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## Article

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## COMPARATIVE STUDY OF CERTIFICATION SCHEMES FOR FOOD SAFETY MANAGEMENT SYSTEMS IN THE EUROPEAN UNION CONTEXT

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### Abstract

Public food organizations have come in a relatively short period of time to operate in a highly complex business environment. As a result, quality and especially food safety became elements with new values, in a multidimensional approach of economy consumption. Simultaneously, the globalization of economic and social life has highlighted the need for a unitary approach on how to produce quality and safe products for the final consumer. For this reason, at the international level a series of standards have emerged that organizations have to follow to design, implement and certify food quality and safety management systems that benefit all parties involved.

The present paper aims at carrying out a comparative study of certification schemes of food safety management systems in an attempt to give organizations the opportunity to understand what type of quality management system is appropriate to the organizational framework in which they are located, according with established objectives. The research is based on a comprehensive study of specific literature, articles and reference papers, the collection of data being carried out through comparative analysis of international standards, private certification schemes for food safety management products and systems, in the desire to clarify the different approaches but also the similarities and differences between them.

**Keywords:** quality management system, food safety, certification schemes, international standards, quality

**JEL classification:** F23, L2, M16

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## **Introduction**

The fast-paced lifestyle of today, globalization and market interconnection, gastronomic cultural harmonization, have led to major changes in how food is prepared and consumed by consumers, with positive effects such as rapid advances in food technology, food preparation and product packaging in order to ensure the quality and safety of food in the logistics of goods. Considered in this context, the issue of food safety and quality generates common efforts and responsibilities for all those involved in the complex chain that includes agricultural production, processing, transport, storage and consumption of food commodities. Today, more and more specialists in the field suggest that food safety is in fact a consumer's right to use safe products for consumption and is an intrinsic quality of the food, namely the right not to affect his / her life and health. At European and international level, producers and service providers directly or indirectly involved in the food chain have the obligation, regulated by European regulations and national legislation, to provide safe consumer products in line with customer needs and expectations. Respecting this desideratum to maintain and ensure food safety and quality, a set of referential rules, codes of good practice, hygiene codes have been created at international and European level to help organizations in the field implement their systems of food safety management, according to international standards or private certification schemes. Implementation Criteria for Food Safety Management Systems and Certification Scheme Requirements are detailed in International Standards.

## **1. Review of scientific literature**

Contemporary agricultural and food systems are built on the basis of public and private regulations, which have become a mandatory part of the logistics activity of basic food packed in bulk and processed food products (Henson and Reardon, 2005). Of course, in this process, state governments have traditionally played a major role in setting minimum food quality standards and regulations for their populations, in the desire to ensure the availability of safe food for the general population and the protection of consumers against fraudulent practices. At the same time, governments must keep abreast of the fact that quality standards in the field of agricultural and food products have continued to evolve as a result of technological change, scientific developments on food-related risks but also in response to the increasingly complex demands and needs of consumers and society. At the same time, in the agricultural and food sector in many developed countries private control systems and enforcement procedures have developed in response to consumer demand trends that have increased the role of voluntary private standards in food chains (Smith, 2009). The wider use of private standards reorients agricultural and food supply chains from price-based competition centers to those based on quality (Henson and Reardon, 2005).

Food quality standards are now increasingly seen as private goods that differentiate food from one another often by distinguishing between the offers of the profile firms. Parallel to private standards, public standards and regulatory controls have also evolved over time in most countries around the world and have become increasingly complex and rigorously respected since consumers require specific attributes or information about certain attributes of foods (Josling et al., 2004).

As a result of globalization, food supply chains extend beyond national borders, evolution partly facilitated by new processed food and an environmental policy that is more friendly towards international food trade. While public standards, considered to be minimum standards of quality, protect the consumer, they often do not allow food industry companies to differentiate their products on the basis of quality characteristics to protect and gain market share when competing in national and regional markets (Smith, 2009). As a result, private standards have emerged to bridge this gap and respond to regulatory developments. Generally, they are based on coordinated systems to meet consumer demand for quality characteristics based on product differentiation and market segmentation (Fulponi, 2006). These standards may be more rigorous and more demanding than the minimum standards imposed by governments on their national markets. However, private standards, although quite a recent phenomenon, are not yet universally applied at the same time as public standards, even though they are still the dominant form of control in food systems in some countries. In this context, the complexity of the interaction of public and private quality standards is greatly enhanced. In addition, the distinction between product, process and system standards has become important in the context of the multilateral trading system, especially in the case of the process and system standards that involve distinct production processes and methods (Smith, 2009).

As part of the quality management system, Quality Assurance (AQ) covers all types of activities, from design, development, implementation to production, installation, service delivery, etc. (Militaru et al., 2014). This includes regulations on the quality of raw materials, assemblies, products and components, production-related services, and management, production, inspection and control processes. As a function of quality management, the main purpose of quality assurance is to ensure that the product meets or exceeds customer expectations (Militaru et al., 2014). In this context, the adoption and implementation of quality standards becomes a priority for organizations, as evidenced by mandatory certification (required by the legislative framework in some countries for certain areas) or voluntary, in order to bring added confidence to consumers. What we call today the "certification process" is basically a resultant of international cooperation that has emerged and developed first and foremost in developing countries and then rapidly worldwide (Militaru et al., 2014).

As agreed by the International Organization for Standardization (ISO), the main objective of certification is to "ensure through a third party body, independent of the manufacturer and the beneficiary, the conformity of a product, service, process or organization quality system with a predefined reference ". In order for the certification activity to be carried out efficiently and in order to achieve the purpose for which it was created, a committee was established in 1985 inside ISO that was responsible for providing the necessary information, by developing international guides on the different types of inspections, tests or certifications. This committee, originally called CERTIGO, is currently functioning as the Committee on Conformity Assessment (CASCO) and can develop compliance assessment policies.

As it results from the ISO definition, there are several types of certifications that can be made for either products / services, management systems or other activities. Therefore, organizations are committed to continuously improving the quality of their products and

services offered to consumers, thus ensuring that they meet the requirements of future certification. The certification indicates that, in the opinion of the certification bodies, the business has a specific set of knowledge, qualities, skills or abilities. Although voluntary in some cases, certification is often required by large commercial chains operating in more developed markets. The importance of certification of management systems cannot be challenged by anyone. It is scientifically demonstrated how important it is for organizations to carry out their work on the basis of common principles and proper phasing of activities, as required by the various referentials. Certification only serves to support organizations that can demonstrate that they really apply the rules in the standards. Moreover, the certification of a management system is proof the organization performs superior quality processes over the rest of the competitors, having the capacity to continuously improve to meet and even exceed consumer requirements (Militaru et al, 2014).

The certification bodies are mostly business organizations or, in certain situations, professional bodies or non-profit organizations (sometimes the latter exist primarily to provide a certain type of certification). Regardless of its nature, the certification body sets out the certification program policies (Caccamisi and Crescenzo dell'Aquila, 2007).

## **2. Research methodology**

To evaluate the similarities and differences between the international standards on the safety of food used at the international level and implicitly of the private certification schemes of products and the food safety management systems, comparative analysis was used based on the comparison of requirements, identification of common elements and differences, as well as assessing the compatibility and feasibility of integrating these requirements (Nicolas, 2013). The results of the analysis are presented in the following sections based on the structure and requirements of the standards as well as the criteria that food business operators have to meet in the case of private certification schemes. For the results of the comparative analysis to be conclusive and pertinent in the research, the following materials were used: Codex Alimentarius: Food hygiene code (basic texts) - fourth edition (WHO, 2009); BRC Global Food Safety Standard, Number 7 (BRC, 2015); IFS Standard for Food Quality and Safety Audit, Version 6 (IFS, 2014); ISO 22000: 2005 Food Safety Management Systems - Requirements for any organization in the food chain (ISO, 2005); FSSC 22000 Requirements for FSSC 22000 version 4.1, SQF Code, Issue 7, Quality Management Systems ISO 9001: 2015 - Requirements (ISO, 2015), etc.

Considering the variety of international standards, requirements and criteria for the purpose of certifying food quality and food safety management systems, we believe that comparative analysis of these is one of the most effective ways to obtain information applicable at the organizational level, both for organizations seeking certification and for certification bodies. In this respect, it is necessary to present the main criteria for differentiating the standards in the field and to identify the context of their applicability, depending on the needs and interests of the organizations. The most generic of systems and most commonly adopted by food industry manufacturers (ISO 22000, EurepGAP, FSSC 22000, BRC, SQF Code and IFS) are then compared, discussing the criteria, similarities and differences between them.

### **3. Characterization of the main standards and certification schemes in the field of quality and food safety management systems**

#### **3.1. Hazard Analysis. Critical Control Point (HACCP)**

Hazard Analysis Critical Control Point (HACCP) is a management system in which food safety is addressed through the analysis and control of biological, chemical and physical hazards generated by the production, procurement and handling of raw materials, the manufacture, distribution and consumption of food.

In 1980, the International Commission on Microbiological Specification of Food (ICMSF-WHO) produced a report on the application of HACCP. The guidelines for the application of HACCP were adopted at the 20th session of the Codex Alimentarius Commission in 1993, and were addressed to all Member States as associate members of the FOA and WHO in the form of a consultative text, as the use of the HACCP system was the responsibility of each government.

Through these guidelines, Codex Alimentarius encourages and recommends the implementation of the self-control system, HACCP, in the food industry. Prior to its application to any sector of the food chain, the sector should operate in accordance with: the Codex of General Food Hygiene Principles, a suitable Codex for manufacturing (GMP – Good Manufacturing Practice) and an adequate food safety legislation (Codex Alimentarius Commission, 2003). Successful implementation of these guidelines requires training and a multidisciplinary approach, including appropriate expertise in agronomy, veterinary medicine, production, microbiology, medicine, public health, food technology, environmental health, chemistry and engineering (Caccamisi and Crescenzo dell'Aquila, 2007).. It is estimated that over the years there have been private standards for food safety both in terms of number and complexity (Reardon, 2000; Jaffee, 2004). The development of standards at different levels (national, regional and international) that are not harmonized has led to the emergence and development of the HACCP system (Stefanova and Gotchev, 2016).

The mandatory HACCP version for food business operators in the European area is the one codified in the Regulation (EC) No 852/2004, as amended by Regulation (EC) No. 1019/2008. In the private certification schemes, the version mentioned is often the one provided in the Codex Alimentarius. The mandatory HACCP version is based on the requirements of the Codex Alimentarius, but it is not as elaborate as the one in the private schemes. By including them in private schemes, the non-binding Codex acquires a legal effect. The inclusion of HACCP in private systems adds for European companies applicability in sectors exempted from Regulation 852/2004 (the primary sector in particular), application through private law instruments and certification visibility. For companies outside Europe, this brings an obligation that does not exist in the public law system (European Food Law Association, 2011).

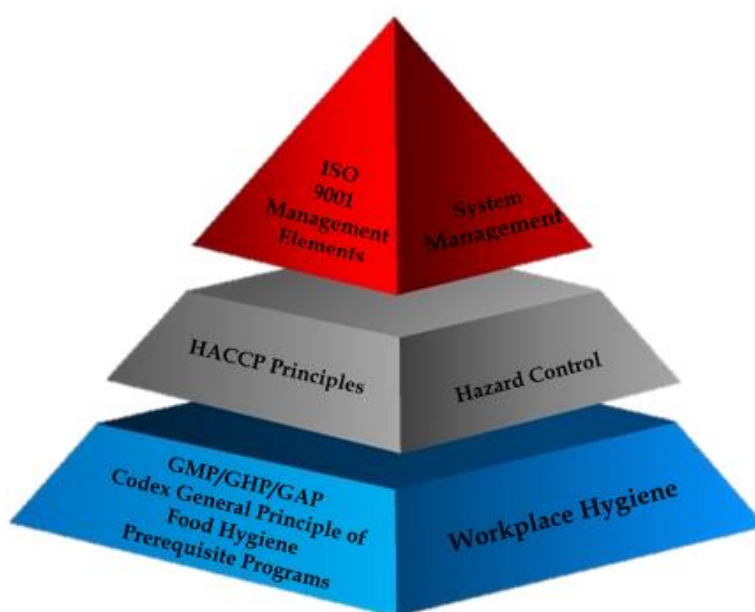
#### **3.2. ISO 22000 standard**

By the early 2000s, a number of standards had been developed by various private and national organizations around the world, leading to contradictory situations when companies began using their own internal codes and procedures to control suppliers. Different audit criteria have made it almost impossible for suppliers to meet all the requirements of the global market. In this context, in 2001, the International Organization

for Standardization (ISO) began working on a standard for the Food Safety Management System (FSMS). This international FSMS standard, known as ISO 22000, was finally published on September 1, 2005. It is a framework that combines prior programs, HACCP principles, implementation steps described by the Codex Alimentarius Commission and ISO 9001 (figure no. 1) standard elements. Within two years the standard has been implemented by organizations in over 50 countries as an alternative to more than 20 food safety systems developed by individual companies in the sector to audit their suppliers.

ISO 22000 intends to define the requirements of the food safety management system that companies have to meet to comply with food safety regulations around the world. ISO 22000:2005 adopts a food chain approach to food safety, defining a set of general food safety management requirements that apply not only to raw material manufacturers and food producers but to all organizations participating in the food supply chain.

ISO 22000 can be applied independently of other management system standards, but its implementation can be aligned or integrated with the requirements of other management systems (eg ISO 9000), thus leading to the certification of integrated management systems.



**Figure no. 1: Three Layer Model of ISO 22000:2005**

*Source: Lokunarangodage C.V.K. et al., 2015, p. 4*

The standard integrates the HACCP system and the measures applied by the Codex Alimentarius Commission. Through audited requirements, it combines the HACCP plan with the prior programs (PRP) (ISO 22000: 2005, 2005). Prior programs include all the basic conditions and activities necessary to maintain a hygienic environment in the food chain that is appropriate to production, logistics and supply of safe food.

On the other hand, the new standard offers an alternative to food manufacturers that do not implement the ISO 9001: 2000 standard while they want an efficient food safety management system (Aggelogiannopoulos et al., 2007), combining a number of advantages, quality management, external and internal communications, accountability, implementation of crisis management, continuous improvement, good health practices and differentiation between PRP, OPRP and PCC (Talbot, 2007).

Besides the fact that the HACCP system is a food safety system and ISO 22000 is a standard of the food safety management system, the improvements made by the latter include the following:

- ISO 22000 enables the development, implementation and verification of a food safety management system or of part of it by experts of any company;
- ISO 22000 also refers to good sector practice and general hygiene rules published by Codex Alimentarius;
- In addition to internal communication, external communication is also a precondition for creating, implementing and updating FSMS in accordance with ISO 22000;
- ISO 22000 requires risk analysis to assess each identified hazard for food safety;
- ISO 22000 requests PRP documentation;
- HACCP uses the traditional concept of control splitting measures in two groups: preconditions and measures applied to critical control points (CPCs). In the case of ISO 22000 standard, these concepts are reorganized in a logical order by adding a set of control measures called Prior Operational Programs (OPSP).
- ISO 22000 calls for the monitoring system and the planning of corrective actions for operational PRPs, as well as for PCCs;
- ISO 22000 requires analyses and improvements based on the outcome of monitoring the OPRP and HACCP plans;
- ISO 22000 also requires reviewing and identifying the specifications, formulation and origin of input products and end products;
- ISO 22000 separates and clarifies verification activities and validation activities;
- Although not mentioned in HACCP, allergen control is a necessary program in ISO 22000;
- New terms have been developed within the ISO 22000 standard, such as "potentially uncertain product" and the term "withdrawal" for product recall and adjacent activities.

Unlike other food safety management system certification programs (eg FSSC 22000 and SQF), ISO 22000 does not have prior programs specific requirements (PRPs), but requires the organization to identify and implement the appropriate programs. This makes it more flexible and food organizations can implement and be certified according to ISO 22000. Food manufacturing and processing companies can use the ISO ISO / TS 22002-1 specification to develop their PRP programs. It describes the requirements for PRP programs applicable to these organizations. The requirements presented are widely accepted and are equivalent to the PAS 220 requirements, with the publicly available specification being used with ISO 22000 for the FSSC 22000 Certification Scheme.



In this context, ISO 22000 is not a benchmark for the Global Food Safety Initiative (GFSI). This means that if a company wants to implement a GFSI-recognized system, it will need to implement the requirements of the 22,000 FSSC, which is most similar to the ISO 22000 standard or one of the other GFSI-recognized certification schemes.

### **3.3. EurepGAP/GlobalGAP**

EurepGAP is a quality standard that began in 1997 as an initiative of major European Retailers belonging to EUREP (Euro-Retailer Produce Working Group) to meet consumer concerns and demands on food safety, environmental protection, workers' health, safety and animal welfare. The objective was to develop voluntary standards and procedures for GAP (Good Agricultural Practice) certification. EUREPGAP standards have helped producers comply with the accepted European Food Safety Criteria, sustainable production methods, animal welfare and worker welfare and responsible use of water, compound feed and plant propagation material. Harmonized certification also meant savings for manufacturers, as they would not have to do more audits according to different criteria each year. It was also considered that the development of joint certification schemes is in the producers' interest. So far, organizations affiliated with several retailers have had to perform multiple audits based on different criteria each year. Under these circumstances, EUREP has laid down harmonized standards and procedures for developing good agricultural practices in conventional agriculture, including highlighting the importance of integrated crop management and a responsible approach to worker welfare. This has led to what was initially called the European Retailers Protocol for Good Agricultural Practice (EurepGAP).

Collaboration between retailers and agricultural producers has led to a protocol for independent and recognized certification of third-party farming processes that farmers worldwide can use to demonstrate compliance with GAP. EurepGAP certification covers a range of agricultural and food products. The scheme covers the entire agricultural production process of the certified product, from planting in soil (seed control points) to the unprocessed final product (handling and storage control points). The scheme also helps to establish awareness and accountability regarding social aspects and animal welfare criteria on farms. EurepGAP emphasizes the importance of determining the quantity of residues, setting a standard regarding MRL (maximum residue limit) and drawing up guidance notes to help farmers and producers demonstrate that their products meet the MRL requirements.

Since most manufacturers and retailers in the food industry considered this model to be in line with the emerging pattern of globalized transactions, EurepGAP began to have a global meaning. In order to better reflect its global expansion and its goal of becoming the global leader in GAP, EurepGAP changed its name to GlobalGAP in 2007 at the 8th Bangkok Global Conference. GlobalGAP is a private sector body that sets standards for the certification of agricultural products around the world. The goal is to set a single standard (The Integrated Farm Assurance Standard (IFA) Standard) for good agricultural practices with different product applications, able to match the whole global agriculture. Governance is provided by a council whose decision is based on a consultation process, with retailers (50%) and manufacturers (50%) being represented on board. GlobalGAP is today the most important farm insurance program in the world, translating consumer requirements into good agricultural practices from over 120 countries. GlobalGAP is also the most important

private standard, requiring producers to demonstrate good agricultural practices (GAP) related to sanitary, phytosanitary and environmental concerns (Henson and Humphrey, 2009). In the fresh products sector, private agro-ecological standards typically cover pesticide use and application rates, traceability, water management, adoption of integrated crop management systems, record keeping and self-inspection, harvesting and packaging as well as transport practices.

These private standards, originally developed to meet the concerns of fresh food safety with the potential risk of contamination with pathogens and the attempts to reduce pesticide residues, have subsequently evolved to meet ethical and environmental requirements. In part, private standards are designed to ensure that manufacturers meet the requirements of public standards. GlobalGAP aims to ensure that fresh produce complies with EU MRL regulations. However, private standards often have higher requirements than the requirements of public standards (Gorton et al., 2004).

GlobalGAP offers three main certification products called LocalGAP, GlobalGAP and GlobalGAP +, namely: 40 standards and programs for three areas: crops, livestock and aquaculture, and customized solutions for GlobalGAP members. With over 600 certified products and more than 175,000 certified manufacturers in over 125 countries, GlobalGAP manages to build trust, integrity, innovation and excellence for its members.

GlobalGAP is a "pre-farm-gate" standard, which means that the certificate covers the process of obtaining the certified product from farm inputs such as feed or seedlings and all agricultural activities until the product leaves the farm. GlobalGAP certification is performed by more than 100 independent certification bodies accredited in over 125 countries. It is open to all manufacturers around the world. GlobalGAP includes regular manufacturer inspections and unannounced additional inspections.

GlobalGAP consists of a set of normative documents such as the GlobalGAP General Regulations, the GlobalGAP Checkpoints and Compliance Criteria, and the GlobalGAP Checklist. Farm insurance plans existing at national or regional level may require recognition as equivalent to GlobalGAP through independent comparisons. The GlobalGAP standard is subject to a three-year review of continuous improvement to take account of technological and international developments.

#### **3.4. British Retail Consortium (BRC) and Global Standard for Food Safety**

The British Retail Consortium (BRC) is a consortium of UK retailers having as members British companies and other parts of the world such as: Abercrombie & Fitch, IKEA, L'Occitane, Swarovsky, Toys R Us, Starbucks, Tesco, Sainsbury etc. Although the BRC standard on food safety has begun in the UK, it is now recognized as a global standard. There are over 17,000 companies certified BRC sites worldwide and an extensive network of BRC Certification Bodies in 90 countries. Originally, BRC developed its global food safety standard in 1998 to help the food industry meet the legislative requirements of the EU's General Product Safety Directive and the UK Food Safety Act. The BRC standard is a standard for food supply which applies to food supply activities, acting as proof for UK retailers and trademark owners to demonstrate "necessary diligence" in the face of a possible prosecution by the authorities in that country.

In a short time, the BRC standard has become a true reference for other food business organizations, being considered a benchmark for best practices in the global food industry. The standard is used not only to evaluate retailer suppliers but also as a framework on which many companies have based supplier rating programs and the manufacturing of branded products (own products). Therefore, most traders and brand owners in the UK and many retailers in mainland Europe or the international market will only consider affiliated suppliers who have obtained certification based on the appropriate BRC standard.

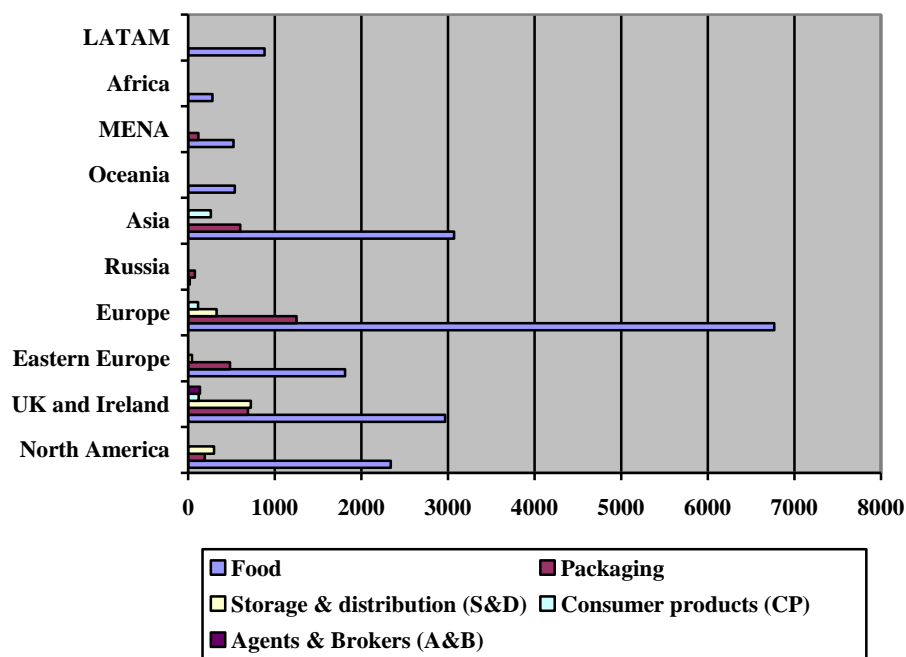
The BRC standard covers all areas of product safety and legality, including the HACCP system, quality management, environmental standards, and product and process control within the organization. Major business benefits come from customer trust granted by BRC certification. Each standard is developed under the leadership of BRC and its members, being constantly reviewed, at least once every three years, to a large extent reflecting changing EU legislation and continually developing the requirements of best practice. The use of the BRC standard is legally voluntary, but it is recommended to food manufacturers who are willing to supply hypermarket products in the UK (Caccamisi and Crescenzo dell'Aquila, 2007). Following the success and broad acceptance of the Global Food Standard, BRC published the first edition of the Packaging Standard in 2002, followed by Consumer Products Standard in August 2003 and the BRC Global Storage and Distribution standard in August 2006. In 2009, BRC collaborated with the Retail Industry Leaders Association (RILA) to develop the Global Standard for Consumer Products in North America (European Food Law Association, 2011).

The BRC standard is recognized as a food safety scheme recommended by the Global Food Safety Initiative (GFSI) and has been accepted by 8 major international traders: Carefour, Tesco, ICA, Metro, Migros, Ahold, Walmart and Delhaize. Instead of creating another standard, the GFSI Technical Committee identified the key components required to meet food safety standards and operating protocols to provide certification and created a reference document. Standard owners, such as BRC, have been invited to submit the benchmarking standard. Therefore, BRC became the first recognized standard to meet the GFSI reference criterion. Benchmarking to GFSI ensures that the BRC global food safety standard is accepted by many of the largest retail groups in the world. The standard offers advantages not only for the retail industry, but also for food producers, importers, food suppliers, ingredients suppliers and the food industry. It is currently used by suppliers in Europe, Africa, the Middle East, Asia, the Far East, North and South America and Australia (European Food Law Association, 2011) (figure no. 2).

BRC is an accredited certification scheme in accordance with EN ISO / IEC 17065: 2012 and is one of the recognized Global Food Safety Initiative (GFSI) systems as a benchmark for food business appraisal. Firm evaluation and certification must be carried out by accreditation bodies accredited according to EN ISO / IEC 17065: 2012 for the BRC scheme by an accreditation body.

To date, BRC has developed a set of standards in many areas for certification of its suppliers: food safety, packaging and packaging materials, storage and distribution, agents and brokers, consumer products.

The BRC Food standard is a product standard and not a standard for a quality management system, focusing on additional requirements for products, production processors and equipment.



**Figure no. 2: Total numbers of certificated sites for each BRC Global Standard**

*Source: BRC Global Standards Compliance Programme, 2017*

There are 3 degrees of certification: A – the highest level, B – the average level, C – the basic level. The degree depends on the number and severity of the nonconformities identified during the audit. The certification decision takes into account both the degree of audit and the quality and the limitation period of the Corrective Action Plan.

There are some fundamental differences between BRC and ISO 22000:

- BRC uses Codex HACCP, ISO 22000 uses ISO-HACCP. One of the big differences is that ISO 22000 introduces a set of control measures called prior operational programs (OPSP);
- BRC is recognized by GFSI, ISO 22000 is not;
- BRC is prescriptive, ISO 22000 is generic (FSSC 22000 is also prescriptive and recognized by GFSI);
- BRC Standard is continually revised, ISO 22000 has not been changed for more than 10 years;

- ISO 22000 focuses more on integrating the food safety management system with business objectives and the need for communication, as well as an additional prior standard, while BRC focuses more on improving the food safety management system by clearly addressing the prior programs for product testing and focus on the day-to-day monitoring of food safety.

Unlike the FSSC 22000 that evaluates the organization's documented systems and records, BRC focuses on implementing appropriate manufacturing procedures.

### **3.5. International Food Standard IFS**

In 2002, in order to create a common food safety standard, German food business operators from HDE (Hauptverband des Deutschen Einzelhandels) have developed an audit standard called the International Food Standard or IFS. In 2003, the French retailers (and wholesale traders) from the FCD (Federation of Trade and Distribution) joined the IFS Working Group and contributed to the development of the current standard.

The objective of IFS is to create a consistent assessment system for all retail food companies with uniform documentation, joint audit procedures and mutual acceptance of audits, which will create a high level of transparency throughout food logistics. Its scope has exceeded the food sector (International Featured Standard), although its food standards still hold an important stance. The International Food Standard is a unique and globally recognized standard that applies to all stages of food processing (European Food Law Association, 2011).

IFS Food Standard is one of the eight standards of the International Featured Standards (IFS) brand umbrella. It is a recognized GFSI standard for verifying food safety and the quality of manufacturers' food processes and products. It refers to food processing companies or to food packaging companies. IFS Food applies when products are "processed" or when there is a risk of product contamination during primary packaging. The standard contains many aspects of compliance and supports production and marketing efforts for brand safety and quality.

Standard version 6 IFS Food has been developed with the full and active involvement of certification bodies, retailers, industry and food service companies around the world.

IFS Food includes requirements for the following six topics: Senior Management Responsibilities, Food Quality and Food Safety Management Systems, Resource Management, Production Process, Measurements, Analyzes, Improvements, and Food Security.

The IFS Global Market program is based on risk analysis as a tool for small or less developed companies to create and implement an efficient food quality and safety management system through a systematic approach to the concept of continuous improvement. Standard requirements give each company the chance to develop its own solution that suits the company's processes and needs.

IFS Standard 6 has been reassessed by GFSI and gained recognition from the GFSI Document Guidance Sixth Edition. IFS Food version 6 accords greater importance to quality criteria in addition to food safety criteria. It also covers the issue of "packaging" and the risk of food contamination through packaging.

### **3.6. Safe Quality Food (SQF)**

Safe Quality (SQF) is an initiative in Western Australia in response to European food safety initiatives, currently run by the Food Marketing Institute (IMI) in Arlington, USA. In addition to food security, SQF focuses on product quality and stimulating improvement strategies. The main goal of the SQF is to control the entire chain. However, SQF believes that a standard does not work for all chain companies and that most other standards only work for large companies. Most procedures associated with standards are considered too elaborate and laborious for small companies. Thus, the SQF developed two different rules, SQF 1000 and SQF 2000. The SQF 2000 Code, based on the HACCP rules developed by the Codex Alimentarius Commission, was developed in consultation with the food industry and the quality professionals.

Unlike other recognized quality systems such as BRC, HACCP and ISO 9001, SQF combines a quality management system, such as ISO 9001 and a food safety system (HACCP), with the requirements of traceability of food products. In addition to Critical Control Points (CCPs) for food safety, critical quality points are identified, which makes SQF an integrated system.

The SQF program is recognized by the Global Food Safety Initiative (GFSI) and links the primary production certification to food production, distribution and certification of agent / brokerage management.

SQF codes (in particular, Code 1000 and 2000) provide the food sector (primary producers, food producers, retailers, agents and exporters) with a food safety and quality management certification program that is tailored to its requirements and allows suppliers to meet the regulatory, food safety and commercial quality criteria in a cost-effective way. In 1994, the SQF Code was developed and pilot programs were implemented to ensure its applicability to the food sector.

The SQF 2000 code can be used by all sectors of the food industry. The Code is a quality management system based on HACCP incorporating the National Advisory Committee on Microbiological Criteria for Foods (NACMCF) and CODEX HACCP, the proven methods used by the food industry to reduce the incidence of unsafe food that is on the market. It is designed to support the company or branded products of the company and to provide benefits to suppliers at all links in the food supply chain.

The SQF 2000 Code allows a vendor to demonstrate that it can provide safe food and meet the needs and requirements of its customers. SQF 2000 certified suppliers who receive raw materials from suppliers that implemented the SQF 1000 Code can ensure that through these complementary systems the product can be tracked from manufacturer to consumer.

The SQF 2000 Code also provides for a food sector mechanism in developing countries that seek to enter the global food market to implement a management system that meets the needs and requirements of their customers.

SQF Code Ed. 7, published in July 2014, replaces both SQF 1000 Code Edition 5 and SQF 2000 Code Edition, meeting the needs of all food industry providers through an internationally recognized certification system, focusing on the systematic application of HACCP for controlling food quality hazards as well as food safety. The implementation of an SQF management system addresses the buyer's quality and safety requirements and provides solutions for companies delivering products on local and global food markets. The

latest edition includes three levels of certification. Organizations can choose the SQF certification level to be audited to get the most benefits.

Level 1 SQF (Safe Food Certificate) is the "introduction" level of food security. Called "Food Safety Fundamentals", it is intended for low-risk food manufacturers. Level 1 certification requires the manufacturer to know and implement fundamental food safety controls. Tier 1 is also the first step towards SQF certification for new or emerging businesses. It covers good agricultural practices (GAP), good manufacturing practices (BPF) and good distribution practices (PIB).

SQF Level 2 certification, known as the "HACCP Certified Food Safety Plan", includes all Level 1 requirements and adds risk assessment and implementation for risk analysis and critical control points (HACCP). Level 2 is considered a food safety plan.

SQF Level 3 certification, "Comprehensive Food Safety and Food Quality Management System", which includes all Level 1 and Level 2 items, taking the process one step further by ensuring that actions have been taken to correct or prevent low quality or contamination through the HACCP process.

### **3.7. Food Safety System Certification (FSSC 22000)**

Food Safety System Certification (FSSC) is a private certification scheme for food and feed safety and quality management systems in accordance with SR EN ISO 22000 and SR EN ISO 9001 standards, specific prior sector programs and additional requirements scheme (RENAR, 2017). This scheme, which is based on ISO standards, has been approved since 2010 by the Foundation for Food Safety Certification (FFSC), and is internationally accepted by GF SI, EA, ANAB, the Canadian Accreditation Board, JAB, NABCB.

The FSSC 22000 (also known as FS 22000) combines ISO 22000 for food safety management with pre-requisite program requirements (PRP) along with other requirements. ISO 22000 alone was not enough to obtain GFSI approval due to deficiencies in the PRP content. As a result, a group of large multinational companies gathered to write PAS 220 (replaced by ISO / TS22002-1), which focuses on covering the necessary PRPs. However, GFSI has called for a global scheme of the industry that brought together the two individual programs, focusing on regulated requirements and the customer. In this respect, the FSSC 22000, a standard fully recognized by the GFSI, has been developed to serve as an international benchmark for food safety.

The FSSC 22000 is designed for food producers who deliver their products to major retailers. In this context, any manufacturer already certified according to ISO 22000 should only review its documentation in accordance with the requirements of the Food Safety Standard ISO / TS22002-1 PRP Part 1 Food Production in order for the GFSI to recognize that certification. The FSSC 22000 can be applied to a wide range of organizations in the food industry, regardless of their size or the complexity of processes in the food chain. This includes the production of perishable products of vegetable and animal origin, products with long-term preservatives, food ingredients, chemicals for food production, but excludes technical and technological aids. The standard has recently been extended to include the manufacture of food packaging materials.

While the first editions of the FSSC 22000 have been applied only to food manufacturers, the scope has been extended to packaging by including the new PAS 223 technical

specification, the preliminary requirements and design requirements for food safety in the manufacture and supply of food packaging. The FSSC will further extend its scope to feed manufacturers in the near future and will be ready for further food industry sectors as soon as technical requirements are developed. With more than 100 certification bodies and 1500 auditors worldwide, FSSC has so far managed to provide certification to approximately 15,000 beneficiaries in over 140 countries.

FSSC 22000 requires the organization to establish PRP programs to control the likelihood of product contamination caused by factors related to the work environment. There are different PRP requirements depending on the industry to which the organization belongs: ISO / TS 22002-1: Food Processing, ISO / TS 22002-3: Agriculture, or ISO / TS 22002-4: Production of food packaging. The widely adopted FSSC 22000 Certification Scheme was revised to conform to market developments and the expectations of stakeholders in the food market. The new edition, version 4, was published in December 2016. The main reason for revising the standard was to align the FSSC 22000 scheme to the GFSI reference requirements. With the release of the GFSI Version 7 Guidance Document, some schema updates have become necessary to maintain the status of the GFSI best practice scheme. Since the new GFSI requirements are a baseline, it is not surprising that the changes in the new version of the FSSC 22000 relate to two major themes: introducing an unannounced audit scheme and preventing food fraud. Thus, the changes that appear in the FSSC 22000 Version 4 recall the changes already underway in the latest revisions of IFS and BRC Food Safety Standards.

The FSSC 22000 establishes requirements for certification bodies (CBs) to develop, implement and enforce a certification scheme and to ensure its impartiality and competence. The scheme sets out the requirements for assessing the food safety system of food production organizations. The certificate provided indicates that the organization's food safety system is in compliance with the requirements in the system and that there is organizational capacity to maintain compliance with these requirements.

The scheme is composed of three components: ISO 22000, specific PRP and FSSC 22000 specific requirements. In addition to these three components, there is a voluntary FSSC 22000 - Quality module based on all ISO 9001 requirements integrating FSSC 22000 certification of food quality management. To meet this requirement, a voluntary ISO 9001: 2015 module was added to the FSSC 22000 scheme, offering the possibility of offering a combined FSSC 22000 and ISO 9001 certification. Starting March 1, 2015, FSSC 22000-Q certification was available for organizations that want to include food quality management in the field of certification.

### **3.8. Global Food Safety Initiative (GFSI)**

Global Food Safety Initiative (GFSI) coordinated by the CIES (Comité International d'Entreprise à Succursales; Food Business Forum) was launched in May 2000 as a reaction to the unprecedented development and expansion of private standards. Since that time, GFSI has begun to assess private standards to accept them as GFSI Good Practices. The strongest retailers in Europe, Asia and the US agreed to apply for GFSI-compliant certification for their own products and private labels.

Currently, GFSI brings together key stakeholders in the food industry to help continually improve food safety management systems around the world. With a vision of safe food for consumers everywhere, food industry leaders have created GFSI to find solutions in



response to particular concerns to reduce food safety risks, double and expensive audits, building confidence in the supply chain. The GFSI community works on a voluntary basis and is made up of leading food safety experts from food retail, food production and food services, as well as from international organizations, governments, academia and service providers for the global food industry.

GFSI is not a certification program itself nor does it conduct certification or accreditation activities. A food safety certification program is "recognized" by GFSI when it meets internationally recognized food safety requirements developed by a multi-stakeholder group that are established in line with good international practice.

All GFSI-recognized systems have been developed over many years, starting from individual standards set up by organizations such as retailers, industrial sectors, or certification bodies. Schemes recognized by GFSI have their origins in standards dating from the early 1980s, with the major influence being given by the requirements specified by retailers for their own product suppliers. All schemes and standards recognized by the GFSI contain requirements that go beyond the requirements of the Code of Practice on food hygiene (Codex Alimentarius), which are perceived by the food industry to be important for food safety. This is why they are explicitly required to be respected by the players on the market.

Benefits of GFSI Recognition:

- The GFSI benchmarking process provides an independent verification of the certification program;
- Recognition of the certification program by the GFSI Board, provides credibility through support from the world's largest food industry companies
- The systematic review of GFSI benchmarking requirements by global stakeholders has led to continuous improvements to certification programs by reviewing them.

Currently, GFSI recognizes the following certification schemes: BRC Global Standard, Global Standard for Food Safety version 7, PrimusGFS Standard, IFS PACsecure, Global Aquaculture Alliance Seafood - BAP Seafood Processing Standard, GLOBALG.A.P. - Integrated Farm Assurance Scheme version 5, Produce Safety Standard Version 4 and Harmonized Produce Safety Standard; Global Red Meat Standard (GRMS) 4th Edition Version 4.1, FSSC 22000 - October 2011 Issue, CanadaGAP - Scheme Version 6 Options B, C and D and Program Management Manual Version 6; SQF CODE 7th edition level 2, IFS Food Standard Version 6, IFS Logistics Version 2.1, BRC / IoP Global Standard for Packaging and Packaging Materials Issue 5 and BRC Global Standard for Storage and Distribution V3.

Private Scheme Certification offers a number of benefits to all stakeholders such as:

- for governments, as funding and management by the food industry provides a welcome framework to allow resource reallocation based on risk analysis in areas that may require more attention;
- for producers, as it helps address the problem of resource reallocation by avoiding overlapping audits;

- for suppliers, since, with the support of the GFSI tools, training programs are created that can lead to increased market access even for the smallest suppliers.
- for retailers and the final consumer, as it requires ensuring a thorough review of internationally recognized standards, and compliance is guaranteed by stringent and international accreditation procedures for certification bodies that carry out these controls.

#### **4. Results and discussions**

According to the European Union's food safety policy, the main objective is to protect consumers, while guaranteeing the smooth functioning of the single market. Dating back in 2003, policy focuses on the concept of traceability of both inputs (seeds, feeds) and outputs (primary production, processing, storage, transport and retail).

By analyzing both the certification schemes and the standards underlying them, we can highlight the following elements presented below:

- There are many common points in programs that are recognized by GFSI for certifying a food safety management system. It is important to highlight the differences and points of interaction between each recognized certification scheme and also between them and ISO 22000. The five major international standards approved by GFSI for food safety (BRC, FSSC 22000, SQF, IFS and Global GAP) have procedures and different structures, but all demonstrate the implementation and maintenance of the following three requirements: a food safety management system, good manufacturing practices, good distribution practices and good agricultural practices, risk analysis and critical control points (HACCP).

- ISO 22000 is not recognized by the GFSI as the reference standard for food manufacturers because it does not contain sufficient detail about PRPs. In 2010, the specifications available to the public were introduced (PAS) for food manufacturers to address this deficiency. PAS 220 has been designed to provide pre-program requirements for food processors and manufacturers. PAS 220 has been withdrawn and replaced by ISO / TS 22002-1, which has requirements identical to those initially published in PAS 220. ISO / TS 22002-1 requirements are used by companies preparing for FSSC 22000 certification as an excellent document to develop PRP programs for any food processor manufacturer or processor.

- irrespective of the standard chosen by food organizations, they will need to demonstrate commitment to superior food safety management and review all processes according to customer requirements. Each scheme also requires that processes be clearly defined and that there is consistent control over all identified hazards (HACCP).

- ISO 22000: 2005 has been developed on the basis of good food and food safety practices by developing a comprehensive management system based on the elements of the ISO 9001 management system. For this reason, the Food Safety Management System described in ISO 22000 and other ISO standards management systems is highly compatible.

- ISO 22000: 2005 has established a robust basis for establishing and demonstrating the compliance of the organization's food safety management system with the appropriate documentation and procedures as defined by the standard. Good manufacturing practices

(GMP) have been implemented through pre-programs (PRP), but the specifications given in the standard were no longer considered satisfactory by the major actors in the food industry, requiring additional guidelines to eliminate this deficiency. The FSSC 22000 standard largely solves these deficiencies and is considered superior by many specialists in the field. In this context, the competition between ISO 22000 and FSSC 22000 will increase in the future.

- Compared to the IFS or BRC schemes, the FSSC 22000 brings several benefits including: reduced certification fees, longer certificate validity (3 years), easy implementation for ISO 22000 certificate holders (common requirements), high compatibility with other ISO standards (eg ISO 9001), which leads to the possibility of joint audits as well as greater international acceptance (the international network of national accreditation bodies is used to accredit certification bodies).

- BRC and IFS standards are focused on very strict production, authenticity, counterfeiting and cross-contamination requirements that are not fully covered by other systems. Although they have similar requirements, they are not identical, half of the requirements of both schemes overlapping completely. The IFS and BRC schemes set requirements that are not specified in other systems and which concern the control of heat treatment, contamination and contamination with allergens.

- All standards reviewed and certification schemes require that the management system built is documented.

- The common points for all the standards analyzed are good practices in the food industry, the use of a HACCP system and a traceability system to identify food risks.

- Certification of the Food Safety Management System (FSMS) required to meet each clause.

- Each analyzed scheme is a bit different, with different sections, but the main objective is to create a food safety management system based on HACCP principles.

Analyzing the main standards and certification schemes in the field of quality and food safety management systems we can highlight a series of similarities and differences presented in table no. 1.

**Table no. 1: Comparative study of the main standards and certification schemes in the field of quality management and food safety management systems**

Comparison criteria	ISO 22000	BRC	IFS	SQF	FSSC 22000	GlobalGAP
<b>The type of activity</b>	Primary and secondary production, Simple and high tech processing and services	Simple and high tech processing and services	High tech processing and services	high tech processing	High tech processing	Primary production

Comparison criteria	ISO 22000	BRC	IFS	SQF	FSSC 22000	GlobalGAP
<b>Stages in the certification process</b>	2 stages: Document review, planning and implementation assessment and facility audit	1 Stage: Document review and facility audit are conducted are the same time	1 Stage: Document review and facility audit are conducted are the same time	2 stages: Document review and facility audit	2 stages: Document review and verification of preparedness for stage 2 facility audit	2 stages: Document review and facility audit
<b>Duration of the audit</b>	1-5 days	2 days	2 days	3 days	5 days	5 days
<b>The nature of standard requirements</b>	Generic	Prescriptive	Prescriptive	Prescriptive	Non-prescriptive	Non-prescriptive
<b>Type of certification</b>	Management certification	Product and process es certification	Product and process es certification	Product and process es certification	Management certification	Product certification
<b>Certification validity</b>	3 years, annual check	1 year, with the possibility of recertification	1 year, with the possibility of recertification	1 year, with the possibility of recertification	3 years	1 year, with the possibility of recertification
<b>Possibility of logo use</b>	Yes, including on the product	Yes, but not on the product	Yes, but not on the product	Yes, but not on the product	Yes, including on the product	Yes, but not on the product
<b>Accreditation scheme</b>	ISO 17021 Scheme	ISO 17065 Scheme	ISO 17065 Scheme	ISO 17065 Scheme	ISO 17021 Scheme	ISO 17067 Scheme
<b>Recognized by GFSI</b>	No	Yes	Yes	Yes	Yes	Yes
<b>Integration with other ISO standards</b>	Yes, perfectly integrated	Difficult to integrate with other standards	Possible to integrate with other standards	Difficult to integrate with other standards	Possible to integrate with other standards	No

As a part of the European Single Market and the Romanian food market, it is confronted with the same situation. Large European retailers want certified suppliers, according to internationally recognized schemes. Thus, at the national level, the Romanian Accreditation Association - RENAR, which performs accreditation of the bodies that certify food safety management systems, was established. The Romanian Accreditation Association - RENAR is a non-profit private law organization set up under the Civil Decision no. 1966 of 07.08.1990 (file 1975 / PJ / 1990) of the District 1 Court of Bucharest, functioning according to the provisions of the Ordinance no. 26/2000, as amended and supplemented, of Law no. 256/2011, of the EC Regulation no. 765/2008 and harmonized standards.

RENAR is a member with full rights of the following regional and international bodies;

- International Laboratory Accreditation Cooperation (ILAC) – of the year 1996,
- European Accreditation (EA) – of the year 1999
- International Accreditation Forum (IAF) – of the year 2002.

RENAR is a signatory of European and International Recognition Protocols for all areas: EA-MLA, ILAC-MLA, IAF-MLA. Since 2013 RENAR has accredited 8 bodies for SR EN ISO 22000 and a body for FSSC 22000. RENAR is also ready to provide

credentials for the latest version of the FSSC - Accreditation Specific Regulation RS-5.4 FS.2, 2017. (RENAR, 2017)

## Conclusions

In line with the development of human society and the emergence of great advances in science, the rise of living standards and the evolution of society's concerns regarding environmental protection and sustainable development, both private organizations and public institutions are increasingly confronted with the requirements and consumer needs in terms of food quality and safety. Although private and social interests in the food industry should be the same, they often do not coincide, and an efficient food quality control system operating from the perspective of a private business, or from a public perspective in a legislative context lacking efficiency, may not produce the desired results from a social point of view. Therefore, creating a common, public and private framework for food quality and safety can lead to the main objective of delivering safe end-products for use at the next stage of the food chain or safe for the final consumer. A food safety management system (FSMS) created in an organization is a network of interconnected elements that combine to ensure that products, processes and foods do not cause adverse effects on human health. These elements include programs, plans, policies, procedures, practices, processes, goals, objectives, methods, control measures, responsibilities, relationships, documents, records and resources.

The comparative study carried out in the present paper can be used by economic agents that carry out their activities in the field of public nutrition as a basis for substantiating and elaborating the necessary documentation for the design and implementation of the food safety management system. Depending on the standards to be met, the market requirements and the organization's needs, senior management can opt for one or more private certification schemes. We believe that implementing an integrated management system for food quality and safety requires alternative implementation of several certification schemes.

A certified food safety management system demonstrates the commitment and capacity of the organization to control food safety hazards in order to ensure that the food meets the quality standards at the time of human consumption. Therefore, certification of the food safety management system of an organization operating on the European market is an element that, although often voluntary, can bring the desired performance and safety to the Single European Market. Therefore, the analysis of the private certification schemes of the food safety management system is a necessary step in order to find those elements of good practice and to harmonize them, so that we can contribute either to their understanding by the actors on the food market or to the development of common practices for the use of harmonized standards.

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