

# Medjool Date Palms

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The origin of Al Medjool palm is the Arab Maghreb as this brand was very-well known and usually offered to high-class people and senior personalities and the visitors of the Moroccan Kingdom, but as a result infection of the Moroccan oasis with Al Bayoud disease which devastated a significant proportion of the kingdom's palms at the time and, in a step to save the palm trees this brand was presented to the USA and at the same time the UN Food and Agriculture Organization ( FAO) had established the regional research center for palm and dates for the Near East and North Africa to conduct studies and research and give support in the developmental programmers for palm farms in the dates-producing countries and thus, studies started in the USA, France, Britain and other countries by reproducing palm using tissue culture.

However, in a climate that serves the palm in cochlea Valley in California with hot weather and scarce rainfalls. The scientific name of the Medjool palm is *Phoenix dactylifera* i.e. (life tree) where it's available to common people (and people of desert in particular), as those people used it for food and fuel and for building in addition to the provision of nutrition, knowing that palm cultivation started early in Mesopotamia and Nile valley since more than 7000 B.C., and thus the Medjool dates are considered among the best quality and costly dates in terms of size, flavor, in addition to its beauty as far as color is concerned, it has reddish-amber color during the ripening stage and when fully ripe it turns into blackish- dark-brown and as for the texture of the fruit flesh it is soft and rubbery with delicious taste, but its outer skin, it's medium-thick and adhered to the fruit flesh and soon will shrink forming very nice and distinctive wrinkles and grooves.

## Features of Medjool dates

1. Oval, long, rectangular in shape, large in size with orange-yellowish color when partially ripe
2. Fruit length 3.7 -5 cm
3. Diameter 2.5-3 cm
4. Length of pit 2.5cm and 6.8cm thick
5. Fruit weight ranges between 15 g to 34 g and sometimes more

6. Color of fruit at the ripe stage dates is reddish-amber and turns entirely into brown
7. Low in fibers
8. Fruit flesh thickness ranges between 5-7 mm
9. Texture of fruit flesh is soft and elastic
10. Delicious taste

### Composition of Medjool date

Energy	Kcal 277	%
Carbohydrates	74.97 g	58%
Protein	1.58 g	1.81 %
Total fats	0.10 g	1%
Cholesterol	0mg	00%
Fibers	6.7%	18%

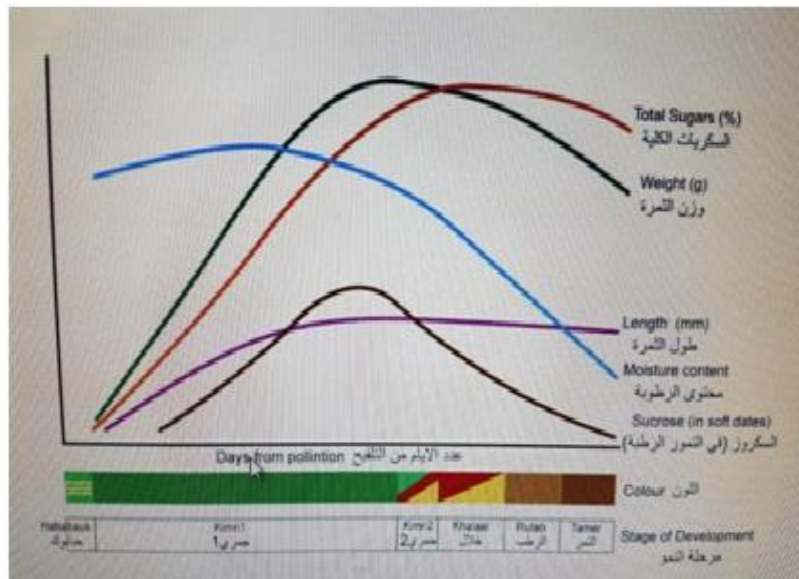
### Features of Medjool palm

1. Bluish Green-color palm tree
2. Coarse fronds
3. Profuse shoots
4. Leaves are silver green to bluish green
5. Tree trunk diameter 18-20 inches
6. Adult tree productivity 80-120 kg
7. Color of palm branch yellow-orange
8. Multi- stamens
9. Palm leaves is short to medium in length
10. Thorns are multiple, medium-long and sturdy
11. Each cluster of adult tree contains 110 racemes each with 52 fruits
12. Medjool palm is late in ripening
13. Anti-salinity
14. Anti-winds
15. Anti-dryness
16. Medium-tolerant against frost
17. Blossoming season in Jordan at the end of February and the beginning of March, depending on the prevailing temperature fit for blossoming
18. Pollination process continues till the end of April and May of each year
19. Heat accumulation is important for the ripening mechanism of Medjool brand fruits and also the time up to ripening, however, fruits are set to ripe in 180 days.

### Mechanism of Medjool fruits ripening

The process of pollination and fruition starts and there the division process of meristematic cells starts to become more active and multiply for a short time then Al Chamri stage and green-ripening date then yellow-ripening date due to fertilization schedule and ideal irrigation which enhance the size of fruit to

reach a stable size (yellow-ripening), so, it's advisable to boost irrigation (continuous irrigation) from Al Chamri stage up to yellow-ripening (900 liters/week), and at this stage biologic and physiologic and chemicals processes start to work on the size, taste, flavor where chlorophyll disappears and pigments appear



Graph of commercial production in Medjool dates

A Form showing the main changes in date fruit in the growth stages sugar, moisture, weight, color and other. In other words, the process of continuous irrigation is given, according to commercial ripening curve, to the fruit where palm tree needs at the beginning of fruition a plenty of water reaching 900 liters/week till attaining the peak size at the end of yellow-ripening and, at the beginning of becoming ripe from the tail the process of water irrigation will be lessened gradually according to a schedule based on environmental circumstances and, after this stage the process of complete gradual ripening will start and thus physiologic, chemical, physical and biologic changes in the fruit will continue as regards increased softness and elasticity of its tissues and decreased respiration and acidity and all pectin materials will convert from insoluble to soluble form...etc.

Among the most important issues in the Medjool palm is the process of cutting to produce good size and weight fruits which is a pure technical process and though which the kind and quantity of production can be determined and, the process of cutting depends on the experience and skill of the farmer to be able to make compromise between production and the process of preparation (infrastructure) of the farm and, the most important steps of cutting are as follows:

- Cutting of the clusters (OTHOUQ), a very important process so that half the number of is nearly removed so that the rest bunches would distribute over the apex of tree and more attention is

paid to bunches with long racemes (SHAMAREKH) as a palm contains two types of clusters, those with long racemes and those on the peripheries with short racemes.

- a. Clusters (OTHOUQ) with short racemes contain 90-98 racemes, each raceme carries 25 date fruits and, each raceme is about 45 -48 cm long.
- b. Clusters with long racemes contain 104-110 racemes each one of them contains 55-57 date fruits and, the raceme length is 60-65 cm.

The first steps of cutting are to remove the peripheries of cluster at a distance of 10-12 cm on the same level then to remove the core racemes according to the attached table and thus there remains on the cluster the set number of racemes according to the weight required and, we know that the minimum weight of a Medjool fruit is 15 g, for example to take first the weight of 15g and then the other weights as demanded.

**Table 1** The process of cutting applied to the Medjool palm to get high quality fruits.

Fruit weight g	Fruit # on a raceme	# of racemes on a bunch	# of bunches on a palm tree	Weight of a bunch	Weight of bunches on a palm tree	Expected farm production	Loss %	Total production in kg
15	10	20	8	3	24	48000		
15	10	30	12	4.5	54	108000		156000
15	8	35	8	4.2	33.6	67200		
15	8	40	12	4.8	57.6	115200		182400
15	10	30	8	4.5	36	72000		
15	10	35	12	5.25	63	126000		198000
15	8	40	8	4.8	38.4	76900		
15	8	40	8	4.8	38.4	76800		153600

- 1) Cluster with short racemes: each raceme is 45-65 cm long, number of fruits on a raceme is 44 fruits, number of racemes on a cluster is 95-98
- 2) Cluster with long racemes, each raceme is 60-65 cm long, number of fruits on a raceme is 57 fruits, number of racemes on a cluster is 112

Noting that 10-12 fruits are left over on each raceme, or as wished by the farmer 14, 15 or 16 fruits are left over

**Table 2** How to get good and high-quality fruits

Fruit weight /g	Number of fruits on a raceme	Number of racemes on a bunch	Number of branches on a palm	Weight of a cluster	Weight of clusters on a palm tree	Expected production /kg 1800 trees
15	15	45	16	10.125	162	291600
20	14	45	16	12.6	201.6	362880
20	14	45	17	12.6	214.2	385560
15	15	75	15	16.875	253.125	455625
	15	40	10	9	90	162000

There is a difference in this table in the number of fruits 14, 15 and the number of racemes also differed and the number of clusters on the palm tree, the table to be completed with the weights realized from the assumed ones until the highest weight of fruit is achieved. An example of the mathematical equation of cutting the clusters and racemes and date fruits on the Medjool palm

Each cluster contains 100 to 110 racemes and, let us to assume: 100 racemes

Each raceme contains 50 to 52 date fruits and, let us to assume: 50 fruits

Number of fruits on a cluster is  $100 \times 50 = 5000$  date fruits

### **The process of cutting**

1. Cutting 60 racemes from the core of cluster and this means to leave over 40 racemes (60 racemes  $\times$  50 date fruits = 3000 fruits removed)
2. Each raceme produces about 34 fruits and 14 are left over (40 racemes  $\times$  34 = 1360 date fruits removed)
3. Total fruits lost from a cluster is:  
 $3000 + 1360 = 4360$  date fruits removed  
Number of fruits on a cluster - number of fruits removed =  
 $5000 - 4360 = 640$  date fruits left over on a cluster  
Number of clusters  $\times$  640 – yield of Medjool palm tree after cutting  
 $14 \text{ cluster} \times 640 \text{ fruits} = 8960$  fruits per palm tree  
Weight of fruit = ranging between 20 to 27 g, the average is 25 g  
 $25 \text{ g} \times 8960 \text{ fruits} = 214000 \text{ g} = 214 \text{ kg}$  the yield of palm tree  
 $214 \div 14 = 15 \text{ kg}$  the weight of branch approx. which is assumed in theory  
Actual weight will not exceed 8-10kg/cluster and the difference is counted as a loss in the table  
Palm tree yield  $8 \text{ kg} \times$  number of clusters  $14 = 112 \text{ kg/tree}$   
And the average is 80kg/tree and the rest will be counted as a loss due to environmental conditions and insects...etc.

### **AI Medjoolseason**

1. Medjool fruits are harvested in the middle of September and according to seasonal temperature and harvest may continue to the middle of October therefore the process of harvesting takes a time and consumes effort and the reason of that is that the Medjool fruit is costly and cannot be exposed it to risks by no means (from insects or birds) therefore they are bagged early to preserve the date fruits and, due to its weight it drops inside the bag, knowing that the harvest of Medjool dates is per fruit contrary to other types of dates which are reaped by cutting the clusters, therefore the Medjool is harvested on stages and successively with the process of repining, these fruits are considered soft and they are collected in shallow dish boxes
2. **Precooling:** we know that the temperature of field is relatively high around 45 to 50 Celsius degrees and in this case temperature must be reduced progressively down to 15 Celsius degrees and then to 5 degrees for 24 hours for the fruit to pull taut and coheres and keeps up its distinct shape



Figure: The venation in Medjool skin.

3. **Weighing process:** this is an important process which is followed immediately from the field to the workshop (preparation house) to know about the production first and maintaining it and know about the workforce needed for the process of such preparation
4. **Washing & Drying:** washing and cleaning process is done to remove straw, dirt and this process must be cared for as the Medjool date skins are sensitive and essential in the selling process as the outer skin is one of the major features therefore attention should be paid not to hit or shred and damage the outer skin while washing, as excessive water in its turn would impact the quality of Medjool date due to increased acidity therein, therefore the process of drying must not impact also the date skin and, then the process of sterilization will be carried out to remove the insects and their eggs using vaporization materials in tight chambers.
5. **Grading:** an important process to identify and sort out the sizes because they are fundamental in the determination of prices and the required packing and, this process needs control and monitoring and skillful labor and, recently machine has been used in sorting out the sizes and weights.

#### **Assortment and gradation of the Medjool date standards:**

1. Optimal humidity rate from 25-28%
2. The first class is separated from the second class and from dry and damaged dates
3. The first-class dates are those with beautiful venation and free of any air venations which would give their elegant brown color.
4. The second-class dates are the yellowish-brownish color due to the presence of air between the skin and fruit flesh which changes its venation from the first class, these are good dates because they are natural due to the environmental circumstances and the quality of soil that impacts the formation of Calcium Glucosite and Calcium Fructosite crystals under the skin due to dryness of fruit
5. To be free of any mechanical, physical or chemical damages
6. To be free of any defects like: swelling, sugar crystals, peeled loose skin

## Sizes of Medjool dates in Jordan and number of fruits in a 5 kg pack

Size	Weight/g	Average weight	Number of dates in a Pack/5kgfilled with dates (no.)
Small	14	12	76-80
Medium	15-18	16	55-71
Large	19-23	21	43-50
Jumbo	24-27	25	45-37
Super jumbo	+27	29	30-40

Weights of Medjool date may reach, if duly treated, 40-60 g each date

### Packing

Packing depends usually on customer demand but generally packing is made in cartoon boxes of 5kg, and there are 3, 2, and 1 kg, and such boxes are anti-moisture and wrapped with shrink nylon

### Storage

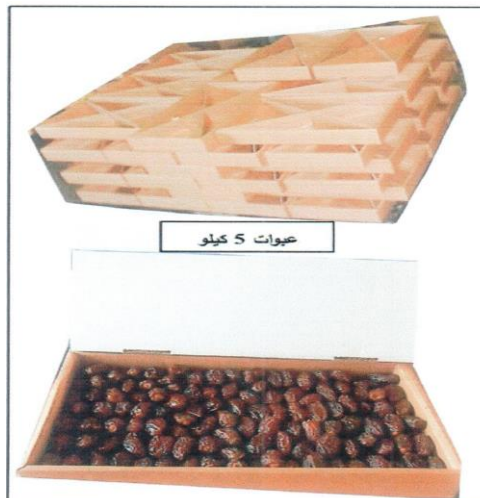
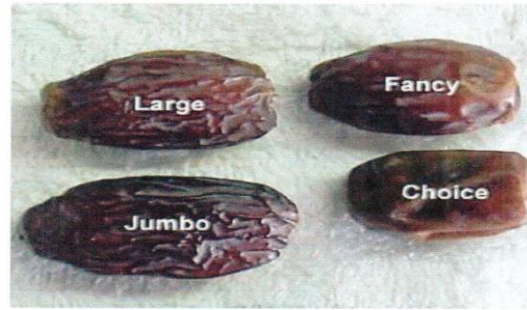
Storage process is of two types:

1. Short-term storage
2. Long-term storage

Storage for a short period is carried out in stores 5 x 10m, while storage for long time is conducted in stores at temperatures -18 to -25 degrees.

The following colors are assigned for packing:

Size	Color
Medium	Maroon
Large	Black
Jumbo	Golden
Super Jumbo	Golden
Classic	Green
403	Blue



## Carton box of dates

### Factors affecting the time of harvest

Among the most important factors affecting the time of harvest:

1. Type of brand and nature of consumption (direct, export, processing)
2. Weather conditions in terms of heat, winds, rain...etc.
3. Different agricultural processes- palm service
4. Intensity of fruition
5. Place of fruit on cluster and of the tree
6. Experience in the brand
7. Moisture content of fruit

### Control of damage and waste

1. Good training of labor will serve the Medjool palm
2. Time of harvest to be done in the morning or in the evening and to avoid noon time and sun heat
3. To use cooled carriages
4. To place the date in shaded and well-ventilated places
5. To avoid throwing the date lest of its damage
6. To select soft-touch field packs fit for the brand
7. Clean packs
8. To arrange dates well inside the packs

### Wastage in Medjool date yield

Waste in the Medjool dates is quite large according to the following equation:

1. Waste in the quantity of cluster to half the quantity as the palm produces around (24) clusters and (12) branches are only left over on the tree
2. Waste in each cluster where more than (60) racemes (strand) are removed and additionally one-third of racemes are made short to less than the half of length
3. Waste in dates as 10-12 dates are left over on each strand which contains (52-60) date fruits

**and by a mathematical equation:** each cluster that contains (5000) dates and weighed about (30-35) kg will go down to (500) dates and weighs after ripening (8) kg, and this means the wastage is very considerable, therefore, I advise Medjool farmers to lessen the process of arbitrary cutting made on clusters and racemes and date fruits, and make full use, reasonably and scientifically, of the palm production.