

Potential of Moroccan dates of Jihel variety

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Abstract

Morocco's phoenicultural heritage is known for its varietal diversity. The present study aims to determine the potential of the Jihel variety of dates, compared to the other most economically important varieties of dates in Morocco. Based on a bibliographic analysis, a follow-up of units of dates and an analysis of the surveys were realized along with field data recovery. The present study shows that dates of Jihel variety have many criteria that permit its position as an important commercial produce. However, many interesting measures must be envisaged, in particular, the respect of the good practices of production, the accompaniment of the phoeniculturists, the encouragement of industrialists and the promotion of the dates of Jihel variety by the implementation of an appropriate communication approach: advertising campaigns, innovative concepts of packaging and labeling. The results represent an exploitable base to establish a roadmap, aiming for the development of the phoenicultural sector in particular dates of Jihel variety of Morocco.

Key words: Date, Jihel, marketing, Morocco, phoeniculture, varieties

Introduction

The oasis economy of the South East of Morocco is essentially based on the exploitation of date palm. In fact, they are the main source of income for local residents, through the exploitation of the date tree.

The phoenicultural activity contributes in the formation of the agricultural income. In addition to the date, various materials intended for the craft, the construction or energy production. The analysis of the sector of date in Morocco shows that this sector has several advantages *viz.*, the dietary and nutritional virtues of the date; the strong cultural and religious load symbolized by the date palm among the populations; the existence of real potential for extension of the date palm cultivation area; the increase in the performance of the sector, particularly in terms of improving the productivity and quality. The diversity of Moroccan date palm varieties and professional and professional organizations are existing.

In spite of the promising prospects for the development of the date palm sector; many constraints hinder its development, especially, marketing deficiencies of the Moroccan date product. These constraints are mainly related to the low characterization of Moroccan dates varieties. The most marketable date varieties are Majhoul, Boufeggous, Jihel and Bouskri. This exploratory study aims to characterize one of the most marketable date varieties, the Jihel variety.

We studied the characterization of this variety on the one hand about agronomic level (production potential, productivity, physical, chemical criteria) and on the other hand, about marketing and commercial level (notoriety, quality requirements and sensory appreciation.). The characterizations of date Jihel will be done with comparison to other most marketable varieties.

Material and methods

Location of the study area: In Morocco, the date palm, is implanted mainly along the valleys of Ziz and Drâa. The production of date Jihel in Morocco is estimated at 7.500 tons, this production presents 9 % of the Moroccan phoenicultural production (Fig. 1).

The date palm of Jihel variety is groves are mainly in the provinces of Zagora (78 %), Tata (18 %) and Ouarzazate (4 %). The province of Zagora hosted many of development projects of the date palm sector, including densification, extension of palm groves, and support of professional organizations and specially installation of an infrastructure to valorize date production by the creation of cold storage units of dates (UD) (Table 1).

Table 1. The capacity of conditioning units and cold storage of dates at the province of Zagora

Conditioning units of dates (UD)	Status	Refrigerated storage capacity (in tons)
UD Mezguita Agdz	EIG	400
UD Ouahat Tamazmoute Tinzouline Draa	EIG	400
UD Ternata	EIG	400
UD Maider Tazarine	EIG	200
UD Toumour Mhamid	EIG	100
UD Toumour Assala	Cooperative	40
UD Annakhil	Cooperative	80
UD Moustakbal Draa	Cooperative	25
UD Toumour Tinzouline	Cooperative	40
UD EL Mezouari	Private	20
UD El Ghazali	Private	20
UD Malali	Private	20
UD Lahcini	Private	10

EIG: Economic Interest Group

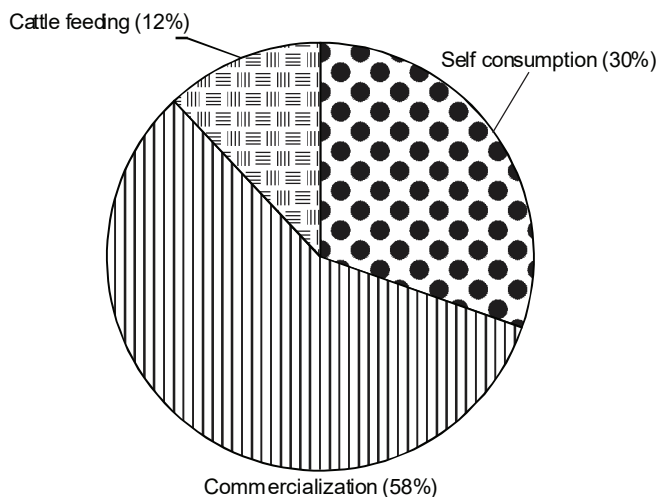


Fig. 1. Contribution of the different varieties of dates in the total production of dates in Morocco

Materials and methods

As part of the present study, a literature review and surveys were conducted between 2013 and 2017 throughout the Moroccan national territory.

The study included characterization of dates of Jihel variety, production potential, productivity, physical and chemical parameters, marketing and quality standards (notoriety, quality requirements and sensory appreciation). The characterization of Jihel variety dates was achieved at the cradle of its production, particularly in the province of Zagora, while the prospecting and surveys were realised inside and outside the Jihel variety date production area. A documentary analysis realised the physical, chemical and biochemical characterizations of Jihel dates, the production aspects were studied on the basis of the studies and reports completed by the field data collection, the questioning was intended for the farmers and the technicians who work in the development institutes of the phoenicol sector. The study of the aspect conditioning of dates was realised essentially on the basis of the field investigation and surveys, in particular UD: units of UD Mezguita Agdz, UD Ouahat Tamazmoute Tinzouline Draa, UD Ternata, UD Toumour Assala, UD Annakhil, UD Toumour Tinzouline and UD Moustakbal Draa. Concerning the commercial characterization of the Jihel dates, in addition to the documentary analysis, it was based on outcomes of field surveys. The survey targeted the managers of the refrigerated units of dates, farmers, date consumers, point of sale managers and manufacturers. Our field survey was conducted using fact sheets based on specific questions (preference, notoriety, price and availability.)

Results and discussion

Study of the Moroccan supply of date of Jihel variety

Analysis of production: The geographical area of the Moroccan date palm is located in the South and South-East of the country, in particular, the provinces of Errachidia, Figuig, Tinghir, Ouarzazate, Tata, Zagora and Guelmim, which represent nearly 98 % of Morocco's date palm heritage. Thanks to Morocco's national strategy about date palm development, today the area occupied by the date palm is about 59.640 ha with an estimated

production of 117.000 tones. The province of Zagora contributes to 78 % of the Moroccan Jihel date production. The palm groves of Zagora are characterized by a date dominated by the khalts (52 %) and the Jihel variety (18 %).

The Jihel date production is concentrated especially at traditional palm groves. Concerning the agronomic aspect, the productivity of Jihel date palm, varies according to the conditions of irrigation, the state of the plantations, etc.; however, the average productivity is estimated at 45 kg/ha in the province of Zagora (traditional palm grove). Date palm cultivation is subjected to various phytosanitary problems that hinder its development and extension. The Bayoud, *Fusarium* vascular disease of *P. dactylifera*, caused by a fungus of telluric origin *Fusarium oxysporum* fsp. *albedinis* (Moulay, 2003). The varieties with good commercial value (Mejhoul, Boufeggous, Jihel, Bouskri) are very sensitive to the disease (Sedra, 2011).

Physical, chemical, biochemical and morphological criteria of Jihel dates: Dates are known for their nutritional value. They contain proteins, lipids, cellulose, mineral salts, vitamins, enzymes, etc., but it is especially in sugars that they are very rich. These sugars represent more than half of the dry matter of the date and they consist varying proportions of sucrose and reducing sugars (glucose and fructose).

As for the moisture content, it varies from 12 to 40 % depending on the date varieties and the regions of production (Harrak and Boujnah, 2012). Sugars and water have given the date, by their proportion, the consistency of the flesh. The calculation of this proportion, called quality or hardness index and designated by "r", estimate the degree of stability of the fruit, considered optimal if r is equal to 2. The dates are described as soft for r less than 2, half-soft for r between 2 and 3.5 and dry for r greater than 3.5 (Harrak *et al.*, 2005). Date of Jihel variety is classified as a semi-soft date, with an index $r = 3.6$. Jihel variety is nutritious as it has total sugar content (78.3 %), energy (240 Kcal/100g of dates) and the average protein content (2.40 g/100 g dry matter). The Jihel date is characterized by a total titratable acidity of about 0.25 g of citric acid/100 g of dates with a pH of 4 (Harrak and Boujnah, 2012). The color of dates and their consistency constitute an important aesthetic criterion for the marketing of dates. The Jihel date is brown in color, the volume is 10.17 cm³ and the density is 0.92 g/cm³, the shape is oval (Harrak and Boujnah, 2012). The Moroccan heritage date variety Jihel is characterized by a caliber quality complying with the standards required by the extra quality and the quality Category I. Indeed, 80 % of the national Jihel date production is commercialized as an extra quality or quality Category I. The attributes related to the volume (size) depend on the planting conditions, the technical itinerary and the harvest conditions. Moroccan Jihel date production is low and concentrated in traditional palm groves but is characterized by a caliber meeting commercial quality standards. Expanding into modern palm groves and respecting the good farming practices will increase the production potential of dates of Jihel variety.

Conditioning and cold storage of dates: There is an important infrastructure in the province of Zagora, for the valorisation of dates, in particular by conditioning and cold storage units of dates (UD). The Moroccan state and some donors have installed UD. In 2017, the province of Zagora established infrastructure

for conditioning and cold storage of dates, with a cold storage capacity of 1.750 tons. These units of dates have different storage capacities, and are managed by private companies or cooperatives or EIG. The date processing can be summarized in the following key steps: Receipt and weighing of dates, fumigation by phosphine treatment, cold storage, hydration, drying and packaging. A follow-up was carried out at the conditioning units UD. The work consisted of following the sensory quality (taste, color, texture) of stored Jihel dates. At storage temperature of 0-4 °C, for 9 months, the dates maintained their sensory quality with slight browning and wilting in the texture due to the relative humidity, however, no alterations or deteriorations were recorded. The managers of UD declare their preference for the storage and packaging of Jihel dates compared to other varieties, which require advanced technological operations (drying, hydration etc.).

Geographical Indication “Jihel Drâa dates”: Authentic products, related to the terroir and the practical human knowledge, are related to geographical origin which guarantees specific quality. To escape the rule of standardization, local products seek to be distinguished from conventional products in the same market. This differentiation can be established through the Distinctive Signs of Origin and Quality (DSOQ). In Morocco, the willingness and commitment of public authorities to improve and protect the quality of agricultural and food products have resulted in the launch of ambitious programs, including the establishment and promulgation of a new arsenal legal and regulatory framework in addition to other pieces of legislation, including Law 25-06. The Law 25-06 concerning the DSOQ defines three types of distinctive signs of origin and quality, viz., the Agricultural Label (LA), the Geographical Indications (GI) and the Appellations of Origin (AO). The Moroccan varieties of labelled dates are: the variety of Boufeggous with protected geographical indication ‘Boufeggous dates’, the variety of Bouittob with Protected Geographical Indication ‘Bouittob Dates of Tata’, the variety of Najda with the Agricultural Label ‘Najda Dates’, the variety of Majhoul with Protected Geographical Indication ‘Majhoul Dates of Tafilalet’, the variety of Aziza with Protected Geographical Indication ‘Aziza Bouzid’; Dates of ‘Figuig’ and Geographical Indication for ‘Jihel’ Dates of Drâa (MAFRDWF, 2018). At the beginning of the twentieth

century, the Jihel variety of dates, was selected and propagated by the phoeniculturists of the valley of Drâa, where it has a very good adaptation. This variety has the elements that justify the link between the quality and characteristics of the product with the geographical area. Thus, the recognition of the geographical indication and the homologation of the specifications related to Jihel dates of Drâa have been published. The geographical area of production of the product ‘Date Jihel of Drâa’ covers an area of about 49.000 km² including the provinces: Tinghir, Ouarzazate, Tata and Zagora. The traceability of the product for which the GI “Jihel dates of Drâa” is requested must be ensured at different levels from production to expedition. In fact, 40 % of consumers surveyed are interested in the origin of dates. Hence, in the interest of exploiting the origin of dates as a selling point (Chetto *et al.*, 2005) Dates of Jihel variety can be labelled ‘Jihel dates of Drâa’, in condition that they respect specification required. As a recommendation, it is important to make efforts to accompany the phoeniculturists for the diffusion and the exploitation of the IG label ‘Jihel dates of Drâa’.

Study of the demand for dates Jihel variety at the national market

Destination of date of Jihel variety production: In Morocco, the phoenicultural production is intended for the self-consumption, the marketing and the feeding of cattle. Only 58 % of the total production is intended for marketing. However, the production of Jihel dates is primarily intended for marketing (84 %), only 3 % is declared lost or intended for feeding of cattle (Fig. 2) and (Fig. 3) (Regional Office for Agricultural Development Ouarzazate, 2016). The variety Jihel is a variety intended primarily for marketing, thanks to the attributes it has.

Quality requirement: The development of the phoenicultural sector necessitated the setting up of a date standardization system. The MAFRDWF of Morocco has set up a Moroccan date standardization system about the quality and safety of dates and date paste marketed. Dates should be picked when ripe, can be marketed with or without kernels, washed, bagged, rehydrated or pasteurized. The maximum water content for dates containing mainly sucrose and dates containing essentially glucose and fructose is respectively 26 and 30 %. Commercialized dates

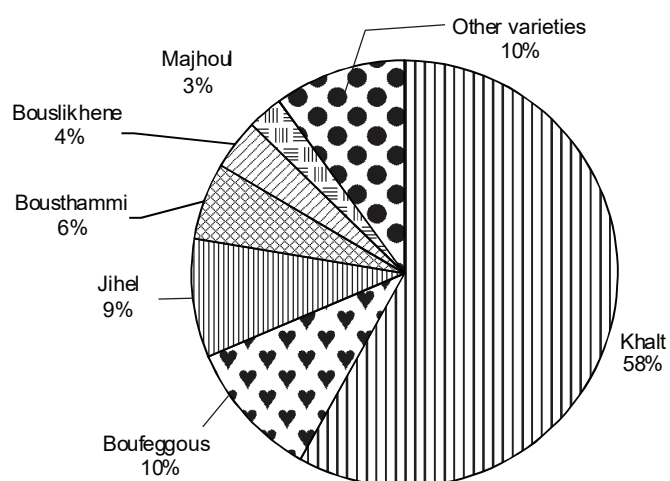


Fig. 2. Destination of phoenicultural production of Morocco (2014)

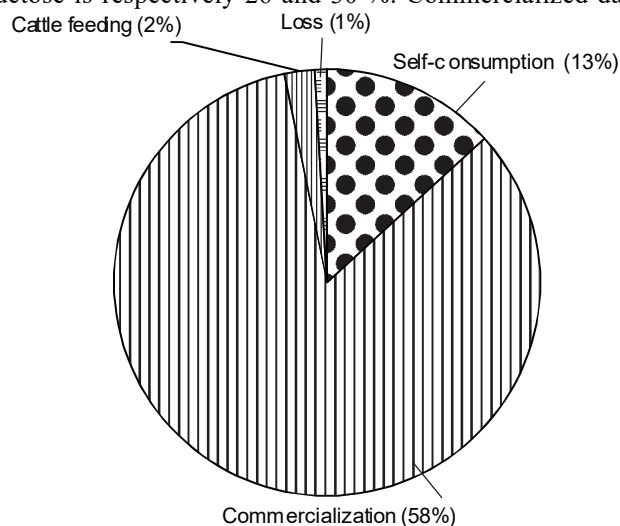


Fig. 3. Destination of phoenicultural production of dates of Jihel variety of Morocco

Table 2. Comparison of quality standards requirements for the date of Jihel variety (Extra quality)

Standards requirements	Extra quality			Category I			Category II		
	Official Bulletin (Morocco)	Moroccan standard (Jihel)	Unece Standard	Official Bulletin (Morocco)	Moroccan standard (Jihel)	Unece Standard	Official Bulletin (Morocco)	Moroccan standard (Jihel)	Unece Standard
Minimum weight (g): minimum weight of the dates of the variety whatever the category		5,4	4		5,4	4		5,4	4
Immature / unpollinated	1 %	1 %	1 %	2 %	2 %	2 %	4 %	4 %	4 %
Sour / spoiled / moldy	0 %	0 %	0 %	1 %	1 %	1 %	1 %	1 %	1 %
Damaged by parasites	3 %	3 %	3 %	8 %	6 %	6 %	12 %	10 %	10 %
Staining, discolouration, melanosis, sun burns or cracks in the pulp	3 %	3 %	3 %	5 %	5 %	5 %	7 %	7 %	7 %
Live insects (number)	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %
Not pitted among pitted dates (in number / 100dates)	2 %	0 %	2 %	2 %	0 %	2 %	2 %	0 %	2 %
Foreign matter (weight)	1 %	1 %	1 %	1 %	1 %	1 %	1 %	1 %	1 %
Dates belonging to varieties other than that indicated in the labeling (in number / 100 dates)	5 %	0 %	10	5 %	0 %	10	5 %	5 %	10
Maximum tolerance		5 %			12 %			20 %	
Average weight		10,3			6,9			6,0	
Date not in accordance with the minimum size: percentage of dates of less than average weight of the lot, without the weight being less than the minimum weight.	10 %	10 %	10 %	10 %	10 %	10 %	10 %	10 %	10 %

are classified into three categories: Extra-quality, Category (I) and Category (II), depending on their size and the allowable date thresholds for defects. Hence, 12 varieties are specifically distinguished in the standard, namely: Aziza, Boucerdoune, Boufeggous, Bouittob, Bourar, Bouskri, Bouslikhene, Black Busthammi, Jihel, Majhoul, Najda and Outokdim. The other varieties and khalt is the subject of more general standards. Referring to the models of the United Nations Economic Commission for Europe (UNECE) and Food and Agriculture Organization (FAO) standards, the Moroccan date marketing standard facilitate, clarify and objectify trade, the standard concerns whole dates, not-pitted and pitted dates, of varieties (cultivars) or Khalts from *P. dactylifera* and intended for direct consumption and no longer other forms of presentation, such as dates in pieces, paste, or those intended for later industrial use (The Head of Moroccan Government .2017) and (MAFRDWF. 2018a). The quality required by the Moroccan Jihel variety dates standard allows this variety to be commercially facilitated with compliance with the United Nations Economic Commission for Europe standards (Table 2) (Unece Standard, 2017).

Awareness of date of the Jihel variety among the consumers: Phoenicultural production in Morocco is characterized by variety diversity. Variety names are not all known, however, some varieties are better known than others. It is important to report, that in Morocco, more than 400 dates varieties have been inventoried and thousands of khalts (unselected hybrids of semi-natural origin) (Harrak and Boujnah, 2012). According to the survey conducted in 2005, the Boufeggous variety was considered the best known by the consumer, followed by khalt, Bouskri, Jihel, Majhoul and Bousthammi (Chetto *et al.*, 2005). There is a positive correlation between awareness and the rate of consumption of varieties. The more a variety is known, the more it is consumed, the less known are less consumed. It is important

to note that the notoriety of the varieties is evolutionary, in 2017; a recent study revealed that the Majhoul variety has risen to the highest level of notoriety (Regional Office for Agricultural Development Ouarzazate. 2016). Today, this variety is considered the best known among the Moroccan consumer followed by the variety Boufeggous. Hence, campaigns must be considered for the promotion of Jihel variety.

Penetration and distribution of date of Jihel variety among professionals: Commercial distribution is an important parameter to consider when setting up a marketing strategy: Dates are distributed to the final consumer through a complex network of producers, importers, souk sellers and retail stores. The analysis of the penetration of date varieties on the national market shows that the Tunisian date comes first, then Majhoul, Boufeggous, Jihel, Bouskri and Bousthammi. The analysis of the distribution of the Jihel variety among professionals (wholesalers, semi-wholesalers and retailers) shows that this variety is well distributed.

Sensory appreciation of date of Jihel variety: Date attributes as sought by the consumer are essentially related to the following elements: color: honey-golden, pulp: fleshy, size: close to Jihel caliber of good quality, consistency: non-deformable soft, taste: close to Jihel and Boufeggous varieties (Chetto *et al.*, 2005). The variety Jihel has the main attributes sought by the consumers; sensory tests have shown that this variety is considered better in terms of taste than visually. The attributes related to the visual characteristics can be improved by the treatment, in particular, the hydration and the treatment with glucose.

Study of marketing prices for dates of the Jihel variety: Dates are part of agricultural products whose prices are conditioned essentially by the law of supply and demand. Another parameter is the availability period (harvest). Indeed, dates selling prices are down at the time of harvest (Table 3) and (Table 4).

Table 3. Price range of main varieties of dates (EIG, 2016-2018)

Variety	Date price (in DH)			
	15-25	26-40	41-60	Plus de 60
Jihel	80 %	20 %		
Majhoul		2 %	3 %	95
Boufeggous	5 %	13 %	80 %	2 %
Bouskri	3 %	67 %	29 %	1 %

Table 4. The average selling price of the packaged date of Jihel variety (EIG, 2016-2018)

Category	Average selling price per kg (in dirhams)
Extra (with Branch)	40
Extra	30
Category I	28
Category II	20

Dates of the Jihel variety meets the needs of the middle class with the quality and the price ratio it offers. Prices are closely linked to quality, which can be ensured by the mastery of good production and recovery practices (cultural practices, harvesting and sorting).

This study determines the potential of Jihel dates by comparing it to the other most traded varieties. The study showed that Jihel variety has high potential; it is a variety with significant production potential, considerable profitability, and marketing attributes. It is a variety that can have a better commercial position. The Moroccan variety diversity should be considered as a wealth for consumers and professionals. This wealth of the Moroccan dates varieties satisfies the diverse needs of consumers on one hand and on the other hand, it does ensure the biodiversity of the phoenicicole heritage of Morocco.

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