

# Organic Farming in the Tropics and Subtropics

Exemplary Description of 20 Crops

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## Date Palm



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Naturland would like mention the following authors and thank them for their contributions:

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The cultivation guidelines are available in English, Spanish and German for the following crops:  
banana, brazil nut, cashew nut, cocoa, coconut, coffee,  
cotton, hibiscus, macadamia, mango, papaya, peanut,  
pepper, pineapple, sugar cane, sesame, tea, vanilla.

The cultivation guidelines for Bananas, Mangoes, Pineapples and Pepper were revised in 2001 for the United Nations Conference on Trade and Development (UNCTAD) by Udo Censkowsky and Friederike Höngen.

In 2002 two more guidelines, for rice and date palms, were published in English.

All the authors emphasize, that the cultivation recommendations at hand can just provide general information. They do not substitute technical assistance to the farmers with regard to the location.

All indications, data and results of this cultivation guidelines have been compiled and cross-checked most carefully by the authors. Yet mistakes with regard to the contents cannot be precluded. The indicated legal regulations are based on the state of the year 1999 and are subject to alterations in future. Consequently all information has to be given in exclusion of any obligation or guarantee by Naturland e.V. or the authors. Both Naturland e.V. and authors therefore do not accept any responsibility or liability.

Furthermore the authors kindly call upon for critical remarks, additions and other important information to be forwarded to the address below. The cultivation guidelines will be updated regularly by Naturland e.V.

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# Organic Date Palm Cultivation

## 1. Introduction

The fruits of the date palm (*Phoenix dactylifera* L.) are sweet berries with a sugar content of more than 50%. The origin of the date palm (*Phoenix dactylifera* L.) is supposed to be in North Africa or Middle East. In North Africa and in the Middle East the date palm (*Phoenix dactylifera* L.) is a staple food that can be produced easily under unfavourable natural and economic conditions. Normally, this palm is cultivated for subsistence/local markets on small holder farms besides other crops. Because of its high nutritional value, great yields and its long life (yielding up to 100 years) the date palm was already mentioned as the “tree of life” in the bible.

### 1.1. Botany

*Phoenix dactylifera* L. belongs to the Palmae (= Arecaceae) family. There are other species with eatable berries like *P. atlantica* A. Chev. And *P. sylvestris* Roxb.. But *Phoenix dactylifera* L. having more nutritious and tasty berries is the only species with economic importance.

The date palm has a single stem of 15 to 30 m. Some 12 (0-25 range) flower buds develop during the winter in the axils of some of the leaves just below the growing point. The leaves ( 4 m long) can live up to 7 years, depending on site conditions. During youth stage of the palm, shoots are developing from the buds in the leaf axils. The shoots are used for vegetative propagation. The inflorescence, enveloped in a sheath or spathe, pushes through the fibre on the leaf base it originated from to a length of 25 to 100 cm. There are 12 inflorescences every year.

The palm is dioeciously, which means there are male and female plants. The yellowish flowers are small, attached directly to the spike lets; male flowers are sweet-scented and have six stamens, female flowers consist of three carpel's with ovules, of which normally only one will develop into a fruit. For fruit setting, fertilisation of the female flowers by male pollen is required, which in date palm cultivation is not left to the wind or insects but is done traditionally by man. They insert a piece of spike let of male flower at the moment when the female flowers are getting open. More modern methods will collect the pollen from the males and in combination with a carrier (such as flour) will be dusted on the female flowers with a mechanical device.

The development of the berries doesn't take more than five month. The colour of the ripe berries is yellow and brown red depending on the variety. There can be more than 200 berries in one inflorescence.

The date palm may reach an age of over 100 years and reach up to 30 m in height. As the high yielding period is between 40 and 80 years date palms are cut down earlier.

## 1.2. Varieties and countries of origin

At the end of the nineteenth century date palm were cultivated solely in the “old world”. Nowadays, they cultivation takes place in many other regions of the world (e.g. United States: California, Arizona, Texas; Mexico; Brazil; Argentina; South Africa; Australia; Namibia). Nevertheless, the highest production is still in the Arabic area and in the Middle East.

**Tab: World Date Production 1998**

Country	Quantity in MT
Iran	900.000
Egypt	750.000
Iraq	660.000
Saudi Arabia	600.000
Pakistan	535.000
Algeria	387.313
United Arab Emirats	250.000
Sudan	175.000
Oman	135.000
Libya	130.000
USA	019.050
Israel	009.760

The following table gives an overview on different commercially important date varieties:

	Description of the mature fruit
<b>Bahri</b>	Fresh consumption: at Khalal stage; Sweet and juicy, yellow in colour, available only during harvest season
<b>Hayani</b>	Fresh consumption: black and shiny in colour, long fruit and not too sweet
<b>Medhjoul</b>	Dried date: large fruit, soft and sweet; light brown to dark brown in colour
<b>Amari</b>	Dried date: soft, sweet and medium sized date
<b>Deglet Nour</b>	Dried date: semi-soft and famous flavour, light to dark brown in colour, harvested semi-dry
<b>Hadrawi</b>	Dried date: sweet and fleshy date, dark brown (mahogany) in colour)
<b>Zahidi</b>	Dried Date: round, medium sized and not too sweet date, golden in colour

Actually, three varieties are mostly required on the world market:

- (a) **Medjhool:** big size and attractive appearance
- (b) **Deglet Nour:** unique taste and mostly known in the Middle Eastern
- (c) **Barhi:** preferred consumption at the Khalal stage (partially ripe)

Especially in the Republic of South Africa, Namibia, Zimbabwe and in the Sahel-region new plantations mainly of Medjhool variety can be observed whereas in the Arabic countries Medjhool and Barhi are mainly used for new plantations.

In Egypt, Iran, Pakistan and Saudi Arabia the majority of production is aimed at subsistence and local markets. On the contrary countries like Iraq, Algeria, Morocco and Tunisia are focussing on exports mainly to Europe. All in all 250.000 tons (estimation) are traded on international markets, the major quantity is consumed locally.

Export orientation goes along with specialized farms, packing stations and warehouses in order to comply with international quality requirements. A negative impact of the export/market orientation is the reduced number of date varieties used for new plantations. The spread of only a few higher yielding varieties increases the risk of damages by pests and diseases. And, being the key species in very fragile micro-environments (e.g. oases) date palms ensure the biological diversity of oasis. Thus, by providing shade, keeping moisture and stabilizing/protecting soils. Without date palms no other agricultural plants could be kept like olives, citrus, pomegranates, figs, almonds, grapes, alfalfa, beans and grains. A decrease in date varieties will have a negative impact in the long run.

Therefore it is recommended not only for organic date plantations but also for conventional ones to cultivate different date varieties (high yielding improved varieties for export and local varieties for domestic consumption and local markets). Currently, most of the world's organic date cultivation takes place in Egypt, Tunisia, Marocco, Israel and United States.

### **1.3. Uses and contents**

Beside direct consumption of the whole dates the fruits are traditionally used to prepare a wide range of different products such as date juice concentrates (spread, syrup and liquid sugar), fermented date products (wine, alcohol, vinegar, organic acids) and date pastes for different uses (e.g. bakery and confectionary). Also the by-products arising from date processing can be used for different purposes. Within agricultural systems date press cake (by-product of date juice production) as well as date pits can be used as animal feed-stuff (also dates falling down from palms before maturity). In case no other uses are possible, all organic waste material arising from date processing shall be used as a component for compost preparation at least.

Furthermore a wide range of other date palm products (beside the date fruit) are existing because of the long tradition of date cultivation in the "old world". With respect to agriculture shredded leaves can be used as feedstuff for ruminants as well as a mulching material and/or a potting medium for horticulture production (high cation exchange capability). All non-fruit components of the date palm (frond bases, midrib, leaflets, spikelets, fruit stalks, spathes) have a certain but limited value for ruminant feeding (in natural environments with no or limited alternatives it should be used). Leaves are very often used to construct fences providing wind protection and creating favourable micro-climates for horticulture and/or in nurseries. Also, date palms are providing construction material for different purposes (roofs, fences, baskets, cranes, textiles etc.).

The nutritional value of dates is a high sugar content (around 50-60%), potassium (2.5 more than bananas), calcium, magnesium and iron as well as vitamins (B1,B2) and Niacin. People eat fresh and/or dried dates. Dried dates can easily be stored and preserved because of the naturally high sugar content.

## **2. Aspects of plant cultivation**

### **2.1. Site requirements**

#### **Temperature**

Date palms require an arid climate (hot and dry) with a temperature between 25° C to 32° C and a sufficient water supply. Daily maximum temperature below 9° C and a minimum temperature below 0°C are growth-inhibiting and temperatures around -



7°C cause damage. As a precondition for flowering date palms need temperatures over 18° C (in the shade) and for fruit setting temperatures above 25° C.

### Water

The daily water uptake of an adult date palm is estimated with 150 to 200 l. Rain fed date palm cultivation is not possible. To ensure growth and development of the berries irrigation is needed. Rainfall and humidity of the air leads to fungus diseases and pollination is inhibited. Rainfall during final maturation of the fruits can cause damages in many date growing areas.

### Soil

Date palms grow on different types of soils but the best yields can be reached with sandy loams. Soils should be permeable with a good drainage and a deep ground as roots are used to grow deep (6 metres) into the soil for water uptake. The date palm is considered to have the highest salt tolerance compared to all other fruit crops. Also alkaline soil conditions with a PH up to 8 is tolerable.

**Table 2: Relative salt tolerance of fruit crops (FAO 2001)**

High salt tolerance ( $EC_e \times 10^3 = 18^*$ )	Medium salt tolerance ( $EC_e \times 10^3 = 10$ )	Low salt tolerance ( $EC_e \times 10^3 = 5$ )
Date Palm	Pomegranate	Pear Almond
	Fig	Apple, Apricot
	Olive	Orange, Peach
	Grape	Grapefruit, Strawberry

\*The numbers following  $EC_e \times 10^3$  are the electrical conductivity values of the saturation extracts in millimhos per cm at 25° C associated with a 50% decrease in yield.

### Site requirements of different varieties

The following table from DOWSON and PANSIOT shows the site requirements of different varieties:

Country	Varieties	Site Requirements
Tunisia, Algeria	Bouhatem, Bouzeroua Kenta, Aguewa	suitable for early rain in autumn
Irak, California, Arizona	Dayri, Halawy, Kustawy	small rain sensitivity
Algeria	Iteema, Deglet Noor	high rain sensitivity
Irak, Egypt	Zahidi, Hayany	low sensitivity against cold
Algeria	Azerza, Taddala	resistant against
Algeria	Deglet Noor	Drought sensitive
Irak, Tunisia	Sayer, Lemsi	high salt resistance

## 2.2. Seeds and seedlings

Propagation of date palms can be done by using the seeds (sexually) and by using the offshoots (asexually). Using seeds 50% will develop to male date palms which do not bear fruits. For that reason the use of offshoots (vegetative propagation) is the most common one. Offshoots are cut with a chisel and/or machete from proven female cultivars and transplanted into a nursery with good growing conditions (wind protection, shade trees, soil etc.) in order to support the development of the roots.

After one year (or earlier) young date palms are transplanted to their permanent place. The right time of transplantation depends on the development of the root system as well as on the number of palm leaves (10 to 12 are recommended). Sometimes offshoots already have developed roots at the mother plant. In this cases offshoots can be planted directly.

In more intensive and specialised date palm plantations seedlings are gained by tissue culture. Thus, to avoid the propagation of pest and diseases.

## 2.3. Methods of planting

In the traditional date orchards especially in the oasis the density of palms is very high with the intention to form an almost closed canopy. The high density provides shade and protection from wind, thus creating a micro-climate in which the harsh conditions of a hot and dry climate are tempered to make living conditions somewhat more sustainable. However, the high density diminishes the opportunities for growing secondary crops and the introduction of mechanization in date palm cultivation.

In specialized plantations the most common planting system is in a grid of 9m X 9m (or 10mx10m) providing space for the use of machines as well as for secondary crops. In case an old plantation needs a rejuvenation, young date palms are planted very close to the old palms in order to remove them when the young palm starts to bear fruits. Sometimes date palms are planted around a field for arable cropping and or horticulture production in combination with other fruit trees.

The young date palms are planted in a hole (90cm deep x 90cm wide) in order to put the roots closer to the water table. In traditional cultivation systems the alkaline earth is removed and replaced by a mixture of organic manure, sand and ash. In organic cultivation systems it is recommended to add also composted organic material.

It is recommended to prepare the wholes two to three month before planting. After planting the young date palms are watered daily for at least one or two weeks. With the objective to protect the date palm and to improve the growth conditions young plants should be surrounded by fences (e.g. with cut date palm leaves). In addition a coat out of straw and palm leaves is put around the shoot to reduce water losses.

Normally, farmers choose the season with moderate temperatures for planting. However, date palms can be planted throughout the year provided a sufficient water

availability is given. In order to provide natural pollination two to three male shoots are planted with approximately 100 female shoots to gain pollens.

Before planting a new date plantation land has to be prepared by building a drainage and irrigation system. Old stems should be removed but old palm leaves should be reduced to small pieces and brought into the soil by ploughing (provided the material is not infested with pests and diseases). In some areas it is recommended to establish shelter belts of Tamarisk trees (*Tamarix aphylla*) and Ironwood (*Casuarina equisetifolia*) before planting the date palms.

## 2.4. Diversification strategies

Traditionally, intercropping with other fruit trees (citrus, pomegranates, olives, grapes, guava) or arable crops (alfalfa, barley, beans etc.) is practised in many of the main production areas. Without the shade provided by the date palms other crops very often cannot grow. Organic cultivation does not allow for monoculture systems. Especially, intercropping with alfalfa and other legumes provide an enrichment of the soils with nitrogen as well as fodder for livestock production. Beside a site-appropriate mixed system of date palms, arable crops and fruit trees date plantations should be sheltered/surrounded by green fences (e.g. with Polynesian Ironwood (*Casuarina ssp.*) or by stripes of Spanish Reed (*Arundo donax*) within the plantation. Both are multiple use plants in arid climates.

## 2.5. Nutrients and organic fertilisation management

### 2.5.1. Nutrient requirements

The following average amounts of nutrients are cited in the literature looking on conventional date palm plantations: 500 g N (nitrogen), 300 g P (phosphorous) and 250 g P (potassium).

#### Average nutrient up-take of date palms (g/plant)<sup>1</sup>:

	N[g]	P [g]	K [g]
<b>Average Nutrient up-take</b>	500	300	250

It has been shown that there is a stronger effect of nitrogen in terms of yield and quality than Phosphorous and Potassium. The effect of Phosphorous and Potassium on yield and quality is not proven.

<sup>1</sup> Rehm und Espig (Hrsg.) (1994): Nutzpflanzen der Tropen und Subtropen; Bd. 3: Spezieller Pflanzenbau. UTB Verlag

### 2.5.2. Organic fertilisation strategies

In organic cultivation fertilisation strategies are based on green manure and compost. This strategy doesn't differ much from the traditional way of fertilizing date palms. Animal manure was applied by digging a trench around the tree in order to bury the animal manure. Nitrogen was provided by intercropping of alfalfa (and other appropriate leguminous plants). Organic cultivation systems requires for a sufficient supply with composted organic materials (animal manure with other organic materials like straw and other organic waste material) on a regular basis. At least every 4 years compost should be added to the date palm. For that reason the compost must be brought into the soil around the stem. Regular application of organic materials improves the water holding capacity and therefore the efficiency of irrigation.

### 2.6. Biological methods of plant protection

Most of the problems concerning disease and pests have the following causes:

- (a) Monoculture cultivation and use of non-resistant and/or of few varieties
- (b) Insufficient distance between species that grow to the same height; failure to trim agro forestry systems.
- (c) Unfavourable soil conditions like degenerated or poor soil, soil not deep enough for roots, lack of organic material, high salinity etc.
- (d) Unsuitable site conditions (deep water table, insufficient irrigation, drought, temperature, high rainfall level etc.)

In case diseases and/or pests are occurring in a date plantation the overall situation of a date plantation has to be analysed in order to identify the reasons. Thus it is possible to develop site appropriate strategies to prevent the outbreak of diseases/pests in the long run.

In general two mayor threats are existing in conventional date palm plantations, namely Red Palm Weevil (*Rhynchophorus ferrugineus*) and Bayoud (*Fusarium oxysporium*). The outbreak of both can be prevented by the strict use of non-infested seedlings and strong hygienic precautions. Tissue culture propagation of seedlings is the most successful way to achieve this aim, but requires for appropriate techniques and facilities. Health status of date offshoots and seedlings from nurseries needs to be clarified in order to avoid any infestation of the own plantation. In this context it is of utmost importance to take care for regular disinfections of the working tools, removal of infected palms, leaves or inflorescences.

In the following chapter a more detailed overview on pest and diseases in date palm plantations is given:

### 2.6.1. Diseases

Most occurring fungal diseases:

- (a) **Omphalia root rot:** Triggered by *Omphalia pigmentata* or *O. tralucida*. This fungus doesn't exist in the stem, only in the roots.
- (b) **Inflorescence rot (and/or Bayoud):** Triggered by *Fusarium oxysporum* f. sp. *Albedinis*. This fungus exists in the soil. Symptoms: white chlorite colour and fade of the palm leaves. Bad conditions of cultivation and an intensive cultivation of alfalfa and vegetables in rotation supports an infection. The following varieties have a lower fruit quality but they are supposed to be resistant against inflorescence rot: Takerboucht, Bou Jigou, Taadmant und Bou Stammi.
- (c) **Diplodia disease:** Triggered by *Diplodia* spp. Can occur in young cultivations.
- (d) **Terminal bud rot:** Triggered by *Ceratocystis paradoxa*. Rot of the terminal buds in older palms.
- (e) **Khamedj:** Triggered by *Mauginiella scaettae*. Rot of the flowers which can lead to a total destruction of the inflorescence.
- (f) **Fruit roots:** Triggered by *Aspergillus niger*, *Rhizopus nigricans*, *Alternaria citri*.

### 2.6.2. Pests

- (a) **Cottony cushion scale:** *Parlatoria blanchardii* and *Phoenicoccus marlatti* are wide spread. Sucking on the leaves leads to early dead of the leaves. Cottony cushion scales need humidity and wind free areas therefore they exist inside of the plantation. Biological control is done with natural predators like bugs of the species *Pharascymnus*, *Cybocephalus* and *Chilocorus bipustulatus* but also by appropriate methods of cultivation.
- (b) **Bryobia:** *Oligonychus afrasiaticus* and *Paratetranychus simplex* are wide spread in North Africa and in the Middle East and *O. pratensis* in California. Bryobias infest the leaves and unripe fruits. They need dry and windy conditions. The use of *Arundo donax* in mixed cultivation supports their spreading therefore it is recommended to use other crops for mixed cultivation.
- (c) **Caterpillars:** Most common are the caterpillars of the butterfly *Ephestia cautella* and *Batrachedra amydraula*, which eat the leaves and penetrate into the fruits. *Bacillus Thuringiensis* is used for biological control.
- (d) **Bugs:** Rhinoceros bug of the species *Oryctes* spp. They eat tissue of the young leaves and destroy the area of vegetation. There are different possibilities of biological control: Removal of their hotbeds like rotten plant material and green manure. Artificial preparation of hotbeds for catching, biological control by the fungus *Metarrhizium anisopliae* and the virus *Rhabdionvirus oryctes*.
- (e) **Fruit bugs** of the species *Cotinis texana*, *Carpophilus hemipterus*, *Coccotrypes dactyliperda*. They destroy ripe fruits and inflorescences. Inflorescences are used to wrap up with bags to be save.

### **2.6.3. Rodents**

As in other palm crops rats, mice and other rodents may cause damages on the trunk as well as on the fruits. For that reason it is recommended to support predators like owls with the objective to control the population of rodents in the date plantation. Another mechanical way of reducing fruit damages is to place a mechanical device around the stem in order to make it impossible for rodents to climb up the tree.

## **2.7. Crop monitoring and maintenance**

Regular activities during a growing season are:

In intensive date plantations machines (cranes) are used up-lifting the workers for artificial pollination, maintenance work and harvesting.

- (a) Artificial pollination
- (b) Protection of inflorescences by bags
- (c) Bunch management

In this case it is important to remove some to avoid nutritional competition. to the growing point. Normally, the age limit is less (between 40 and 80 years is the high yielding period) consequently the height will not be more than 15-25 m maximum before it will be cut down because of declining yield and increasing difficulty (and danger) to reach the crown during pollination, bunch management and harvesting.

## **2.8. Harvesting and post-harvest treatment**

### **2.8.1. Harvesting**

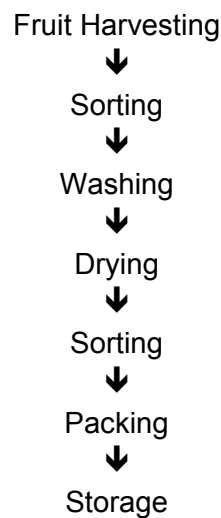
The colour of the dates indicates the right harvesting time. At the “Khalal” stage dates are partially-ripe showing a yellow or red colour (depends on the variety). At this stage some dates are already harvested in spite of the fact that the moisture and tannin content is still very high. Most of the dates are harvested at the fully-ripe stage showing a colour. Furthermore, the sugar content is higher and/or moisture and tannin content is lower.

Harvesting is labour intensive as dates are hand picked. In intensive date plantations cranes are used to lift up the workers. However, in most of the cases workers have to climb up the date palm in order to reach the fruit brunches.

Overall country averages in the main production regions do not go much higher than 20-30 kg/palm/year, though the production inputs are also less (fertilizers, pesticides) and generally the palms are much closer spaced. Even so, in well organized date plantations yields may reach over 100 kg/palm/year under favourable environmental conditions. At the age of 30 years date palms are reaching the high-yielding period.

### 2.8.2. Preparation, transport and storage

After harvesting dates are sorted, washed in drinking water, air dried (45°C), again sorted and packed. Sorting of dates is done manually. While sorting workers can remove dates with any indication of infestation as well as other particles and damaged dates.



Air-drying should result with a moisture content of 20% or below in order to prevent incidence of molds and yeasts. Storage of dates depends on anticipated duration of storage as well as on the variety of dates. The optimum storage temperature is 0° C which allows for a storage period of 6 up to 12 months. Semi-soft dates like Deglet Noor and Halawy have a longer storage life than soft dates like Medjool and Barhi. For longer storage durations it is possible to freeze the dates (-18°C). In case dates are stored for a short time temperature shall be below 13° C (prevent insects to cause feeding damages and reproduction) and/or below 5° C (control of new insect infestation). The humidity in storage rooms shall range between 70% and 75%. High moisture in combination with higher temperature levels increase enzymatic as well as non-enzymatic browning of dates.

Dates with insect infestation have to be treated in order to maintain export quality. Unlike conventional dates the use of methyl bromide and other chemical storage pesticides is not allowed within management system for organic food. Alternatively, disinfestations with 100% carbon dioxide for 1-2 days is recommended.

Other measurements to ensure product quality are:

- (a) Avoidance of temperature fluctuations otherwise moisture condensation on dates will support growth of unwanted micro-organisms
- (b) Clean and hygienic conditions in packing houses, storage rooms etc.
- (c) Separated storage of dates as ripe dates absorb the aroma of other products (e.g. garlic, onions, herbs, spices)
- (d) Packaging of dates in nitrogen reduces enzymatic browning (darkening) of dates (exclusion of oxygen).

### **3. Product specifications and quality standards**

There is a wide range of date products offered in the market like syrup, juice, jams, preserves and condiments. Dates are often used as a component of food preparations like sweets, confectionary, breakfast foods, desserts, baking products and dried fruit and nut mixtures as well. The main share of the organic date production is sold as fresh or dried fruit.

The worldwide codex standard for dates are shown in the Annex.



## **Annex : CODEX STANDARD FOR DATES**

(World-wide Standard)

### **1. SCOPE**

This standard applies to commercially prepared whole dates in pitted or un-pitted styles packed ready for direct consumption. It does not apply to other forms such as pieces or mashed dates or dates intended for industrial purposes.

### **2. DESCRIPTION**

#### **2.1 Product Definition**

Dates are the product prepared from sound fruit of the date tree (*Phoenix dactylifera* L.), which fruit:

- (a) is harvested at the appropriate stage of maturity;
- (b) is sorted and cleaned to remove defective fruit and extraneous material;
- (c) may be pitted and capped;
- (d) may be dried or hydrated to adjust moisture content;
- (e) may be washed and/or pasteurised; and
- (f) is packaged in suitable containers to assure preservation and protection of the product.

#### **2.2 Varietal Types**

Varietal types are classified as:

- (a) Cane sugar varieties (containing mainly sucrose) such as Dagleat Nuur (Deglet Noor) and Dagleat Beidha (Deglet Beidha).
- (b) Invert sugar varieties (containing mainly invert sugar - glucose, and fructose) such as Barhi (Barhee), Saiidi (Saidy),
- (c) Khadraawi (Khadrawy), Hallaawi (Halawy), Zahdi (Zahidi), and Sayir (Sayer)

#### **2.3 Styles**

Styles may be classified as:

- (a) unpitted; and
- (b) pitted.

#### **2.4 Sub-styles**

Sub-styles are as follows:

- (a) Pressed - dates which are compressed into layers using mechanical force.
- (b) Unpressed or Loose - dates which are free-flowing or packaged without mechanical force or compression.
- (c) Clusters - dates with the main bunch stem attached.

#### **2.5 Size Classification (Optional)**

Dates may be designated as to size names in accordance with the following charts:

- (a) Unpitted dates
- (b) Pitted dates

Size No. of dates in 500g

Unpitted Dates

Small	more than 100
Medium	80 to 100
Large	less than 80

Pitted Dates

Small	more than 110
Medium	90 to 110
Large	less than 90

### **3. ESSENTIAL COMPOSITION AND QUALITY FACTORS**

#### **3.1 Composition**

##### **3.1.1 Optional Ingredients**

Dates from organic agriculture shall be kept as natural as possible. Use of glucose syrup, sugars, flour, vegetable oils as allowed according to the Codex Alimentarius for Dates is not usual for organic qualities.

#### **3.2 Quality factors**

##### **3.2.1 General Requirements**

Dates shall be prepared from such fruit and under such practices that the finished product shall possess a characteristic colour and flavour for the variety and type, be of proper stage of ripeness, be free of live insects and insect eggs and mites and meet the following additional requirements:

##### **(a) Moisture content (Maximum)**

- Cane sugar varieties 26%
- Invert sugar varieties 30%

##### **(b) Size (minimum)**

- Unpitted Dates: 4.75 gram
- Pitted Dates: 4.0 gram

##### **(c) Pits (Stones)**

- Not more than two pits or (in Pitted Style) 4 pieces of pit per 100 dates

##### **(d) Mineral impurities**

- Not more than 1 g/kg

##### **3.2.2 Definition of Defects**

(a) Blemishes

- Scars, discoloration, sunburn, dark spots, black nose or similar abnormalities in surface appearance affecting an aggregate area greater than that of a circle 7 mm in diameter.

(b) Damaged

- (Unpitted dates only) - dates affected by mashing and/or tearing of the flesh exposing the pit or to such an extent that it significantly detracts from the visual appearance of the date.

(c) Unripe Dates

- Dates which may be light in weight, light in colour, have shrivelled or little flesh or a decidedly rubbery texture.

(d) Unpollinated Dates

- Dates not pollinated as evidenced by thin flesh, immature characteristics and no pit in unpitted dates.

(e) Dirt

- Dates having embedded organic or inorganic material similar to dirt or sand in character and affecting an aggregate area greater than that of a circle 3 mm in diameter.

(f) Insects and mites damage and contamination

- Dates damaged by insects or mites or contaminated by the presence of dead insects or mites, fragments of insects or mites or their excreta.

(g) Scouring

- Breakdown of the sugars into alcohol and acetic acid by yeasts and bacteria.

(h) Mould

- Presence of mould filaments visible to the naked eye.

(i) Decay

- Dates that are in a state of decomposition and very objectionable in appearance.

### 3.2.3 Allowance for Defects

The maximum allowances for the defects defined in 3.2.2 shall be:

A total of 7% by count of dates with defect (a)

A total of 6% by count of dates with defects (b), (c) and (d)

A total of 6% by count of dates with defects (e) and (f)

A total of 1% by count of dates with defects (g), (h) and (i)

### **3.3 Lot Acceptance**

A lot will be considered as meeting the quality criteria requirements of the standard when:

- (a) there is no evidence of live infestation; and
- (b) the sub-sample, as taken in conformity with sub-section 8.1.2 meets the general requirements of sub-section 3.2.1 and does not exceed the allowances for the respective defects in sub-sections 3.2.2 and 3.2.3, except that, with respect to size requirements, 5% by count (5 dates out of 100) may weigh less than the specified minimum.

## **4. FOOD ADDITIVES (not allowed for organic dates)**

## **5. HYGIENE**

**5.1** It is recommended that the product covered by the provisions of this standard be prepared in accordance with the International Code of Hygienic Practice for Dried Fruits recommended by the Codex Alimentarius Commission (Ref. No. CAC/RCP 3-1969).

**5.2** When tested by appropriate methods of sampling and examination, the product:

- (a) shall be free from micro organisms capable of development under normal conditions of storage; and
- (b) shall not contain any substances originating from micro organisms in amounts which may represent a hazard to health.

## **6. WEIGHTS AND MEASURES**

Containers shall be as full as practicable without impairment of quality and shall be consistent with a proper declaration of contents for the product.

## **7. LABELLING**

In addition to sections 1, 2, 4 and 6 of the General Standard for the Labelling of Pre-packaged Foods (Ref. CODEX STAN. 1-1981), the following specific provisions apply:

### **7.1 The Name of the Food**

**7.1.1** The name of the product shall be "Dates"

**7.1.2** The style shall be indicated as "pitted" or "unpitted", as is applicable.

**7.1.3** The name of the product may include the name of the varietal type, such as "Hallawi", "Sayer", "Khdrawi", "Daglat Noor", "Barhee", or others, the sub-style as "pressed" or "unpressed", and the size designation as "small", "medium" or "large".

## **7.2 List of Ingredients**

A complete list of ingredients shall be declared on the label in descending order of proportion in accordance with the provisions of sub-section 3.2(c) of the Codex General Standard for the Labelling of Pre-packaged Foods (Ref. CODEX STAN. 1-1981).

## **7.3 Net Contents**

The net contents shall be declared by weight in either the metric ("Système international") units or avoirdupois or both systems of measurement, as required by the country in which the product is sold.

## **7.4 Name and Address**

The name and address of the manufacturer, packer, distributor, importer, exporter or vendor of the product shall be declared.

## **7.5 Country of Origin**

**7.5.1** The country of origin of the product shall be declared.

**7.5.2** When the product undergoes processing in a second country which changes its nature, the country in which the processing is performed shall be considered to be the country of origin for the purposes of labelling.

## **7.6 Lot Identification**

Each container shall be embossed or otherwise permanently marked in code or in clear to identify the producing factory and the lot as well as the organic quality.

## **7.7 Date Marking**

**7.7.1** The "date of minimum durability" (preceded by the words "best before") shall be declared by the day, month and year in uncoded numerical sequence except that for products with a shelf-life or more than three months but not more than 18 months,

the month and year will suffice, and for those with a shelf-life of 18 months or more, the year will suffice. The month may be indicated by letter in those countries where such use will not confuse the consumer. In the case of products requiring a declaration of month and year or year only, and the shelf-life of the product is valid to the end of a given year, the expression "end (stated year)" may be used as an alternative.

**7.7.2** In addition to the date of minimum durability, any special conditions for the storage of the food shall be indicated if the validity of the date depends thereon.

**7.7.3** Where practicable, storage instructions shall be in close proximity to the date marking.

## **8. METHODS OF SAMPLING AND ANALYSIS**

### **8.1 Method of Sampling**

#### **8.1.1 Gross Sample**

Select at random not less than 2 individual packages per each 1,000 kg portion of the lot. From each individual package draw a sample of 300 g and in any case sufficient to obtain a gross sample of not less than 3,000 g. Use the gross sample for checking carefully for live infestation and general cleanliness of the product prior to its examination for compliance with other provisions of the standard.

#### **8.1.2 Sub-samples for Examination and Testing**

Mix the gross sample well and take small quantities at random from many different places as follows:

For moisture test - 500 gram

For pits (in pitted style) - 100 dates

For specified defects and size requirements - 100 dates

### **8.2 Methods of Analysis**

#### **8.2.1 Determination of Moisture Content**

##### **8.2.1.1 Codex Defining Method (Type I method)**

In accordance with the AOAC (1975) Method (Official Methods of Analysis of the AOAC, 1975, 12th Ed., 22.013, Moisture in Dried Fruits) (Vacuum Oven Method).

##### **8.2.1.2 Codex Alternative Approved Method (Type III method)**

In accordance with the FAO/WHO Codex Alimentarius Method, CAC/RM 50-1974 (FAO/WHO Codex Alimentarius Methods of Analysis for Processed Fruits and Vegetables, Third Series, CAC/RM 50/53-1974, Moisture Determination - Electrical Conductance Method). However, in cases of dispute, the method in 8.2.1.1 will be the defining method.

## **9. METHOD OF EXAMINATION**

### **9.1 Internal Defects**

Examine each date carefully for internal defects using a strong light. If the dates are pitted, open up the flesh so that the internal cavity can be viewed. If the dates are unpitted, slit the date open so as to expose the pit, remove the pit and examine the pit cavity.