

# Introducing HACCP system in the Tunisian dates sector: an exploratory case study

ABDERRAOUF LAJIMI\*, MARIAN GARCIA\*\*, MAROUEN GHARBI\*

Jel classification : Q130, Q180

## 1. Introduction

The application of the HACCP system in the food sector is recognized worldwide as a good tool for food safety management and food diseases prevention. HACCP system is more and more used in the world food industry, in particular for the large-scale production. It allows facilitating the international food trade that has considerably increased during the last years. However, its implementation is not so easy in the case of Small- and Medium-Sized Enterprises (SMEs). Under the influence of external factors such as legal obligations, market forces, required controls and internal management, the SMEs are urged to implement the HACCP system in their activities.

The management of quality and safety is linked in practice, and market failures can occur for many attributes, not just for safety. Thus, some combination of public and private actions may be needed to improve both food safety and overall food quality, particularly in export markets. Public intervention can provide leadership for improving

## Abstract

Tunisia's economic policy is based on supporting investment and reinforcing production and exports. Several efforts have been made by both private and public sectors aiming to increase market opportunities for renowned Tunisian products such as dates. Therefore, exported products are facing new forms of stricter conditions in quality and safety requirements, as several trends are bringing greater attention to food safety regulations in many countries. The HACCP implementation is being more and more required by international consumers of fresh products. A strong effort has been made by the Tunisian government in order to improve the quality and safety system in the food sector. This paper consists of an attempt to investigate the perception of the HACCP system by the Tunisian date packers/exporters, to examine difficulties related to the adoption of this procedure, to settle advantages related to its adoption and to discover the reasons leading some exporters not to adopt HACCP system. Some recommendations are also given to help the Tunisian decision-makers to identify strategies to encourage dates exporters to adopt this system. Data were collected based on a survey with date packaging companies and exporters. Most of the interviewees showed a willingness to adopt the HACCP system taking into consideration their financial, human and infrastructural means.

## Résumé

*La politique économique de la Tunisie est basée sur l'appui des investissements et le renforcement de la production et des exportations. Plusieurs efforts ont été déployés par les secteurs public et privé dans le but d'augmenter les opportunités de marché pour les produits tunisiens de renommée tels que les dattes. Aussi, les exportations font face à des conditions de plus en plus strictes en matière de qualité et de sécurité, en plus des nouvelles tendances accordant plus d'attention en matière de sécurité alimentaire dans plusieurs pays. Plusieurs actions ont été conduites par le gouvernement tunisien dans le but d'améliorer le système de qualité et de sécurité en Tunisie. Le présent travail consiste en une contribution de recherche en vue d'évaluer la perception du système HACCP par les exportateurs des dattes, d'examiner les difficultés liées à l'adoption d'une telle procédure, d'établir ses avantages et d'analyser les raisons pouvant conduire à sa non adoption. Quelques recommandations ont été avancées afin d'aider les preneurs de décision à identifier des stratégies encourageant les exportateurs à adopter ce système. Les données ont été collectées sur la base d'une enquête auprès des entreprises de conditionnement et d'exportation. La majorité des enquêtés ont montré une prédisposition à adopter le système HACCP compte tenu de leurs moyens financiers, humains ainsi que leurs infrastructures.*

quality and safety, and when well-designed, will not preclude private innovation (Unnevehr and Hirschhorn, 2001). Food producers, processors and traders should operate according to the principles of Good Agricultural / Hygienic / Manufacturing Practices. Food production, processing and other handling operations should be analysed with a view to identifying hazards and assessing associated risks. This should lead to the identification of critical control points and the establishment of a system to monitor production at these points (Stuart, 2002).

Many academic studies (Mazzocco et al, 1996; Roberts and Unnevehr, 2002; Caswell and Henson, 1996; Colatore and Caswell, 1999; USDA, 1996; USFDA, 2001) indicate that the imposition of regulations mandating HACCP systems reflects a growing recognition that it is important to control hazards before they

reach the consumer. They raise the importance of the HACCP implementation according to food domain, steps of manufacturing process. Hathaway (1995) points that the imported foodstuffs are far from being in keeping with the requirements of the European consumers in HACCP certification requirement and requires that the control of these products must be made not when they arrive on markets but from the upstream of the marketing channel. Some devel-

\* Département d'Economie-Gestion Agricole et Agro-alimentaire, Institut National Agronomique de Tunisie, Tunisie

\*\* Centre for Food Chain Research, Department of Agricultural Sciences, Imperial College London, UK

oping countries still neglect the adoption of the HACCP system within the manufactured food circuits intended for local markets and consider that HACCP philosophy is much more developed for products intended for export.

Agro-food industries in Tunisia have the awareness of the strong need to apply hygiene and quality standards to be more competitive on international markets. The European community, which is the first destination of Tunisian food exports, established the European directive 93/43/CEE of 14 June 1993, related to food hygiene requiring the agro-food enterprises to adopt HACCP principles. This new situation prompted the Tunisian government to set up a national plan for the implementation of the HACCP program in the agro-food sector in 1999. This enabled to establish the order of 3 March 2001 which is based on HACCP principles and fixing the sanitary rules governing self-control operations for fish produce.

Given the challenges that the agro-food sector will be facing and given the role that this sector is playing in the development of the Tunisian agriculture and in the food safety, a special experimental programme has been launched since, that will allow: i) the improvement in the environmental, safety and hygiene conditions in the food industry ; ii) the improvement of the agro-food firms competitiveness and iii) favour the international trade of agricultural and food products.

The objectives of the present study consist in identifying the perception of the HACCP system implementation by the Tunisian packers/exporters of dates, to examine drivers for the adoption of HACCP system by the managers and to discover the reasons which led some exporters not to adopt HACCP. All these aspects are going to be useful to give some recommendations which should help to identify a strategy of instigation and encouragement for the adoption of HACCP by companies exporting fresh produce in Tunisia.

The paper is structured as follows. The introduction is followed by a second section that gives a brief description of the Tunisian date sector that highlights the importance of dates export for regional development and social inclusion. The third section presents an overview of the HACCP implementation in the Tunisian food sector. The fourth section provide the main results of a survey based on executive interviews with a focus group of date exporters, regarding the main aspects related to the perception of the HACCP system by interviews and reasons to adopt or not this system within their packing process. The paper ends with conclusions and recommendations.

## **2. The Tunisian date sector**

### **2.1. Date marketing channel in Tunisia**

The date sector is ranked third at export level after olive oil and sea food products. On average, its contribution to agricultural exports was about 13% in the last decade (Central Bank of Tunisia, 2003).

Date marketing in Tunisia is characterized by a competition among the exporters not only for purchasing quality dates from collectors, but also in the export market sales. For lack of means (capital especially), most of exporters/packers have by manage to integrate vertically their operations to become a production, packaging and export companies at the same time.

During the last five years, total date production fluctuates around 91,000 tons/year. Exports are about 22,800 tonnes. Dates exports represent 25 % of the national production and the rest is sold on the local market (45 %), or lost, self-consumed and transformed into feeds (30 %). About 70 % of the domestic date production transit through collectors, consequently this allows them to play an original role in the market and price regulations.

### **2.2. Export**

During the campaign 2001/2002, the date exports reached 38,000 tons and 36,059 tons for the previous campaign, that is a 16% increase. Thus there has been an almost continuous growth of these exports since 1994/95. The exports of the variety 'Deglet Nour' raised from 16,750 tons in 1994/95 to 31,069 tons in 2001/2002. This shows the great dominance of this variety which accounts for more than 80 % in the date exports.

It is worth to indicate that Deglet Nour, being very required on both local and international market, can be sold at a higher price than most of common varieties. Besides the variety, several other factors contribute to the determination of the date price, such as the date quality, the packaging, availability on the market, etc.

The main Tunisian destination of the date exports remains the European Union which absorbs about 90 % of the total dates exported. The share of Arabic countries is about 6 %, whereas both American and Asian countries do not exceed 1.5 %. The African markets receive only 1 % of the exports.

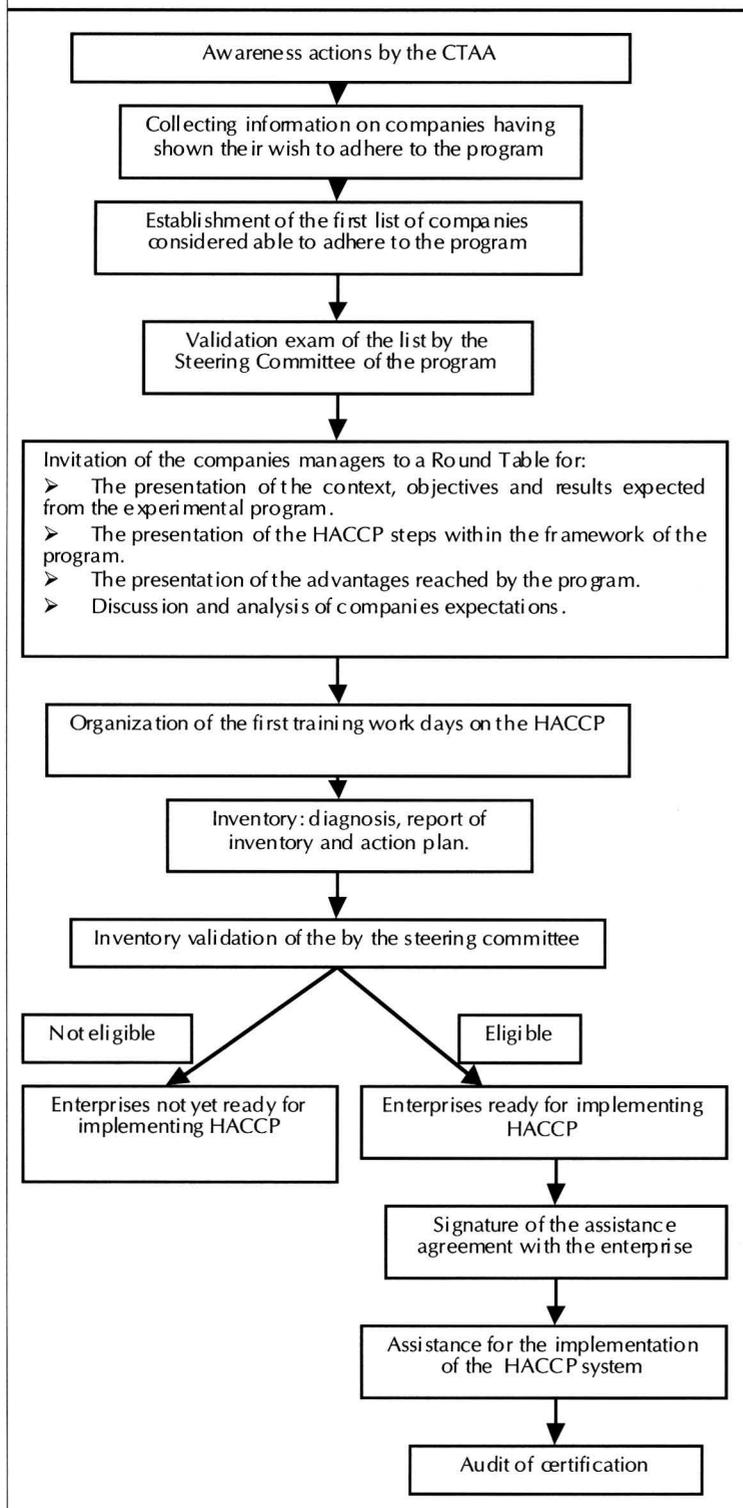
## **3. The HACCP implementation in the Tunisian food sector**

This section aims to give a short overview on the HACCP implementation by the Tunisian agro-food firms.

In January 1994, the HACCP system for risk analysis was introduced in the mineral water sector; since then this concept has been introduced in other sectors such as the confectionery, soft drinks and pastry sectors. In this regard for meat, dairy and fishery industry which represents high risks in terms of food safety, there is a special encouragement to implement HACCP concepts. A special programme including 100 firms to adopt HACCP system has taken place with Tunisian-European collaboration (ETE, Euro-Tunisie Entreprise), and coordinated by the Technical Centre for Agro-food Industry (Centre Technique de l'Agro-alimentaire 'C-TAA') (Figure 1.)

The objectives of this experimental program consist in improving the competitiveness of agricultural and food

Fig. 1. HACCP implementation procedure for companies participating in the HACCP experimental scheme



companies, improving the safety, hygienic and environmental conditions of agricultural and food industries, boosting exports of agricultural and food products and developing hygienic infrastructure to comply with EU legislation.

The CTAA procedure to implement HACCP within Tunisian agro-food enterprises was introduced in September 1999 and included a selected group of agro-food enterprises. The implementation of this action took place until June 2003; 40 firms applied to join the program for the implementation of HACCP system. It is worth noting that three companies are already HACCP certified and a number of audits are currently underway in other companies.

## 4. Results and analysis

### 4.1. Introduction

To reach the objectives of the study, a survey has been conducted within Tunisian packaging companies and dates exporters. In order to estimate the capacity or the faculty of the Tunisian packers/exporters to adopt the HACCP system, we tried, using qualitative questions, to know first the perception of HACCP system by interviewees, the reasons leading the interviewed exporters to implement such system, as well as identifying the reasons why several exporters do not adopt this safety system.

At national level, there are currently a total of 35 date packaging houses, known as 'stations de conditionnement', distributed evenly between the north and south of the country (GID: Groupement Interprofessionnel des Dattes). The processing capacity in most packing houses does not exceed 80%. Some stations in the north, which were originally fruit treatment/packaging centres, have been transformed into date packaging stations. Until now there is not a single company with HACCP systems in place; however, three date companies joined the HACCP pilot program in 2002 and are in the process of implementing HACCP system in their packaging premises.

A total of 25 Tunisian packing companies exporting dates were initially contacted and 16 agreed to participate in the project. Companies were selected according to their processing capacity (the overriding criteria was to interview the largest operations) and proximity to the capital Tunis. Given the complexity of some of the questions included in the questionnaire, it was decided that face-to-face interviews was the most reliable data gathering method as opposed to postal questionnaires. Thereby, companies were visited in.

### 4.2. General characteristics of interviewed firms

All the visited companies were dates exporters, though some firms (18.75%) were also involved in the packaging and export of other products like citrus fruits and other tree fruits. Over half of the respondents had less than 20 employees, 25% between 20 and 50 employees, and 18.75% more than 50 employees. Firm size is a good indicator of the relevance and continuity of these activities as small firms operate only sporadically with significant periods with no activity at all<sup>1</sup>. With regard to the number of

seasonal employees, there is a great variation among respondents with a minimum of 45 occasional workers to a maximum of 1,300 employees. This variation could be explained by different staff management policies of the interviewed companies. However, differences between permanent and seasonal staff within the dates exporting companies give evidence on the seasonal and the non-continuous character of the date packing industry.

With regard to export volumes, two interviewed companies have an important export capacity with more than 3,000 tons exported in 2001. These are leading companies in the date sector with an important production capacity and important business relationships with many European customers while trying to develop new markets. These companies have flexible working arrangements in order to meet customers' demands as quickly as possible. 44% of the respondents show export volumes between 1,000 and 3,000 tons, and the remaining group (44%) exports less than 1,000 tons of dates annually. The last two groups are generally small and medium sized enterprises (SMEs) with a smaller productive capacity than the first group due either to the lack of equipment, availability of raw material, or a small financial capability.

Seventy per cent of the interviewed firms export their packaged dates mainly to the EU ( $\geq 75\%$  of exports), though all companies maintain traditional relationships with EU countries, which is considered as a key market for Tunisian dates. Remaining export volumes are directed mainly to Morocco, the Middle East, the USA and Canada with exports volumes ranging between 2 and 25 %.

### 4.3. HACCP status of survey respondents

None of the companies interviewed for the study had a fully operational HACCP system. Two participants have been working with CTAA (Centre Technique de l'Agro-Alimentaire) towards the implementation of HACCP systems and they are waiting for the final audit by TUNICERT, the Tunisian certifying body, to be certified. Further seven companies (44%) are planning to implement HACCP and most of them are waiting for their membership to the National Upgrading Programme (Programme de Mise à Niveau) which should allow them to improve their equipment and capacity to fulfil the preliminary infrastructure and human requirements needed to join the HACCP pilot scheme. The remaining seven companies did not foresee the implementation of HACCP system. The reasons behind this decision are presented in Section 4.6.

The decision whether to implement HACCP or not seems to be related to the knowledge companies have about HACCP. Results from this survey show that companies may be divided into three groups. In group A (HACCP being implemented) and group B (plans to implement HACCP) companies have a good knowledge of HACCP and are able to outline the various steps of its implementation. Conversely, group C, which comprises those companies with no plans to implement HACCP, has a limited knowledge of HACCP with 40% of companies in this group which have never heard of HACCP before.

### 4.4. Drivers for the adoption of HACCP

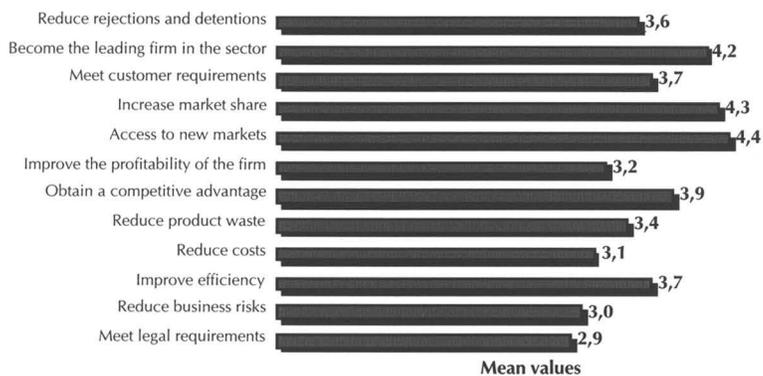
Companies belonging to groups A and B (HACCP being implemented or planning its implementation) were asked to indicate the main reasons behind their decision to implement or planning to implement HACCP. To that end, respondents were asked to indicate the importance of a number of firm-driven factors (i.e., operational efficiency, reduction in error rates and costs, etc.) and customer-driven variables (i.e., legal requirements, customer demands, gain market share, etc.) using a five-point scale ranging from 1 ('Not at all important') to 5 ('Extremely important'). As figure 3 shows, external factors like 'access to new markets' and 'increase mar-

<sup>1</sup> The harvesting of dates takes place between October and December. Given the seasonality to this product, some packinghouses, small ones in particular, are closed when the season ends. Other firms have implemented storage systems and thereby can pack dates all year round. development, Democritus University of Thrace, Orestiada, Greece.

Tab. 1. Summary of respondent characteristics

Characteristic	Classification	Frequency	%
No. of permanent employees	< 20	9	56.25
	20-50	4	25.00
	> 50	3	18.75
No of seasonal employees	1-100	3	18.75
	101-500	10	62.5
	500-1000	2	12.5
	> 1000	1	6.25
Export propensity (%export/sales)	0%	0	0
	Up to 10%	2	12.5
	11-25%	1	6.3
	26-49%	0	0
	50-75%	0	0
	> 75%	13	81.3
Share of export markets	EU		77.63
	Central Europe		1.31
	Eastern Europe		0.03
	Middle East		1.25
	Others		18.59
No. years in export activities	1-5 years	4	25.0
	6-10 years	8	50.0
	11-25 years	2	12.5
	> 25 years	2	12.5

Fig. 2. Reasons for the implementation of HACCP



1 = Not at all important; 5= Extremely important

ket share' as a result of implementing HACCP systems were regarded by surveyed firms as the key determinants for the adoption of HACCP. These results underline the important role of HACCP in the competitive advantage of the firms, which would allow them to become leading firms in the sector. It is worth noting that the need to respond to private demands (meet customer requirement) appears to be significantly more important for Tunisian date exporters than 'meeting regulatory requirements'. This result underlines the increasing commercial pressure that importers or customers are placing on exporters concerning the good application of hygiene rules, control of hazards and their management within the packaging companies. Some exporters who maintain trade relations with North American customers rated this construct with the maximum scores of 5 as an indication that North American importers are more demanding than their European and Arab counterparts in term of HACCP certification. Tunisian date exporters may face a stiff competition on these markets especially from French and German re-exporting firms with good quality assurance systems, though their products are sold at higher prices.

Internal (firm-driven) factors like profitability or reduction of costs scored lower. There seems to be some confusion among top management between the adoption of quality and safety systems and membership to the National Upgrading Program (Programme de Mise à Niveau). PMN aims namely to modernise the firm as a whole through modernisation and upgrading activities, in particular the adoption of adequate quality management systems. Hence, the low scores given to constructs like profitability (3.2) or reduction of costs (3.1) could be explained by the perception among managers that they are not a direct result of the implementation of HACCP systems but due to the different upgrading activities undertaken in the firm as part of the PMN programme where quality systems are also enhanced.

## 4.5. Benefits of HACCP implementation

This analysis of the benefits and costs derived from the implementation of HACCP systems was carried out in group A, that is, companies where HACCP is being implemented. As indicated earlier, only two dates exporting companies are currently in the process of implementing HACCP systems and have undergone significant improvements at production, management and marketing level as part of this process. The importance of the changes undergone in each company depend on the efficiency of their existing quality systems prior to the implementation of HACCP. This would suggest differences at infrastructure level, or management structures to administer human resources, marketing strategies as well as the degree of training or awareness among management staff and employees regarding the implementation of HACCP systems.

In order to determine the type of benefits derived from HACCP implementation, respondents were presented with a list of 14 factors and asked to indicate the importance of each benefit using a five-point scale ranging from 1 ('Not at all important') to 5 ('Extremely important'). As Figure 3 shows, all benefits have high scores being all variables regarded as very and extremely important.

As to the impact of HACCP on packinghouses, results show a net improvement in the traceability of exported products as a result of a stringent sorting process of products entering the stations based on detailed records. Identification and follow-up of products throughout the packaging circuit, increased recording frequency as well as an improvement in the transfer of information for packaging, all resulting from the implementation of HACCP systems, have positive impact product traceability.

Prerequisites prior to the implementation of HACCP system like the setting up of a HACCP team, the flexibility of

Fig. 3. Benefits of implementing HACCP



1 = Not at all important; 5= Extremely important

the process of information transfer, improvement of staff awareness on quality and food safety issues, better organization and specialization of workers as well as the exact reconstruction of the packaging diagrams and the establishment of recording systems and reliable documentation, have allowed companies implementing HACCP system to increase performance in different departments.

As to commercial profitability, interviewed companies considered an improvement of the brand image of their product, which is shown, by an improvement of their relations with their customers. The improvement of the companies' turnover as indicated by participants, reflects the trust granted by consumers to their products as well as their attempts to reach new markets.

#### 4.6. Barriers for the implementation of HACCP

Companies belonging to group C, that is, companies with no plans to implement HACCP systems, were presented with a list of issues, which previous studies have suggested can be a barrier for the implementation of HACCP systems. These companies are generally SMEs with relatively limited financial, infrastructure, and human resources and lower export volumes. They may also have financial difficulties, which prevent them from planning the implementation of HACCP systems as they may consider them as optional and not a prerequisite to export.

Group C companies were asked to indicate how much of a problem each issue was in their decision not to implement HACCP systems using a five-point scale ranging from 1 ('Not at all important') to 5 ('Extremely important'). As figure 4 shows, the lack of information and training on HACCP were the key barriers for the implementation. This has serious implication for policy makers as they reflect the need for technical support from governmental agencies. HACCP is also regarded as expensive and too complicated

to implement with no specific benefits seen. The small size of these companies with limited financial resources implies that they would have to join first the National Upgrading Programme (PMN) in order to upgrade their infrastructure as a preliminary step to HACCP implementation. This group of companies is aware that under the current Tunisian legislation, HACCP is not compulsory for fresh produce exports. Moreover, their export volumes are quite low (less than 1,000 tonnes) and they deal with importers and wholesalers who do not require HACCP systems. Hence, there are not clear market incentives for these companies to encourage implementing HACCP systems.

#### 5. Concluding remarks

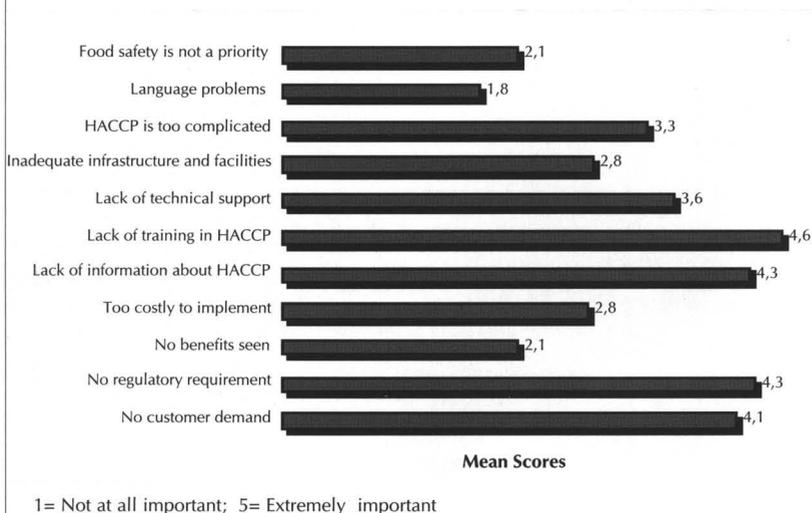
The adoption of HACCP systems by Tunisian agro-food companies is still a new experience. The Tunisian government decided, through the CTAA to assist and encourage these exporting agro-food companies, considering the importance of safety aspects for the fresh produce exports.

Urged by the requirements of importers on food safety and quality, all exporters without exception showed a particular interest in this aspect, even though some of them ignore the existence of such control system. Several performances at the level of the production, management and marketing systems were registered for the companies that adopted this system within their packaging channel.

To make successful a promotion program to adopt the HACCP system by the Tunisian packers / exporters of dates, some recommendations may be considered, such as:

- A better collaboration between the various bodies of follow-up, assistance and technical control of products intended for the export. This may be undertaken through the intervention of the different bodies involved in the upgrading programme, so as to participate in assistance actions, and the technical control bodies.
- Establishing a multi-field team specialized in the implementation of the HACCP system within the dates exporters. This team must be composed of specialists from various public bodies and, why not, representatives from companies who have already adopted this system and who can help the new members to better identify their necessities and action plans. In this context, the federation of exporters, interprofessional groups, and the technical centres can play an important role to build a kind of project that allows the creation of such a team that will be in charge of implementing HACCP in packing houses.
- Adapting the HACCP system to the Tunisian packaging companies of dates. This shall start from the identification of risks and critical points that will form a guideline for all the companies.
- Organising information days of procedures, and of profits of HACCP system for exporting companies. International organisations, through training projects can develop activities for training of food

Fig. 4. Barriers for the implementation of HACCP systems



inspectors, covering research risks assessment, assistance for HACCP, etc. Cooperation between donor countries and international agencies is a must to ensure optimum use of the available resources allocated to HACCP related activities.

- Improving the vertical integration of the various functions in the dates marketing channel in order to promote the product traceability and consequently facilitate the HACCP implementation.
- Elaboration of a reference textbook for the adoption of the HACCP system for the packers / exporters for Tunisian dates sector. This may be achieved through the collaboration between exporters and the CTAA.
- At present, efforts are focused on HACCP application, but future work is needed and oriented toward verification, auditing of HACCP systems in the food sector and assessing the costs of quality.

Finally, while making use of available international and national assistance initiatives, exporters should view the task of complying with international standards not just as a barrier but also as an opportunity to upgrade quality and safety standards and market sophistication in the export sector.

## Références

Caswell, J.A., Henson, S. (1996). HACCP as an International Trade Standard, *American Journal of Agricultural Economics*, 78(3), 775-779.

Colatore, C., Caswell, J.A. (1999). The Cost of HACCP Implementation in the Seafood Industry: A Case Study of Breaded Fish. In Unnevehr L., Ed., *The Economics of HACCP: New Studies of Costs and Benefits*, Ed. Eagan Press.

Central Bank of Tunisia, 2003. 44th Annual Report, Fiscal Year 2002. Tunisia

Hathaway, S.C., 1995. Harmonization of international requirements under HACCP based food control systems. *Food control*, 6, 267-276.

Mazzocco, M. A., 1996. HACCP as a Business Management Tool, *American Journal of Agricultural Economics*, 78(3), 770-774.

Roberts, D., Unnevehr, L., 2002. Resolving Trade Disputes Arising from Trends in Food Safety Regulation: the Role of Multilateral Governance Framework. USDA, Economic Research Service, *Agriculture Information Bulletin* n°798-3.

Stuart, A.S., 2002. "Integrated approaches to the management of food safety throughout the food chain", National Food Administration, Uppsala, Sweden.

Unnevehr, L., Hirschhorn, N., 2000. Food Safety, Issues and Opportunities for the World Bank. World Bank Report.

U.S. Department of Agriculture (USDA), Food Safety and Inspection Service (FSIS), 1996. "Pathogen reduction HACCP systems", Final rule, Doc. No. 93-016F, *Federal Register*, 61(144), July 25: 38805-38989.

U.S. Food and Drug Administration, 2001. HACCP; Procedure for the safe and sanitary processing and improving of juice, Final rule, *Federal Register* 66, No. 13.