Implementing the Standards of Food Safety Management System in Algeria – A Comparison with Arab Countries

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Abstract:

This research paper aimed to assess Algeria's status in implementing management system of food product safety standards by comparing it to a group of Arab countries. The focus was on the three most important standards: ISO 22000, FSSC 22000, and BRC.

ISO 22000 is the most widely adopted standard, with 41% of Arab companies implementing it. This can be attributed to its simplicity and government recognition. FSSC 22000 ranks second with 31% adoption, as it requires a higher commitment to food defense. BRC, with 28% adoption, is the least prevalent due to its stringent requirements.

it becomes evident that Algeria occupies the tenth position. This underscores an area necessitating improvement and heightened attention

Keywords: Management systems, Food safety, Standards.

Jel Classification Codes : I18 ; L51 ; Q18

Résumé:

Cette recherche avait pour objectif d'évaluer le statut de l'Algérie en matière de mise en place de systèmes de management conformes aux normes de sécurité des produits alimentaires en la comparant à un groupe de pays arabes. L'accent a été mis sur les trois normes les plus importantes : ISO 22000, FSSC 22000 et BRC.

ISO 22000 est la norme la plus largement adoptée, avec 41 % des entreprises arabes la mettant en œuvre. Cela peut s'expliquer par sa simplicité et la reconnaissance gouvernementale qui l'accompagne. FSSC 22000 se classe deuxième avec une adoption de 31 %, car elle exige un engagement plus élevé en matière de défense alimentaire. BRC, avec une adoption de 28 %, est la moins répandue en raison de ses exigences strictes.

Il devient évident que l'Algérie occupe la dixième position. Cela souligne un domaine nécessitant des améliorations et une attention accrue.

Mots clés: Systèmes de management, Sécurité alimentaires, Normes.

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I. Introduction

Consumer health is considered a top priority in development, as ensuring it means avoiding foodborne illnesses, diseases, and foodborne epidemics that can lead to negative health and economic consequences. Estimates indicate that the cost of losses in productivity and medical care resulting from foodborne illnesses in low-income countries in 2018 was approximately $110 billion (WHO, 2022). These expenditures are nearly equivalent to the budget of a country like Portugal in 2020 (Wikipedia, 2022). These costs include losses due to food product spoilage and the environmental burden of food waste (World Bank, 2022).

Statistics also show that 1 in 10 people annually suffer from illnesses and poisoning resulting from consuming contaminated food products, with the number of deaths due to this cause reaching 420,000 in 2010. Children under the age of five account for 30% of these deaths.

All of these losses, injuries, and deaths can hinder economic development, strain healthcare systems, and have a negative impact on tourism, trade, and exports. A significant portion of these issues can be avoided by ensuring the safety of food products before they are sold and distributed to markets, and ideally even before they are produced.

Globalization has contributed to changing dietary patterns in societies, evident in the widespread availability of fast food, frozen foods, snacks, and soft drinks, as well as meat derivatives, present in almost every culture. Consequently, the safety of food products has become a major concern, as food is an essential aspect of life that cannot be overlooked. Food products must be safe and healthy for human consumption, considering the risks that food products may contain carcinogens or contaminants that could pose serious health risks to humans.

This issue is addressed by establishing food safety standards that food manufacturers must adhere to and continuously and effectively implement.

From this perspective, the main question of this research paper arises:
- What is the current status of implementing international standards for food product safety in Algeria?
  o What are the food safety standards?
  o To what extent are these standards implemented in Algeria compared to Arab countries?

I. 1. Research Objectives

The primary objective of this research paper is to highlight the importance of implementing international standards for food product safety in Algeria through:
1. Presenting the most common international standards in the field of food product safety.

2. Evaluating the extent to which these standards are applied in Algeria and in most Arab countries.

Research Methodology:

This research was conducted using a descriptive-analytical methodology, which is suitable for describing the phenomenon under study, followed by a deeper understanding and analysis. The phenomenon in question here is the application of international standards in Algeria. It is initially addressed broadly and then broken down into various aspects, as outlined in the sub-questions of the research problem, and analyzed to achieve the research objective.

I. 2. Significance of the Research

Ensuring the safety of food products is a prerequisite for supporting the export of national products and facilitating their entry into international markets. This makes this research supportive of the current national strategy aimed at promoting the export of domestic products and diversifying the sources of economic revenue.

The research addresses a topic of shared interest among various stakeholders, including consumers, customers, and government bodies such as the Directorate of Commerce and its inspectors, as well as product analysis laboratories.

The research provides a brief informational framework regarding the tools for ensuring the safety of food products from any health hazards to consumers.

I. 2. Methodology and Tools:

The study's methodology is descriptive, utilizing a purposive sampling approach. The following details the methodology and tools used:

- Study Population: Arab countries, totaling 22 nations.
- Study Sample: A purposive sample consisting of 11 countries, including Algeria, Saudi Arabia, the United Arab Emirates, Egypt, Iraq, Qatar, Kuwait, Morocco, Tunisia, and Lebanon. These countries were selected based on two criteria: first, they represent the Arab world due to their importance and the size of their economies, and second, they have available statistics.

II. Literature Review:

The primary objective of this research paper is to highlight the importance of implementing

II.1. Concept of Food Safety management system

Understanding the concept of a food product is not difficult, as it is a term

known to everyone in the world in its general sense. However, the evolution of civilization has transformed food products from their natural, organic forms into processed and industrialized forms, which has shifted the focus towards ensuring their safety for consumer health.

Therefore, this research paper primarily focuses on categorizing food products according to the National Statistics Office and places greater emphasis on the concepts and practices related to food safety.

Figure 1: Classification of Food Products According to the National Statistics Office
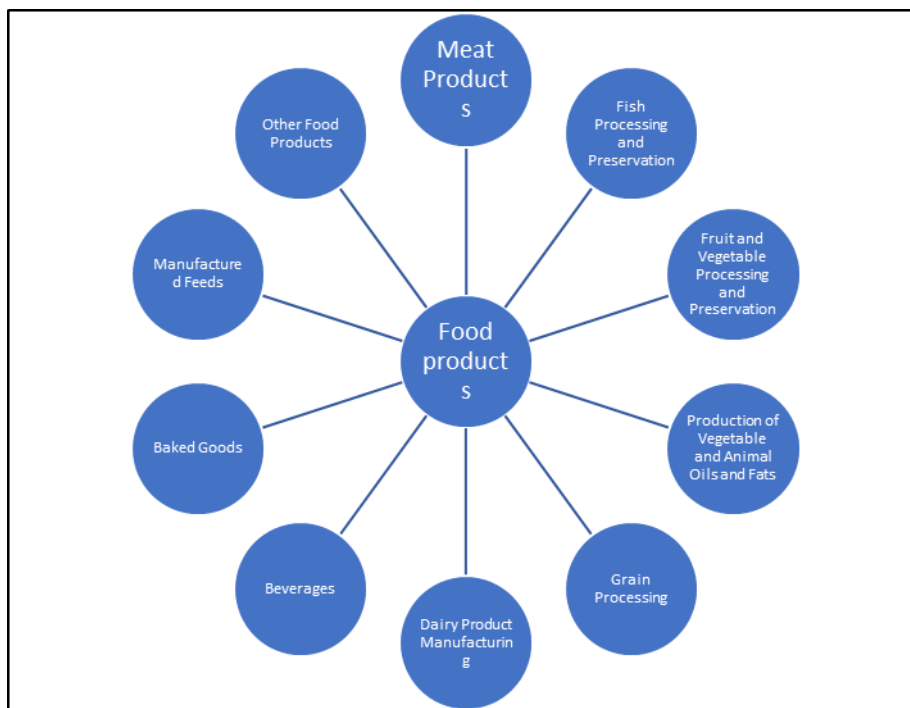
Source: (Office National des Statistiques, 2023)

Considering these categories, it is clear that food in the present day often takes on manufactured forms in nearly all its varieties. It is challenging to find food products that haven't undergone some form of processing or industrialization. Avoiding the consumption of unnatural food products has become increasingly difficult.

Food in its natural state is found in primary sources such as water, plants, and animals. However, the final form of food has changed due to modern agricultural practices, fishing methods, and animal husbandry techniques, which incorporate chemicals and manufactured feeds, and may involve genetic modification. Food products are also often packaged in metal or plastic materials and preserved with chemicals to extend their shelf life. They are prepared in industrial environments that carry various risks to food safety.

Therefore, many definitions of food safety highlight these risks. One of the most well-known definitions is from the World Health Organization (WHO), which defines food safety as the absence of risks or the presence of acceptable levels of risks in food that may harm consumers' health. These risks can be microbiological, chemical, or physical, often invisible to the naked eye, such as bacteria, viruses, or pesticide residues (WHO, 2022) .

Another definition of food safety emphasizes ensuring that food is free from microbiological or environmental contaminants that would render it unfit for safe consumption, such as spoilage and self-decomposition. This is achieved through specific procedures and rules to ensure food safety at all stages of production, preparation, storage, and distribution (Ashraf, 2008, p. 39).

The Food and Agriculture Organization (FAO) focuses on how to address these risks in its definition of food safety. It defines food safety as a science-based field that involves processes or procedures aimed at preventing the presence of harmful substances in food that could affect consumer health. Food safety aims to provide safe food for consumption (FAO, 2023).

Food safety encompasses all processes along the product's path, as indicated by this definition, which suggests that food safety refers to the measures and rules to be followed during the production, preparation, storage, transportation, and distribution of food products in a safe and healthy manner. These rules are aimed at ensuring the safety and quality of food products and protecting the health of consumers (Oba İlter & Tuğçe, 2021, p. 57).

II.2. ISO 22000 Food Safety Management System Standard

ISO 22000 is the most well-known international standard applied to ensure that the management systems used by companies are in compliance with food safety requirements. It was issued by the International Organization for Standardization (ISO) in its latest version in 2018. This standard outlines 451 requirements that companies must adhere to. These requirements are distributed across all levels of management, from top management to operational levels, and across all internal processes, including procurement, storage, production, distribution, and more. It also covers all management stages, including planning, implementation, monitoring, and correction.

The key requirements of this standard include:

- Controlling food safety hazards using appropriate tools such as Hazard Analysis and Critical Control Points (HACCP).
- Identifying stakeholders related to food safety, understanding their requirements, and responding to them.

- Designing internal processes and procedures to meet the requirements of stakeholders, whether they are technical or managerial requirements.

- Tracking food products from the raw material stage to distribution.

- Conducting internal audits to ensure that administrative practices comply with food safety requirements.

- Identifying relevant legal and regulatory requirements related to food safety and complying with them clearly and accurately (ISO, 2018).

II.3. FSSC 22000 Food Safety Management System for the Supply Chain

FSSC 22000 is a global standard for food safety management aimed at ensuring food safety throughout the supply chain. It was developed by the Food Safety Supply Chain (FSSC) organization, which stands for Food Safety Supply Chain.

This standard was developed by considering two other international standards: ISO 9001 for quality management and ISO 22000 for food safety management. FSSC 22000 combines these standards, making it more comprehensive and applicable to many food companies.

The key requirements of FSSC 22000 are the same as those of ISO 22000, as previously mentioned. In addition, it includes:

- Food defense by the company: This refers to all preventive defensive measures taken by the company and trained by its staff to address intentional or unintentional threats to food safety. These threats could include deliberate food poisoning, manipulation of food information such as expiration dates and ingredients, industrial sabotage, and terrorist attacks on the factory and food shipments. These preventive measures may include early detection, consumer notification, reporting to security authorities, and training employees on proper procedures to avoid errors during product preparation and information labeling.

- Stricter requirements for the training of the company's internal audit team, responsible for auditing compliance with food safety procedures during production and supply.

II.2. BRC Global Standards for Food Safety Management in Retail Markets

The abbreviation BRCGC stands for British Retail Consortium Global Standards, and it represents the Global Standard for Food Safety Management in Retail Markets. This consortium was formed in 1996 by retailers in the UK and has since sought to establish food safety standards for products sold in retail

markets. It is known for its strictness in dealing with food safety risks.

The key requirements of the BRC standard include:

- Identifying food contamination risks and controlling them using Hazard Analysis and Critical Control Points (HACCP), a method for identifying critical control points and risks that may contaminate food products during manufacturing.

- Controlling the safety of raw materials, meaning that organizations must ensure their suppliers meet the same food safety and quality standards. This involves evaluating and auditing suppliers.

- Monitoring and controlling the food safety of products, meaning that organizations must implement procedures to control product quality and ensure that products meet customer requirements.

- Maintaining suitable conditions at various sites, whether they are related to manufacturing, storage, shipping, distribution, or sales. Companies must maintain cleanliness standards for personnel, surfaces in contact with food, air quality, and sanitary facilities at production facilities.

- Training employees on appropriate and clean methods for handling raw materials, preparing food products, manufacturing, and monitoring product paths.

Table 1: Comparison of ISO 22000, FSSC 22000, and BRC

Comparison Points	ISO 22000	FSSC 22000	BRC
Scope of Application	Applicable to all companies in food manufacturing or services, regardless of size or field.	Applicable to any party in the food chain, with a stronger focus on manufacturers.	Applicable to any party in the food supply chain, especially those selling to British retailers.
Issuing Authority	International Organization for Standardization (ISO)	Food Safety Supply Chain (FSSC) organization	British Retail Consortium (BRC)
Compliance Monitoring Entity	Auditors certified by ISO	Auditors certified by FSSC	Auditors certified by BRC
Hazard Analysis Control Tool	Hazard Analysis and Critical Control Points (HACCP)	Hazard Analysis and Critical Control Points (HACCP)	Hazard Analysis and Critical Control Points (HACCP)
Additional Tools	Good Manufacturing Practices (GMP)	Good Manufacturing Practices (GMP)	Good Manufacturing Practices (GMP)
Good Hygiene Practices (GHP)	Good Hygiene Practices (GHP)	Good Hygiene Practices (GHP)	

Certification Validity Period	12 months	12 months	6 to 12 months
Key Features	More common	More requirements	Stricter standards

Source: Prepared by the researcher based on (BRCGS, 2023), (ISO, 2018), and (FSSC, 2023).

It can be said that there is more similarity than difference among these standards, as they all aim to achieve the same objective: providing a framework of food safety requirements applicable to related companies. The commonalities include:

1. International Applicability: All three standards are internationally recognized and applicable to any company within the food supply chain, regardless of its size, scope, or location.

2. HACCP Implementation: Each standard mandates the use of Hazard Analysis and Critical Control Points (HACCP) to identify food contamination risks, define control measures, and undergo regular monitoring.

3. Adoption of Good Practices: All three standards require the adoption of Good Manufacturing Practices (GMP) and Good Hygiene Practices (GHP) for both manufacturing and cleaning processes.

These shared characteristics demonstrate a common goal of ensuring the safety of food products within the relevant industries, irrespective of geographical boundaries or the scale of operations.

III- Results:

Table 2: Number of Companies Operating According to Food Product Safety Standards in Several Arab Countries – 2023

ID	Country	FSSC 22000		ISO 22000		BRC		المجموع		Rank
		N	%	N	%	N	%	N	%	
1	Algeria	30	3,28%	17	1,40%	8	1,00%	55	1,88%	10
2	Saudi Arabia	98	10,71%	233	19,26%	73	9,11%	404	13,81%	2
3	Egypt	354	38,69%	355	29,34%	306	38,20%	1015	34,69%	1
4	Morocco	76	8,31%	69	5,70%	217	27,09%	362	12,37%	4
5	Tunisia	67	7,32%	115	9,50%	48	5,99%	230	7,86%	5
6	UAE	144	15,74%	102	8,43%	108	13,48%	354	12,10%	3

7	Jordan	47	5,14%	121	10,00%	22	2,75%	190	6,49%	6
8	Lebanon	48	5,25%	48	3,97%	10	1,25%	106	3,62%	7
9	Iraq	9	0,98%	2	0,17%	0	0,00%	11	0,38%	11
10	Qatar	27	2,95%	102	8,43%	3	0,37%	132	4,51%	8
11	Kuwait	15	1,64%	46	3,80%	6	0,75%	67	2,29%	9
/	Total	**915**	**100%**	**1210**	**100%**	**801**	**100%**	**2926**	**100%**	/

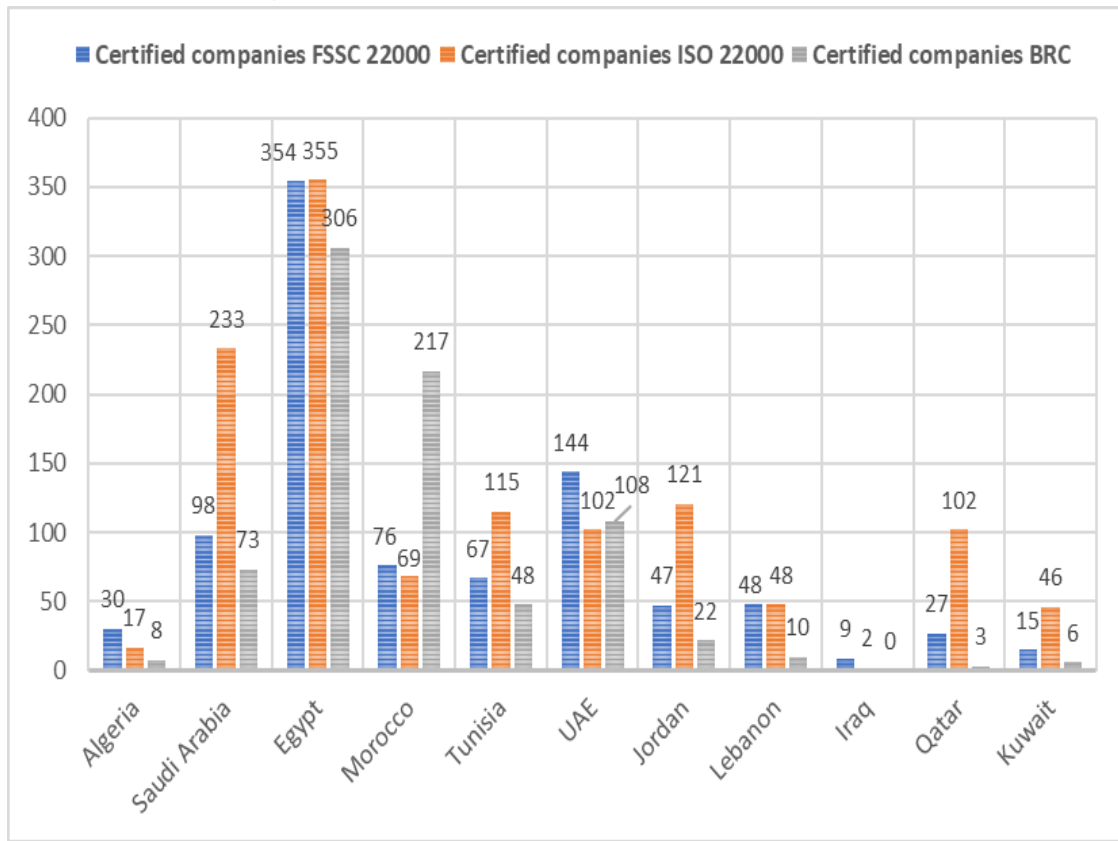**Source :** (Public Register, 2023) and (ISO, 2021) and (BRCGS Directory, 2023)**.**

Table 2 illustrates the distribution of the number of companies that adhere to FSSC 22000, ISO 22000, and BRC standards to ensure food safety for their products in 11 Arab countries.

The ranking of countries can be compared based on the total number of certifications. The total number of companies implementing food safety standards in the studied Arab countries is 2926 companies. Egypt ranks first with a total of 1015 certifications, followed by Saudi Arabia in the second position with 404 certifications. The United Arab Emirates comes third with 354 companies.

Next is Morocco, ranking fourth with 362 companies, and Tunisia follows in fifth place with 230 companies. Algeria occupies the 10th position ahead of Iraq with 55 companies, accounting for a total percentage of 1.88% of the total companies in the researched countries.

For a deeper analysis, Figures (1) and (2) can be referred to.

Figure 1: Number of Companies Operating According to Food Product Safety Standards in Several Arab Countries - 2023

Source : (Public Register, 2023) and (ISO, 2021) and (BRCGS Directory, 2023)**.**

Egypt and Saudi Arabia are among the Arab countries with the highest implementation of food safety standards, while Iraq, Algeria, Qatar, and Kuwait have the lowest adoption of these standards.

Algeria ranks 10th out of 11 Arab countries when considering the total number of companies implementing food safety standards for their products.

When examining each standard individually, Algeria ranks 8th in the application of the FSSC 22000 standard, with 30 companies representing 3.28% of the total, following Lebanon and Jordan with 48 and 47 companies, respectively.

Tunisia ranks fifth with 67 companies, and Morocco ranks fourth with 76 companies, after the United Arab Emirates, Saudi Arabia, and Egypt, which lead the rankings and collectively represent 65% of companies implementing food safety standards.

Regarding the application of the ISO 22000 standard, Algeria ranks 10th with 10 companies, accounting for 0.05%. Kuwait and Lebanon each have more

than 40 companies implementing the standard, and Morocco has 67 companies, while Qatar has 102 companies. Tunisia ranks fourth with 115 companies, and the top three positions are held by Jordan, Saudi Arabia, and Egypt, representing approximately 60% of companies implementing the ISO 22000 standard in the researched Arab region.

In terms of the BRC standard, Algeria ranks eighth with 8 companies, representing 0.01%, coming before Kuwait and Qatar with 6 and 3 companies, respectively.

Egypt, Morocco, and the United Arab Emirates top the list, with these three countries representing nearly 80% of the companies implementing the BRC standard in the studied Arab region, with 306 companies in Egypt, 217 companies in Morocco, and 108 companies in the United Arab Emirates.

Figure 2: Percentage of Adoption of Food Product Safety Standards in Some Arab Countries - 2023
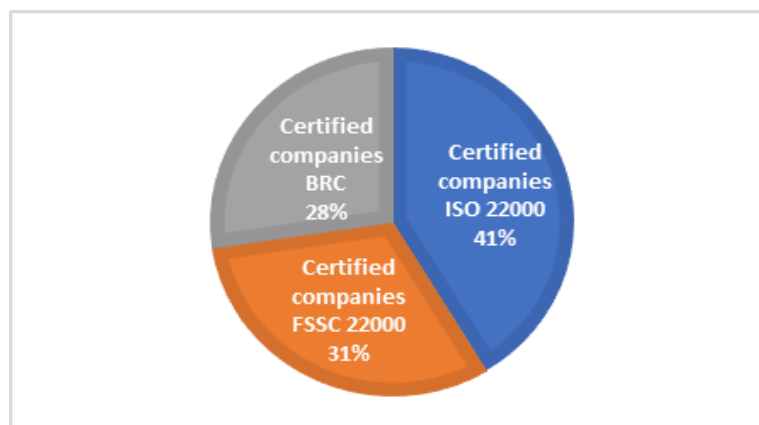
Source: Prepared by the researcher based on Table 1.

The most widely adopted standard is ISO 22000, with 41% of the companies in the Arab countries covered in Table (1) implementing it, totaling 1210 companies. Following that is the FSSC 22000 standard, which is implemented by 915 companies, representing 31%. Lastly, the BRC standard is applied by 801 companies, accounting for 28% of the researched Arab companies.

There are two main reasons for this distribution. Firstly, the ISO 22000 standard has fewer requirements, making it preferable for companies, especially those with no prior experience in adopting international standards. Secondly, it is issued by an international organization with the largest number of member countries globally, making it well-known to governments. In the case of Algeria, the Algerian Institute for Standardization (IANOR, s.d.) is a member of ISO,

which facilitates the training of expert consultants who assist companies in adopting international standards. The institute also distributes international standard booklets and organizes training courses for companies and consultants.

In terms of adoption, the FSSC 22000 standard ranks second among the most adopted standards in Arab countries. It has similar requirements to ISO 22000, with additional criteria related to food defense and supplier management, making it more reliable in terms of food defense. Companies implementing it prioritize food safety by addressing the risks of food contamination and its potential use as a biological weapon against a country's food security, aspects that other standards may overlook.

In Algeria's case, the FSSC 22000 standard is the most widely adopted due to the requirement imposed on Algerian suppliers by multinational companies or companies operating under multiple nationality licenses. These suppliers must adhere to this standard for their products to be sold. Examples include Danone Algérie, Néstlé Algérie, Linde Gaz, and Agro-industrie, (Public Register, 2023) which supply beverage gas to representatives of Pepsi and Coca-Cola in Algeria.

The BRC standard is applied by 31% of the companies in the researched Arab region, making it the least adopted compared to the other two standards. This is due to the strictness of the BRC standard, which is more detailed in its requirements and requires a deeper audit of processes. This poses a challenge for companies that may need significant changes in their operations to achieve compliance.

It's also worth noting that Algerian companies applying the BRC standard are primarily involved in date production and export, as this standard is crucial for accessing international markets in Europe and America. These companies, such as Biodattes Algérie, Alourdjouana Dattes, Agrodat, Oasis Sed, Souf Fruits Dores, Dattes Tayba, Jardin Ziban Sarl, and Tolga Agro Food, operate in the date industry and are mainly located in the Biskra region (BRCGS Directory, 2023). This sector is predominantly agricultural, which makes compliance with standards easier compared to industrial activities.

IV. Conclusion

Consumer health is a priority that should be reflected in the practices of companies by adopting management systems that meet the requirements of relevant international standards in food safety. Among these standards are ISO 22000, FSSC 22000, and BRC.

Implementing these standards is a significant step in equipping Algerian

food-producing companies to protect consumers on one hand and facilitate exports on the other.

Looking at Algeria's position in terms of adopting these standards compared to other Arab countries, it is evident that Algeria ranks tenth. This highlights an area that requires improvement and more focus. The wide range of products available in Algeria, including sugar, cheese, dairy products, pasta, juices, carbonated beverages, meat and fish products, vegetable oils, and date derivatives, demonstrates significant potential that is not fully utilized.

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