemic index.^[51] Low glycemic index will not cause fluctuation in the blood sugar and insulin levels of a person hence good for diabetic person as compared to high glycemic index may lead to increased blood sugar level.^[52] Ajwa date have medium glycemic level, making it safe for people with diabetes.^[53] After the administration of ajwa dates, there was a significant increase in insulin level and decrease in glucose level observed in 50 rats suffering from type 2 diabetes mellitus rats.^[54] Victor also found reduction in blood glucose levels in diabetic rat after they were fed on Phoenix dactylifera.^[55]

Comparatively, date seeds have more active contents than fruit. The vitamin C, total phenolic, total flavanoids, oxidative value and protein content is much more than date fruit (Saryono Saryono). Date seeds inhibit the activity of alpha-amylase, alpha-glucosidase and pancreatic lipase which inhibits the digestion or hydrolysis of starch and fats in the food,

inhibiting their absorption and decreasing the blood glucose level and thereby preventing the hyperglycemic state to develop. It was found that Phenolic constituents like gallic acid, catechin, epicatechin, quercetin, ellagic acid and others were likely to inhibit the activity of these enzymes. Dates are also thought to reduce the proliferation of pancreatic cancerous cells and stops further DNA damage hence maintaining the insulin production.^[56] According to Khalid *et al.*^[2] there is a correlation between sugar and mineral contents of Ajwa date and other local dates which not only indicated the highest amount of digestible sugars like sucrose, galactose, fructose and maltose in Ajwa flesh than other dates but also higher than Ajwa pits. However, Ajwa pits are also found to be beneficial due to its fibers, fats and protein content higher than the flesh part. a group of researchers revealed that when streptozotocin was given to induced diabetes in rats by the selective cytotoxicity on pancreatic beta cells, the administration of date seed extract causes a significant maintaining of bodyweight of rats and reduction in blood glucose level. The possible effect is due to the active components in Ajwa date seeds extract (aqueous) which were mainly flavanoids, tannins, saponins, cardiac glycosides, steroids, palmitic, oleic and stearic acids leading to the improvement in insulin secretion and glycemic control and also it supports the normal kidney function that was disturbed due to diabetes. Hence the aqueous Ajwa dates seed extract have visible ant hyperglycemic effect and no hypoglycemic effect unlike insulin and other drugs.^[31]

Ajwa date belongs to the family *Arecaceae* is being the favorite date of Holy Prophet (PBUH). This date can be differentiated from other varieties of dates because of high nutritional value.^[57] Many Phytochemical studies revealed the active constituents of Ajwa which are certain alkaloids, flavanoids, carotenoids, anthraquinones, saponins, terpenoids and tannins. The polyphenols present in it acts as antioxidant to capture free radicals. The presence of antioxidants, antidiabetic, hypoglycemic activity in Ajwa fruit and dates and in the form of powder, pulp, water extract and infusion has shown proven activity against atherosclerosis, cancer and diabetes. It shows that Ajwa date is also beneficial in combating with complications of atherosclerosis which could be a risk as well as itself a complication of diabetes.

CONCLUSION

Extensive literature survey has been performed on the health benefits of Ajwa dates pulp and seed exclusively for diabetes. Diabetes is a common metabolism disorder which is further

associated with many complications. Dates are the ideal food providing many health benefits and important nutrients. Ajwa is among the most expensive dates belonging to the holy city of Madina Munawara, rich in sugars and proteins as major metabolites. However, it was found from the literature study that the sugar and mineral content varies in different parts of Ajwa dates. The date seeds were also found to be beneficial by reducing the metabolism of ingested carbohydrates and starch by inhibition of natural hydrolysis process of pancreatic enzymes, their availability in the blood and hence prevent the diabetes and additionally it inhibits the proliferation of cancerous pancreatic cells and related DNA damage maintaining the insulin level. And when administered aqueous date seed extract, tremendous anti hyperglycemic effects with safety were revealed. So Ajwa dates in any form, has an excellent effects against diabetes mellitus. Vast research has been conducted on Ajwa dates and still limited knowledge is available about the medicinal benefits of the fruit.

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