



Official Food Safety Control Organization and Enforcement in Barcelona City



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Submission: January 12, 2024; **Published:** January 26, 2024

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Abstract

Official food safety control seeks to protect consumers' health from suffering any damage caused by food hazards along the food chain. This study describes the organization and implementation of official food safety control in Barcelona city through the FAO/WHO's framework on food control systems. Since the Municipality of Barcelona has more official competences of control than the rest of Catalonia and most of the Spanish municipalities, this administration is in a unique position compared to the rest of Catalonia and most of the Spanish local authorities. Food control is implemented and enforced based on nine action lines, which include control, surveillance and audit programs, management of food-borne outbreaks, alerts, denunciations, complaints and irregularities, sanitary authorizations and registries, and official certificates. This administration owns its official laboratory, which supports all control and surveillance activities. Moreover, communication and information activities are performed and addressed to food business operators and consumers. This is the first time this model has been employed to describe a local food control system. This paper lays the groundwork for improving Barcelona's food control system and enables the latter's comparison to other municipal systems.

Keywords: Risk Management; Food Control; Official Food Safety Control; Food Safety; Barcelona City; Catalonia; Spain; European Union

Abbreviations: EU: European Union; FBO: Food Business Operator; HACCP: Hazard Analysis and Critical Control Points

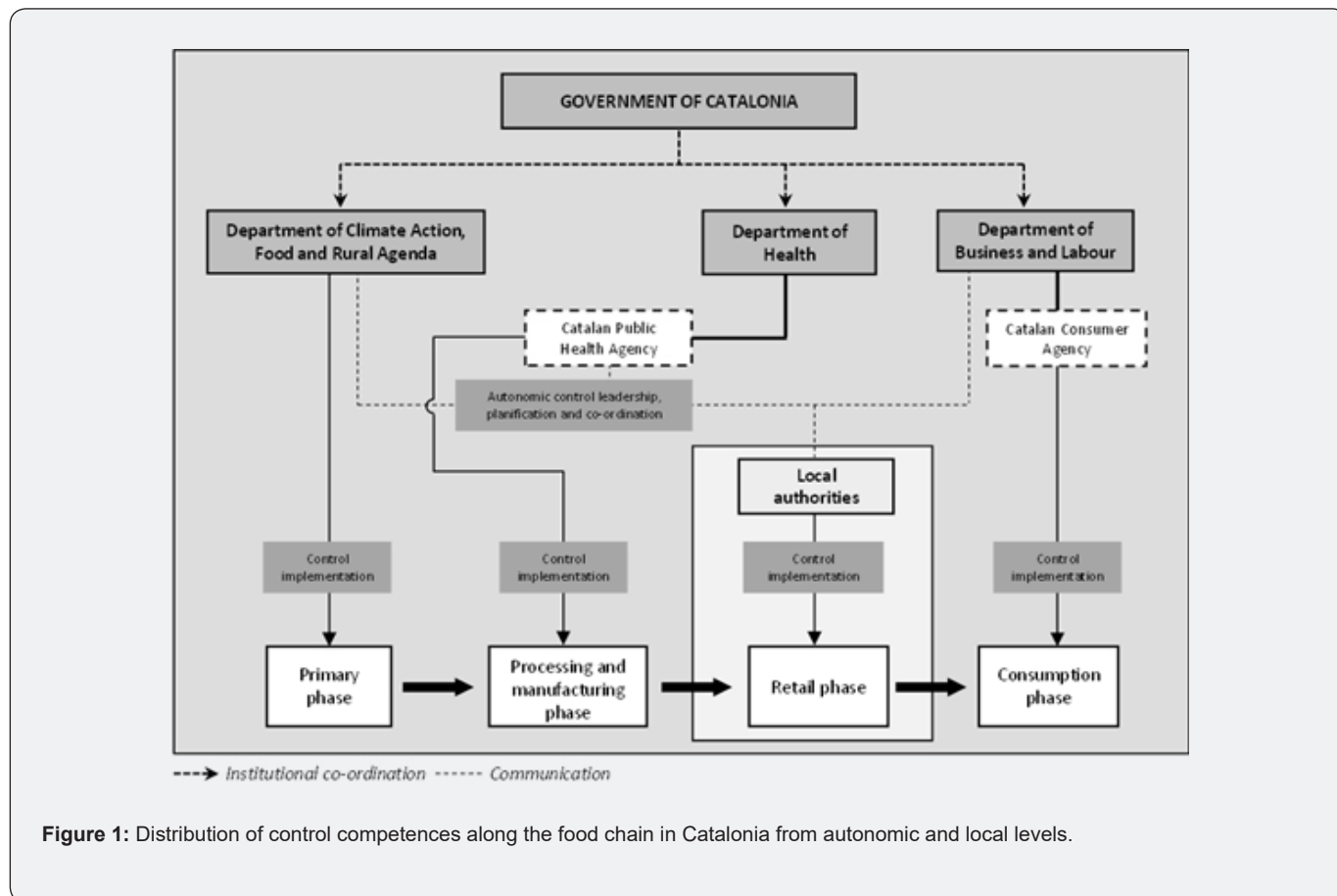
Introduction

Official food safety control (henceforth, control) seeks to protect public health by detecting and handling safety problems along the food chain and ensuring compliance with food regulations [1]. Control performance is carried out by the designated competent authority (henceforth, authority) in each territory [2], according to its given competences and in cooperation with the rest of the authorities [3]. Spain is administratively organized into 17 autonomous communities and 2 autonomous cities [4]. All those communities and cities have exclusive competences to perform control, except for imported food, whereby the Spanish Ministry of Health and the Spanish Ministry of Agriculture, Fisheries

and Food have reserved competences [5,6]. The autonomous communities are divided into further provincial and municipal levels, and in certain cases, some control responsibilities are transferred to municipalities. Catalonia, as a Spanish autonomous community, has full competence to enforce control in its territory [7]. The Department of Climate Action, Food and Rural Agenda, the Department of Health and the Department of Business and Knowledge are the principal authorities in this region. Whereas the Department of Climate Action, Food and Rural Agenda is linked to primary production, the Department of Health is involved in the later phases of the food chain and has the mandate to organize and perform epidemiological monitoring and health

protection and promotion (Figure 1). The tasks of the Department of Health are executed through the Catalan Public Health Agency [8], and its specialized area on food safety, the Catalan Food Safety Agency, which carries out risk evaluation and communication and

strategically plans and coordinates all food safety interventions [9]. Consumer protection during the consumption phase is carried out by the Department of Business and Knowledge through the Catalan Consumer Agency [10].



In Catalonia, municipalities are the designated local authorities for performing control at the retail phase, while control at the processing and manufacturing phase is performed by the Catalan Public Health Agency [9,11] (Figure 1). Nevertheless, unlike the rest of the local authorities, the Barcelona Municipality has extended control competence. At the international level, there is literature available addressing and describing national control systems, their structure and their organization. Nevertheless, there is a lack of research about control systems at the local level. Recognizing that local authorities are key in enforcing control at the municipal level and that their characteristics, resources and necessities are different in contrast with national authorities, there is a need to boost research and content about this subject. Given the lack of research about local control systems and the condition of Barcelona city compared to the rest of Catalonia’s local authorities, this study aimed at describing the organization and enforcement of control in this city.

Materials and Methods

A qualitative description was conducted through a single-case study approach [12]. This method is appropriate to address questions where the investigators have little or no influence over the case and aims at describing a real-life phenomenon [13]. Information was collected based on a purposive sampling method [14], which consists of purposefully selecting sources relevant to the research topic. Here, the sources selected focused on the organization and implementation of risk management in Barcelona. Qualitative data were studied through a content review of laws, regulations, internal guidelines, reports, publications, control programs, manuals and procedures that, at the time of the study, were employed to enforce and implement control. Publications and data retrieved from the official ASPB website, and the Barcelona Information System of Food Control were also included. The content review was driven by a directed content analysis [15], based on the five-component framework of food

control systems given by the Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (FAO/WHO) [1]: (1) food safety law and regulations, (2) food safety management, (3) inspection services, (4) laboratory services and

(5) information, education, communication and training (Table 1). A directed analysis is applied when existing theory is utilized to guide and structure the data study and helps the investigators in identify the key factors and variables to be studied [15].

Table 1: Description of the FAO/WHO five-component framework on food control systems [1].

Components of the food control systems	Description
(1) Food safety law and regulations	This element refers to the mandatory laws and regulations that are enforced to ensure that control is carried out by the designated authorities.
(2) Food safety management	This block is related to the operational coordination of all activities that aim to protect consumers' health and guarantee that produced and commercialized food is safe.
(3) Inspection services	This element is linked to all activities implemented and enforced to ensure that food is produced, handled, stored, and traded according to the legislation.
(4) Laboratory services	This component refers to the capabilities and activities of food analysis and its hazards.
(5) Information, education, communication and training	This block tackles how authorities can improve the knowledge and awareness of food safety among all stakeholders involved along the food chain.

Results and Discussion

Food safety law and regulations

The Municipality of Barcelona has full powers to perform control in this city through the Barcelona Public Health Agency (Agència de Salut Pública de Barcelona, henceforth ASPB) not only at the retail phase of the food chain but also at the processing and manufacturing phase [9,16]. ASPB is an autonomous administration with its own legal personality, created by the Barcelona Health Consortium, funded and governed by the Municipality of Barcelona and the Government of Catalonia [17]. ASPB has the same control competences as any other Catalan local authority, while at the same time having the competences that in the rest of Catalonia correspond to the Catalan Public Health Agency. Although ASPB does not have the competencies to implement control at the consumption phase, it puts effort into improving food safety patterns in household food storage and food-handling practices through promotion activities. Madrid is another Spanish city in which the autonomous government's competence in food control was transferred to a local authority [18]. Other cities include Malaga, Seville or Granada [19]. In Finland and Cyprus, certain risk management tasks also fall under the jurisdiction of local authorities [20,21]. On the other hand, Denmark shifted its food control systems from a decentralized to a centralized organization [22].

Food safety management

ASPB performs control in Barcelona city in close cooperation and coordination with the rest of the autonomous and national authorities throughout the Catalan Public Health Agency (Figure 1). The operative coordination between ASPB and the Catalan Public Health Agency is direct and articulated with communications, the exchange of technical information,

commissions and working groups, highlighting the Catalan Food Safety Agency's interdepartmental and inter-administrative coordination working group, which joins all of Catalonia's authorities involved in control [23]. There is further cooperation amongst ASPB, and other local authorities located in the province of Barcelona through the Provincial Deputation of Barcelona. This organism supplies technical, economic and technological support to all municipalities located in this province and, since 2010, annually organizes the Benchmarking quality circles for local public services on food safety, where each local authority voluntarily shares and compares information about their control performance and results [24].

Inspection services

In 2022, ASPB counted 36 official inspectors (henceforth, inspectors) and 4 official auxiliaries of inspection (henceforth, auxiliaries). Most inspectors and auxiliaries hold a university degree in veterinary medicine. According to the authors, the incorporation of new personnel with different curriculums related to other disciplines, such as food science and technology or public health, may contribute to the trans-disciplinary approach of food safety and control and the one health approach. Based on the ASPB criteria, control is organized according to the following nine action lines:

Control programs for food establishments.

This line comprises all on-site inspections that are annually planned and performed in a risk-based manner with a preventive goal and without prior notice. In cases of non-compliance, inspectors enforce legislation through written notices along with a time limit for correction. Nevertheless, penalty payments and other coercive measures such as suspension of operation or food withdrawal from the market were applied in cases of recurrent or grave violations [2,9]. These inspections are carried out by

inspectors and are addressed to all food industries and retail establishments (restaurants, butcher shops, supermarkets or establishments of catering operations such as hospitals or schools). In 2019, in Barcelona there were 2,448 industries and 20,214 retail establishments [25]. The distribution of establishments varies based on their category [26]: while restaurants are grouped in the touristic areas, the rest of retail establishments are spread along the city. Although industries are present in all districts, they are notably grouped in Mercabarna, one of the biggest southern European markets for fresh food [27]. The annual planification and the inspections' frequency are set according to the risk classification of each establishment. However, they may be contingent on the available annual budget. Furthermore, those scheduled inspections are subjected to unplanned events like food alerts or food-borne outbreaks that require immediate responses. In such situations, programmed inspections at industries and establishments of catering operations are prioritized over the rest of the establishments.

This action line encompasses two types of controls: generic and specific controls. Generic controls seek to check all regulatory requirements for food establishments: facilities, equipment, production processes, food-handling practices, foodstuffs, traceability and self-control systems, along with their implementation. Conversely, specific controls aim to control specific hazards, foodstuff, food-handling practices or food establishments within a defined period. Those controls are designed according to data and information retrieved from generic controls and the rest of the action lines, as well as information coming from risk assessment authorities: the Spanish Agency for Food Safety and Nutrition and the European Food Safety Agency. For example, in Spain, in 2017, there was an increase in food safety alerts because of the presence of histamine in tuna above regulatory limits and food-borne outbreaks linked to tuna products. For this reason, the ASPB implemented a specific control to address this hazard in fish shops and supermarkets [28].

Control programs of central markets.

There are three wholesale markets in Barcelona located in Mercabarna: the Central Fruit and Vegetable Market, the Central Fish Market and the Multipurpose Market. Those markets are a center for food industries and wholesalers, whereby the general sanitary requisites of every business unit and the common installations of each market are controlled. In contrast with the other two markets, there is a permanent service of inspectors and auxiliaries at the Central Fish Market since a high volume of fishery products are marketed.

Audit programs.

Audits are undertaken to assess the implementation and effectiveness of the self-checking system and the Hazard Analysis and Critical Control Points (HACCP) procedures in industries and since 2017, in supermarket groups too. Audits are divided into two

phases: an initial desk evaluation of the prerequisite programs and the HACCP procedures, followed by an inspection that aims to examine their operationalization and execution. Based on the risks identified, the audit may result in either being 'favorable', 'favorable with conditions', or 'unfavorable'.

Program of food safety surveillance.

This line refers to the surveillance of chemical and microbiological food hazards. Since 1984, the ASPB has conducted a research program into the sanitary quality of foodstuffs, which has the purpose of evaluating food compliance with regards to the applicable laws and regulations. This program is characterized by its flexibility to incorporate or suppress hazards on its list based on new regulations or recommendations and it serves to guide and prioritize risk management activities. Considering that ASPB is a local authority, such a comprehensive surveillance program is not common for such authorities [29]. Additionally, ASPB annually analyzes food samples for the national control program for pesticide residues, which accordingly assesses consumer exposure to pesticide residues [30]. Apportioned to Barcelona's population, the Catalan Public Health Agency indicates to ASPB the number of samples to be taken and the type of food. The volume of samples in this program is very low compared to those in the ASPB's program.

Management and control of food safety alerts.

Food safety alerts can originate either at the international, European Union (EU), national or local levels. International and EU alerts are received by the Spanish Government, through the Spanish Agency for Food Safety and Nutrition, via the International Food Safety Authorities Network and the European Rapid Alert System for Food and Feeding Stuffs, respectively [3,31]. Then, the Spanish Agency for Food Safety and Nutrition emits all alerts to each Spanish autonomous community and city through the Spanish Coordinated Rapid Information Exchange System, among other contact points such as the Spanish Ministry of Defense or associations of food business operators (FBOs). When necessary, the Catalan Public Health Agency forwards it to the ASPB. The Spanish Coordinated Rapid Information Exchange System notifies information that either requires an immediate reactive response like inspections, contains information of interest about food risks, border rejections, food withdrawals, and recalls of foodstuffs, or contains so-called notices, which are non-contrasted information against official sources coming from informal sources [32].

Management and control of denunciations and complaints.

Based on denunciations, complaints and notifications presented by citizens, FBOs and other public administrations, such as the Municipal Police of Barcelona, the ASPB carried out inspections. Those inspections aim to investigate presumed law violations. The information collected is a source of valuable insights into citizens' and FBOs' concerns and is used to formulate or adjust control and surveillance programs.

Investigation and control of food-borne outbreaks.

Derived from food-borne outbreak notifications, the ASPB inspects the food establishments where the suspicious food was elaborated on or commercialized. Those inspections seek to assess the hygienic conditions of the establishment and the elaboration processes, and if possible, collect food samples for laboratory analysis. Both during and after the investigation, the ASPB may dictate either preventive or coercive measures.

Sanitary authorizations and registries.

FBOs must register their food businesses in an official registry [2], submitting information about their official identification, location and food processing activities. In Spain, at the national level, the Spanish General Sanitary Registry of Food and Food Establishments includes information about all food industries located in each autonomous community and city [33]. This is managed by the Spanish Agency for Food Safety and Nutrition. Apart from this register, there are autonomic registries: in Catalonia, all industries and establishments of catering operations, including those located in Barcelona city, are registered in the Catalan Sanitary Registry of Industries and Food Products [9], while the rest of retail establishments located in Barcelona are only registered in the municipal registry, the Barcelona Registry of Retail Establishments [34].

Certificates of food and food establishments.

The ASPB is empowered to issue official certificates for those FBOs that are willing to certify specific practices and foodstuffs, as well as their HACCP system. Most FBOs request certificates to export food to non-EU countries. According to each type of certification, on-site inspections may be carried out.

Historically, there was a slaughterhouse located in Barcelona, but due to budgetary issues, it was permanently closed as of October 2020 [35]. The slaughterhouse workload was relocated to other slaughterhouses outside the ASPB jurisdiction. The permanent-based slaughterhouse team of inspectors and auxiliaries was thus reassigned to other duties along the above-mentioned action lines. After each control and at the FBOs' premises, inspectors traditionally documented inspections through handwritten reports. Each report contained a description of the purpose of the inspection, the methods performed, and the non-compliances observed, along with a plan of corrective actions to be taken by FBOs. A hard copy of the reports was always given to FBOs after inspections. According to the risk of non-compliances perceived by inspectors and based on their criteria, a time limit for correcting them was set along with enforcement measures. Even though the system allowed individual risk assessment of non-compliances and the selection of enforcement measures, this high personal burden on inspection's performance may negatively influence the consistency of control [36-38]. Given the limitations of the above-mentioned system to ensure consistency of control, since 2021, ASPB has implemented a digital-based

platform supported by a mobile application. This scenario allows to improve the consistency of controls by standardizing the whole inspection process of registering data and information during inspections, as well as automating the risk assessment of non-compliances during inspections and the selection of enforcement measures through algorithm- and rule-based instructions. Further to this, this system allowed for the registration of the inspection findings already in electronic format, followed by their analysis and visualization through digital tools.

Laboratory services

The ASPB has its own official laboratory, which gives support to all public health activities of this administration and additionally to third parties, such as other authorities like the Catalan Public Health Agency, private businesses or individuals. The ASPB laboratory is accredited according to standard EN ISO/IEC 17025 given by the Spanish National Accreditation Entity, a requirement for any official laboratory in the EU [2]. Furthermore, it is a member of the Department of Health registry of food and environmental health laboratories. The ASPB laboratory contributes to the control and surveillance programs by providing analytical services for chemical and microbiological food hazards. The degree of specialized laboratory equipment, facilities and techniques enables the incorporation of new analytical parameters in the ASPB's surveillance and control programs [29].

Information, education, communication and training

The ASPB divulges content about food safety hazards and risks, food-handling practices, and management of the HACCP and its prerequisite programs. Promotion material is based on control and surveillance results and is meant to support all control action lines. Recent publications covered topics related to acrylamide, anisakis, histamine and food intolerances and allergies. For instance, in 2018, a series of music videos was developed and distributed through YouTube, named "With food, safety is health" [39]. This series aimed to promote hygienic practices in restaurants. Since many food handlers are multilingual in Barcelona, the videos' content was elaborated in multiple languages alongside Spanish and Catalan. Furthermore, promotion of food safety is performed through workshops and educational activities directed towards FBOs and citizens. A complementary consulting service consisting of meetings, telephone calls, and email correspondence is offered to all FBOs located in Barcelona city [40].

This element of the food control system is applied to empower FBOs' technical skills in food hygiene by strengthening and improving their knowledge. In consequence, it is expected to achieve greater compliance with legislation from their side, resulting in better control results and higher health protection. Since 1984, ASPB has annually published a health report, providing information about the health status of Barcelona's inhabitants and ASPB's performance, including information concerning control. Similarly, the results of the Research program into the sanitary

quality of foodstuff's results have been published biannually since 1984. Following the official path, those results are shared with autonomic, national and EU authorities [29]. Besides this, data and information about the ASPB's control performance are included in the annual control report published by the Spanish Agency for Food Safety and Nutrition and submitted to the EU authorities [2,41]. Since January 2020, and on a quarterly basis too, ASPB has published raw data about its control activity on its official website [42], a fact that contributes to aligning ASPB with the current EU and Catalan legal frameworks about transparency [43]. The training of inspectors and auxiliaries on technical issues is directly managed by a permanent commission. This commission evaluates the needs and demands of inspectors and auxiliaries and consequently organizes training and refresher courses. Further to this, the Municipality of Barcelona organizes training addressed to all personnel under its umbrella, covering topics such as conflict solving, management techniques, writing, and information technology skills. Supplementarily, ASPB, in collaboration with the Johns Hopkins Bloomberg School of Public Health and the Barcelona Pompeu Fabra University, annually organizes the so-called Johns Hopkins Fall Institute, a series of short-term courses in a repertoire of public health subjects, addressed to ASPB personnel and external people.

Limitations

This manuscript bears some limitations. First, no interviews were conducted with either inspectors or auxiliaries, who implement control on the front line, or other agents involved in the Barcelona food control system. This exercise would have integrated information from other sources with the intention of triangulating the data. Despite this, our findings were repeatedly checked by senior ASPB official control managers to detect and eliminate any ambiguity and bias coming from the investigators and confirm the integrity of the results. Secondly, this description is nestled in a particular moment in time. We understand a system as an interconnecting network that changes over time. Therefore, components present in this description may change, while new ones may appear based on emerging or unexpected needs and scenarios. Yet, the main five elements of the study model on the food control system will remain identifiable.

No attempt was made to assess the ASPB's control effectiveness and consistency, and further research is required on this matter. FAO/WHO's theoretical model has been previously applied to describe and analyze other control systems [44,45]. Although this model is intended to be employed for national systems, in this case, we used it to describe a local system.

Conclusions

This paper describes an example of a local control system. The results may be interesting and useful for other local authorities

to re-think or improve their current control organization and enforcement. According to the results, the five-element framework on control systems given by FAO/WHO proved to be useful to qualitatively describe a local system. Our investigation evidence that Barcelona city is in a unique position compared to the Catalan and most of the Spanish municipalities because of its extended official competences in risk management. This paper lays the groundwork for future research on Barcelona's control systems organization, be it for further analysis of the current system or to assess and strengthen it. Additionally, the results obtained can be used to compare the Barcelona control system with those of other local authorities.

Acknowledgements

The views expressed in this paper are solely the responsibility of the authors and do not necessarily represent the official views of their organizations. We would like to thank ASPB for its permission to use internal sources of information about this study, as well as Dra. Maria J. Vilar, Dr. Janne Lundén, Dra. Carme Borrell and Ms. Laia Serratosa for their helpful comments on a previous draft of this manuscript. This study was funded by the Barcelona Public Health Agency (Agència de Salut Pública de Barcelona, ASPB) under Grant BEQU-2020-01, and the supported by the Universitat Autònoma de Barcelona (UAB).

Conflict of Interest

The authors declare that they have no known competing financial interests that could have appeared to influence the work reported in this paper.

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DOI: 10.19080/NFSIJ.2024.12.555850

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