



Prospecting and drying method of the local drying fig in northern of Morocco

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ABSTRACT

In Morocco, local dried figs are not of great commercial interest, they are often of poor quality and do not attract consumers. This paper presents a study on dry fig varieties in the northern region of Morocco and their drying methods. According to this study, most varieties are dried. We have noticed that there is a problem of marketing dried figs which is related to the quality of drying and the lack of interest of farmers in the drying of figs in general, because they consider that the product is not profitable. There is also the lack of experience and means for drying figs, so dried figs are exposed to dust and parasitic attacks.

Keywords: *Drying Fig, prospecting, drying methods, variety, Morocco.*

INTRODUCTION

Fig is one of the oldest known fruit trees in the world; it is one of the first plants that were cultivated by humans. The fig is an important harvest worldwide for its dry and fresh consumption. *F. carica* possibly originated from the Middle East, which is one of the early cultivated fruit species [1] and currently is an important crop worldwide. *F. carica* has been cultivated for a long time in various places worldwide for its edible fruit. It is supposed to originate from Western Asia and spread to the Mediterranean by humans [2]. It is also an imperative world crop today. Turkey, Egypt, Morocco, Spain, Greece, California, Italy, Brazil, and other places with typically mild winters and hot dry summers are the major

producers of edible figs [3]. Fruits can be eaten raw, dried, canned, or in other preserved forms [4]. The dried fruits of *F. carica* have been reported as an important source of vitamins, minerals, carbohydrates, sugars, organic acids, and phenolic compounds [5–6].

In recent times, natural antioxidants have attracted considerable interest among nutritionists, food manufacturers and consumers because of their presumed safety and potential therapeutic value [7]. Dried fruits have been studied by many researchers [8] ; [9]; [10];[11]; [12]. The drying of fruits is a very ancient practice for food preservation still in use nowadays.

In Morocco, drying remains until now the only way to profit from a speculation whose possibilities of marketing in expenses are reduced by the difficulties of transport and the fragility of the fruit. The drying methods are traditional and the product obtained is generally heterogeneous.

In general, all varieties, both biferous and even, are dried in all regions. However, the drying of figs flowers remains a function of the abundance of the harvest and the market demand. In remote areas, the excess of fresh consumption is intended for drying. In areas of easy access, the farmer always prefers to sell his produce in a fresh rather than processed form and only uses drying for the part of the non-marketed crop. This is a problem that farmers often face when fruit ripening is accelerated by expensive winds that concentrate maturity over a very short period of time. For autumn figs, the proportion reserved for drying exceeds 50%, depending on the annual yield.

Obtaining dried fruits of first choice requires the respect of certain principles and first and foremost the quality of the raw material:

The valorization of the production of figs requires a well-conducted drying, the protection of the product against the rehumidification and the parasitic attack. Packaging and packaging of the fig under appropriate conditions allows long-term storage and long-distance transport of the goods. In the mid-1950s, the state took action in the Zoumi area to improve traditional fig drying operations. Some demonstrations such as soaking, display, flattening and turning were made with the participation of farmers. The dried figs were packaged in packs of 500 grams and sold with the label "Issoual Fig" [13]. However, this operation was unsuccessful due to a lack of market organization and product sales. In fact, after the operation was completed, the farmers tried to look for a market for the sale of their product. Rural consumers have not appreciated this new form of presentation of dried figs and as a result the product has been rejected from the market.

In the present work a prospection has been carried out during the period 2015 to 2016 in the northwest of the Morocco, in order to detect local varieties of fig dried and their drying technique.

MATERIAL AND METHODES

Investigations and surveys

In order to study the quality of local dried figs and drying methods, surveys were carried out in the North of Morocco (Fig. 1), based on a questionnaire detailing the drying method, the names of varieties and existing types. according to regions. Photos of the different varieties collected were taken.

The information gathered from the questionnaire can be summarized in:

- Description of the type or shape of the dried fig (collared flattened, free, pressed),
- Information to be collected from the merchants (name, origin, varieties with their names, drying processes, selling price, purchase price),
- Sample collection (photo, caliber).

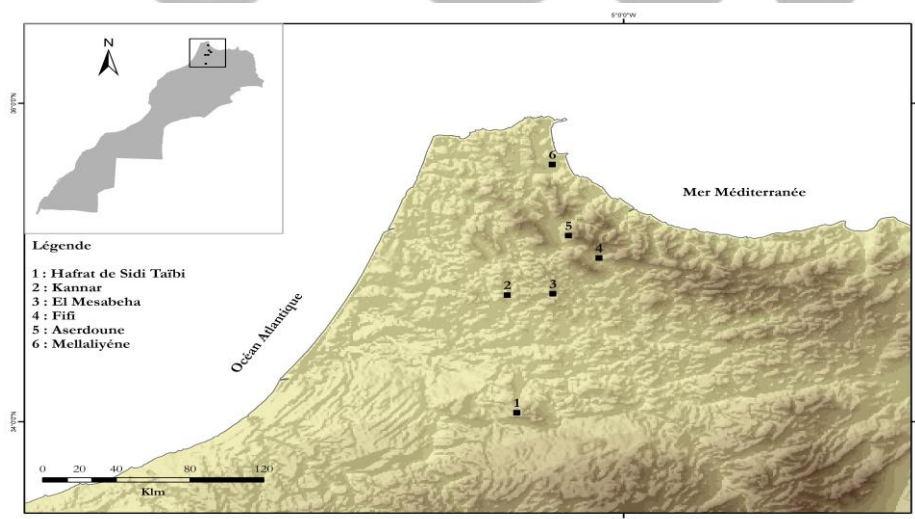


Fig 1: Localization of prospected cites

RESULT AND DISCUSSION

Dried varieties

Results obtained from surveys of farmers:

Surveys carried out in the various douars have made it possible to distinguish the different varieties considered more suitable for drying. 45 varieties are identified as dried by the population (Table 1). Information on drying abilities of figs is obtained from farmers' opinions during surveys in the study area. Four groups of figs are generally distinguished according to their drying ability (Table 1):

- Group 1: represents the varieties that have a very good drying ability this group includes biforous varieties such as kharaza (chriha), zerki, rzilane, saadi, gaouizi, hazouta, harchi lkhal, tibal, makoutia, maalmnouss, fassi, meltoufa , hafri, tbantou, beidi, sinani, ferzaoui, achir, kohli, ournakssi, aroui and lemti. And unifying varieties such as: tahadakte, kharaza, kourti, silfafe, znfough, smouni, herich, khoumsi, larchan and gaouizi,

Group 2: varieties with good drying ability: hafer elbrel and sebt as bifer and bakour varieties which are a single variety,

Group 3: Varieties having a medium drying ability, in the biferas we have: assal, koti, el messari, lmedar, hmar, lassoun, ounk hmam, ghoubiz and lndbar, and as uniflorous varieties we have: chbaa or rhgoud, ferzaoui, harchi lkhal, ounk hmam,

Group 4: varieties of poor drying ability are: rhoudane as a bifère variety and the unified varieties are chitou, mouslikh and tabli.

Table 1 : variety identified and their ability to dry

Variety	drying quality			
	Very good	good	Medium	bad
Maalmnous	x			
Sebti		x		
Lmdar		x		
Labyad	x			
Lassoune			x	
Kharaza	x			
Rzilane	x			
Meltoufa	x			
Lendbar			x	
Lhmar			x	
Kouti			x	
Kouhli	x			
Fassi	x			
Hazouta	x			
Hafer elbrel		x		
Ounk hmam			x	
Hafra ou ferzaouia	x			
El messari			x	
Ournaksi	x			
Tbantou	x			
Sinani	x			
Gaouizi	x			
L'mti	x			
Makoutiya	x			
Al rounbiz			x	
Aroui	x			
Harchi lkhal	x			
Achir	x			
Hafri	x			
Zerqui	x			
Rhoudane				x
Saaidi	x			
Tibal	x			
Assal			x	
Zenfoukh	x			
Semouni	x			
Silfaf	x			
L'kourti	x			
Larchan	x			
Khoumsi	x			
Chbaa ou rhgoud			x	
Harchi	x			
Tahadakte	x			
Bakour		x		
Ferzaoui			x	

bifère

Unifère

Chitoui	x
Mouslikh	x
Tabli	x

Note that about 59% of varieties have very good drying properties, 27.78% have average drying ability, 5.56% have good drying ability and only 7.4% have dryability bad.

This result shows that farmers have not developed a targeted breeding for high-performance varieties with drying characteristics. Indeed, all the varieties are dried, the drying is practiced as a last resort to valorize the surplus of the production, ie all that has not been consumed or sold.

Results of surveys at merchants in the region of north Morocco

Table 2 summarizes most of the results obtained in surveys conducted in the Tetouan region.

In general, dried figs in the region are called "Karmouss" and come in various forms. They are either pressed, free or collared, flattened or not (Fig 2). Most dried figs are Rif, Béni ahmed or Chefchaouen. Only three varieties are from the Tetouan region: Maghzaouia (souk al had), Béni msaouiar (oued drass) and Khmiss anjra.

The other varieties that are not from the surveyed region have different names than Karmouss, and generally bear the name of the varieties in the fresh state such as rhoudane and gaouizi, this shows that the local dry varieties are very diverse and are very numerous except for one variety which is not local and which is imported from Turkey called "Turquia".



Fig 2: The principal local varieties of dried figs.

For the drying technique, it has been noticed that the drying methods do not differ much. Indeed, in all regions, drying is done either on a support (zinc or rocks) or directly on the ground while making sure to expose both sides of the fruit to the sun. Depending on the type of fig, the drying is done either by using figs open for figs flowers or by using figs closed for figs of autumn. In most cases, aromatic plants such as thyme are added during the drying process to give a good taste to dried figs.

Table 2: Summary of the principal results of investigations in the north Morocco

Type	Name	Origin	Variety	Drying technology
In flattened necklace	Karmouss	Bab toute	- Rhouddane black	On zinc block
Free	Karmouss (mix : Rhoudane and Bayoudi)	Maghzaouia (souk alhad)	- Bayoudi - Karmouss white - Ounk hmam - Ferzaoui - Rhoudane - Gaouizi - Hlida - Zerki - Bakour (bifere)	On pals and origano, for shriha we put domes and origano and we press them at the top by the feet, and afterwards cut them into peices
Free	Gaouizi	Béni Msaour (oued drass)	- Gaouizi - Tabli - Bakour - Hmir - Rhoudane - Baghi - Bayoud - Gaouizi - Mtioui - Ounk hmam - Hmar - Ferzaoui - Lndbar - Laachir in Haouz region	Dry drying of bakour
Free	Gaouizi	Oued Drass	- Rhoudane - Tabli - Kouhli - Gaouzi - Ounk hmam Are from Ouad drass while Ferzaoui, Harchi are from Beni Houzma	In summer, the figs are harvested when they become very mature and then dried in the sun on the ground for 3 months of autumn, the drying is done directly on the ground and without opening of the fig
Free	Karmouss, Rhouddane and Gaouizi (in necklace)	Khmiss anjra	- Rhouddane black - Gaouzi - Harchi - Baghi - Ounk hmam	They are harvested and dried without opening on the sun palms and thyme is added to give a good taste and smell to the figs and flour to keep them
Free and flattened in necklace Libre	Karmouss or talled Naboute in Tetouan region	Chefchaouen (free) Taounate	- Naboute- - Bakour	When they become almost dry on the tree they are harvested and then dried in the sun on blankets, for Bakour the month of July drying for a month. Karmouss of September drying for 3 months of autumn.
In necklace, free, pressed	Karmouss	Rif	- Shriha	
In collar more flattened, free (the same in necklace)	Karmouss	Béni-Ahmed	- Karmouss - Rhoudane black - Chriha (open fig)	We take the fresh fig, press it by the hands and then dry it on a rock in the sun
Flattened in necklace	Karmouss	Rachidia	Rhoudane black Tourquia	
Flattened in necklace Free	Karmouss Karmouss	Rif *****	- Shriha (presse) - Figue fromTurquie	
Free flattened in necklace	Karmouss	Chefchaouen (free) Taounate (in necklace)		
Free in necklace Free	Karmouss Karmouss	Rif Béni-Ahmed	- Black rhoudane, - Chriha thick rif (16 DH selling price) and (13 DH purchase price in necklace), good quality from turquie 40 DH purchase price and 60 DH selling price.	Adding the flour above the varieties Drying on plastic tablecloths.
Free	Karmouss	Béni-Ahmed	- Qouti, - Rhoudane, - Lharchi, - Lmtar, - Assal, are different color	Drying is done on Menchar in a protected place and only figs that are well dried are for sale
Free, in necklace	Karmouss, shriha	Rif Béni-Amart	- Naboute, - Harchi, - Gaouzi, - Rhoudane	Drying on the rock, salt and flour are added to the cherqui
Free	Karmouss	Béni-Ahmed	- Rhoudane noir, - Shriha ouvert	Drying on the ground directly throughout the summer.

Drying and size of dried fruit

Drying mode

Two drying techniques are practiced:

Open drying: generally applied to large fruit varieties. Figs flowers are always dried open. The product obtained is called "Chriha". This technique allows a quick drying of the fruit. However, its quality is impaired by the messy action of dust. Some autumn figs are also adapted to this type of drying, among these there are two varieties that are: kharaza and kourti.

Closed drying: this technique is adopted for autumn figs. Before drying, the fruits are sometimes sorted out, eliminating those of incomplete or poorly-developed ripeness, but usually it is the excess of fresh consumption that is dried. Fruits intended for direct drying are those that have been harvested pre-dried on the tree.

The drying is done on plastic, zinc sheets, rocks or directly on the ground covered with clays and dung. The quality of the dried product differs from one medium to another; the dried fig on the zinc plates is usually burned on its underside. The drying place "Menchar" is often fenced by jujubier to avoid the incursion of herds or wild boars. Farmers install their "Menchar" preferably near their homes so that they are constantly monitored by family members or better near an apiary.

In general, drying techniques are different from one region to another. In the region of Tetouan (Marzaouia) to get chriha, we put the figs on the palms, or on zinc plates and we add thyme. The figs are placed on each other and pressed at the top by the feet, and then cut into pieces.

In the region of Beni Ahmed, Taounate, and generally in the Rif the drying can be done on several species, Lentisque, Laurel, Carpet, Laurel rose (Fig 3 & 4).

The duration of the drying depends on the size of the fruit, the exposure of the "Menchar" and the intensity of the sunshine. The optimal drying time is 4 months (end of July to December).

During drying, no weather and pest prevention is practiced. As a result, some caterpillars of Lepidoptera are found inside the fruit, which affects the quality of the product. When the drying season coincides with the autumn rains, figs are collected to complete their drying in domestic ovens. The treatment time is one hour on average. Fruits dried in this manner are

well preserved but are of poor quality, the skin of the fruit changes color (less attractive) and hardens.

Poor quality requires farmers to sell their figs at very low prices, usually less than one euro. On the other hand, competition from other markets further reduces the accessibility of people to these local products, and among the major competitions are figs imported from Turkey.



Fig 3: Drying method in the region of Moukrisset



Fig 4: Conservation of dried figs in the Tafza region.

CONCLUSION

According to this study it can be said that most varieties in the northern region of Morocco are figs that can be better eaten dry as: Kharaza (chriha), Zerki, Rzilane, Saaidi, Hazuta, Tibal, Makoutia, Maalmnouss, Meltoufa , Tbantou, Sinani, Achir, Kohli, Ournakssi, Aroui, L'mti, Tahadakte, Kharaza, Silfafe, Zenfough, El smouni, Khoumsi and Larchane, this huge existing local varietal diversity can be enhanced which will allow a better marketing of figs local dry instead of foreign figs and this can only be the case if we improve the drying qualities of these figs. Also, it has been discovered that the drying of figs in the northern region of Morocco is

done only in a traditional way, it is the simplest and easiest method to practice, but the quality of drying is often mediocre, So you have to take some precautions to improve the drying quality of figs in the region. The state can also play a major role in improving this sector, by providing farmers with means such as dryers while raising awareness of the importance of using local resources. The organization of the marketing channel and the grouping of producers in cooperatives are important initiatives to develop. The poor quality of local dried figs is the main cause hindering the development of this sector. Hence the need to start programs that are interested in improving the drying quality of figs which will make the sector more profitable and exploit its potential.

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