

Official food safety audits in large scale retail trades in the time of COVID: system control experiences supported by an innovative approach

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Abstract

This work describes a new methodology used in large scale retail trades in official food safety auditing processes developed during COVID19 emergency. The aim is to evaluate Food Business Operators' (FBOs) Food Safety Management System and its dynamic implementation and to understand the FBO's level of cultural maturity about food safety according to EU Regulation 2021/382. The innovation mainly consists of: a) a pre-audit phase when auditors analyse food business operator's (FBO) self-checked plan and further documents to identify "markers" and useful evidences (that would be collected in on-site inspections) to evaluate the application of plan by FBO's workers; b) an audit phase consisted of both a check of the company procedures and documents performed by the auditors via web conference and of contextually on-site inspections in a sample of company's supermarkets performed by inspectors teams. The audit methodology here described may be useful, even though it is expensive in terms of time and energy used, for both Competent Authority (CA) and FBOs, regardless of the period of the COVID emergency. The so-structured official control allows the auditors to collect both documentary and on-site evidence at the same time, reaching a broader vision of auditees (not limited to single supermarkets) and a compliant with reality FBOs risk classification. The new approach may give advantages to both audit actors, CA as well as FBO, who may collect "markers" and evidence of the self-checked plan useful to improve FBO's food safety system on the basis of the critical aspects detected during auditing process.

Introduction

According to the World Health Organization, the new coronavirus disease (COVID19) is a public health emergency of international concern with important effects on all aspects of life. Among the economic sectors, the food industry had to overcome challenges, working hard to produce safe food (Djekic, 2021). On the other hand, during emergencies the consumer behaviour changes: the coronavirus pandemic encouraged many families to "panic" buy and to stockpile food to ensure regular level of consumption, resulting in empty store shelves with a serious impact on the food system (Wang, 2020). In this critical context it is essential to rationalize the official controls and to address the monitoring activities to the food sectors where consumers had to be mainly safeguarded. Among official control methodologies, as defined by the EU Regulation 2017/625, "audit" is a systematic and independent examination to determine whether activities and the related results of such activities comply with planned arrangements and whether these arrangements are applied effectively and are suitable to achieve the objectives. The auditing activities allow the Competent Authority (CA) to verify how the food safety self-checked system is structured and how is applied by the Food Business Operators (FBOs). Food safety audits are usually conducted following specific phases such as planning, execution/verification and closing meeting with auditee (Pisanello, 2010). An audit process is carried out performing a verification of company's documented food safety program (procedures and documents) to confirm the compliance with the requirements of regulation/standard and interviewing workers directly involved in the audited process (Kostantinos, 2017). It's essential to choose the subjects to be interviewed taking into account that those who know the management procedures best are those who apply them practically in daily task and therefore it is appropriate to address the questions during normal working hours, where activities usually happen, and in a relaxing climate (Pisanello, 2010). The next step provides that the auditor evaluates the responses and decides whether they are consistent and in accordance with documented policies, objectives, procedures, and records. Only verifiable information can become audit evidence. Inconsistency of responses drive auditors to try to identify the reason of the inconsistency and then to correlate it with the management system and a standard, giving to the food company the necessary tools to identify and address the incon-

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Key words: Food safety, Official audit, Large scale retail trades, Innovative approach.

Acknowledgments: The authors would like to thank Catia Occorsio, Donata Pellegrino and Donato Toscano for supporting in auditing administrative procedures and Dario Benedetto and Fiorenzo Buso for the technical assistance in the setting up of web conference devices and in the on-site inspections. A special thanks to Giulia Bonifacino for adjusting the table layout. Last but not least, we thank Laura Giacon for English language revision.

Contributions: The authors contributed equally.

Conflict of interest: The authors declare no potential conflict of interest.

Funding: None.

Availability of data and material: Data and materials are available by the authors.

Received for publication: 10 August 2022.
Accepted for publication: 24 October 2022.

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Licensee PAGEPress, Italy
Italian Journal of Food Safety 2022; 11:10022
doi:10.4081/ijfs.2022.10022

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sistency (Kostantinos, 2017). According to the EU Regulation 2021/382 "FBOs shall establish, maintain and provide evidence of an appropriate food safety culture" by fulfilling the commitment of the management and all employees to the safe production and distribution of food, by having sufficient resources to ensure the safe and hygienic handling of food, and by assuring that all employees are aware of food safety hazards and of the importance of food safety and hygiene and have open and clear communication in the business, including communication of deviations and expectations. The implementation of the food safety culture "shall take account of the nature

and size of the food business” (EU Regulation 2021/382, Annex II Chapter XIa).

The large-scale retail trades are, for rate of sales volumes, the great majority of food businesses in Turin. This work describes the innovative methodology used in large scale retail trades in food safety auditing processes developed during COVID19 emergency. The aim of this innovative methodology is to evaluate FBO's Food Safety Management System (FSMS) and its dynamic implementation and to understand the FBO's level of cultural maturity about food safety. Both aims allow the Competent Authority to make a compliant with reality FBOs risk classification and to target the forthcoming official controls over the remaining economic operators (*i.e.* small retail stores operating in fixed sites and in market areas) working in the competent territory.

Materials and methods

The methodology applied was made of four stages summarized in Figure 1. Stage 1 [day 0]: communicate to auditee about audit activities (time and date, auditors team, examination topics, notices about the possible inclusion of supermarkets in the list of inspections) and request of documents (supermarkets plants showing the layout of storage equipments for chilled and frozen meats and fishery products, number of workers per supermarket/meat and fish departments, presence of meat/fishery products cutting plans per supermarket, indication of the last renovation applied in each supermarket, a selection of FBO's own-check plan based on HACCP principles). Stage 2 [days 15-29]: analyse the requested documents, select the supermarkets for the on-site inspections according to objective criteria (as size, date of construction/

restorations of the store, presence of meat/fish department, number of food handlers, operator's past record with regard to non-compliance), and define ways of performing controls and the evidences to be collected by the inspector teams. The on-site evidences also included the assessment of food handlers good hygienic practices and performances over the operating instructions according to FBO's self-checked procedures (*i.e.* control of storage temperature of chilled and frozen foods; hand and workwear washing protocols; cleaning and disinfection practices especially regarding surfaces of contact with food). Stage 3 [day 30]: audit – structured as reported in Table 1 – in web conference with FBO and/or other persons legally authorised to represent the food business, who provided documentary evidence, and concurrent “surprise” inspections in the sample of FBO's supermarkets (usually between 2 and 5) made by the inspector teams to collect evidences on-site. Stage 4

[days 35-50]: preliminary communication (within day 35) to FBO about the actions following the established non-compliances observed in the official control and previously shared during the closing meeting with auditee; submission of the auditing final report (within day 50) where all the evidences of non-compliance collected in the auditing process and the resulting corrective actions required to be applied by FBO are reported.

Results

From July 2020 to May 2021, a total of 13 large scale retail trades located in the area of the city of Turin was audited. An average of 15 operators (official veterinarians, official auxiliaries, administrative and technical staff) per audit were involved, for a total of about 150 hours per audit. Here we present two significant cases that are a



Figure 1. The 4-Audit phases.

Table 1. Audit structure. Example.

| Time | Topic – Auditors | Topic – Inspector Teams |
|----------|--|--|
| 8.30 am | Opening audit meeting: introducing of attendees and food business, company's organization chart and liability delegations verification | Official on-site inspections in company's supermarkets |
| 9.00 am | 1 e 2 HACCP principles analysis | Official on-site inspections in company's supermarkets |
| 9.45 am | Cold chain management and temperature monitoring of stored chilled and frozen food (especially meat and fish) | Official on-site inspections in company's supermarkets |
| 10.15 am | Cleaning and disinfection procedures of food of animal origin departments (especially meat and fish) | Official on-site inspections in company's supermarkets |
| 10.45 am | Staff training procedure about temperature monitoring and cleaning provided to operators, shop managers and supervisors | Official on-site inspections in company's supermarkets |
| 12.30 am | Auditors meeting: all the evidence collected during on-site inspection are presented by inspector teams to auditors | |
| 13.00 am | Closing audit meeting: the verification results and any non-compliances detected are presented to the auditee | |

good example of FBOs' food safety cultural maturity according to the prescriptions of EU Regulation 2021/382.

Case 1

The FBO's food safety self-checked system was found formally compliant in the course of the documentary verification performed by auditors, but the evidences collected during the supermarket inspection showed that the system is not able to identify non-compliances. The FBO established a monitoring procedure at the critical control point defined as "storage/sale temperature of perishable products" (HACCP principle 4 (4P) – establishing and implementing effective monitoring procedures at critical control points) not actually effective. The HACCP 4P was based on the reading of the digital display of refrigerated and frozen storage equipments three times a day. During the food store inspection, the inspectors team found some frozen unpackaged fishery products in temperature abuse for sale. The temperature measured by the calibrated official probe thermometer placed into contact (core temperature) with the product (frozen unpackaged pacific clams), after probe disinfecting and after waiting a few minutes to stabilise the measure, was -17.6°C . The same value (-17.6°C) was observed at the same time by the food store operator using company's probe, while the display temperature of the refrigerator, a locked horizontal showcase, showed -24°C . The temperature alarm set point for the equipment was set at -22°C by the FBO.

Case 2

During an official control carried out in a supermarket of a large-scale retail, a major non-compliance has been found. Some cooked foods (roisserie chicken, roasted pork shank) were displayed for sale in a food warmer showcase in temperature abuse (core temperature of $+55.7^{\circ}\text{C}$ and $+56.2^{\circ}\text{C}$ respectively) according to the national law. The temperature control performed by the FBO consisted of daily readings of the display temperature of the equipment (display value $+88^{\circ}\text{C}$), while the core temperature measurement is done by workers only in case of showcase's malfunction. Some displayed foods are compliant (core temperature values $\geq +60^{\circ}\text{C}$) suggesting a non-homogeneous heat distribution inside the warmer showcase. The established major non-compliance encountered on-site forced the inspectors to identify who was legally responsible in order to inform the judicial authority, but the company's documents available on-site were not complete. The official audit carried out on the same

large-scale retail allows the auditors to access to company's organization chart, liability delegations and any other documents needed to define the person to be investigated.

In general, even if auditees were used to apply only corrective actions when a non-compliance occurs, the cause analysis was not implemented by FBOs.

Discussion

In both cases described, the FBOs self-checked food safety system resulted to be immature.

Case 1

EC Regulation 853/2004 states that frozen fishery products must be kept at a temperature of not more than -18°C in all parts of the product. The critical limits at the critical control point "storage/sale temperature of perishable products" fixed by the FBO must comply with temperatures both established by the food regulations and specified by the processor in the food labelling. The inspector team found a border-line core temperature value (-17.6°C) in frozen unpackaged pacific clams stored in locked horizontal shop window. This evidence agrees with the findings reported by other authors who verified the effectiveness of the temperature control procedures put in place by the food retail self-service operators. Zubeldia (2016) found that the procedure adopted by FBOs for the control of the cold chain in retail food stores in Southern Spain, based on the daily reading of the display temperature of the equipments, does not ensure the compliance with safety specifications of perishable food. In fact, the temperature values recorded by the display devices were different (values lower - within a range from 0.9°C [in winter] to 5.9°C [in summer] - than the surface temperature taken on the food inside the refrigerators), especially for fishery products, from the temperature measured using infrared thermometer with a high percentage of non-compliance during summertime. On the other hand, Lunden (2014) observed temperature violations in half of the measured products and reported that many large scales retail trades operators were not aware of temperature settings, thinking that alarm system would be able to ensure temperature compliance. In our case, the observed measured value (-17.6°C) can be considered as a minor non-compliance, in consideration of the uncertainty of measurement of the probe thermometer used (estimated to be $\leq 0.5^{\circ}\text{C}$), but this evidence underlines that the temperature control plan put in place by the

FBO is unable to detect foods that are going to be in temperature abuse. The maintenance of the cold chain of products that need cold holding is mandatory for FBOs according to EC Regulation 852/04 which states that the cold chain is not to be interrupted. Moreover, the practical guidance provided by the European Commission, about the need of harmonizing the implementation of the EU requirements on HACCP-based procedures of FBOs, consider it essential to perform a program of measurements at each CCP able to ensure compliance with specified critical limits; this program have to be supported by a process adjustments to be made when monitoring results indicate a trend towards loss of control at a CCP and before a deviation of the critical limit occurs (Commission notice 2016/C 278/01).

Case 2

The Italian national legislation states that perishable cooked foods to be eaten hot (such as: ready meals, snacks, chickens, etc.) must be stored between $+60^{\circ}\text{C}$ and $+65^{\circ}\text{C}$ (Art. 31 DPR 26 marzo 1981 n. 327). A non-compliant storage condition according to national law is a criminal offence and bring to a communication to the judicial authority. With regard to temperature control, also in this case, the inspector team collected evidence that show that the company's system is not able to identify non-compliances. It is to be noted that only an official process control as audit allowed CA to access to the documented evidences useful to correctly identify the real legally liabilities.

The on-site inspections in supermarkets allowed the auditors to collect evidences about food handlers, good hygienic practices and performances useful to verify the degree of assimilation of the training program delivered by the FBO, to establish the responsiveness of the business system and therefore the FBO implementation of HACCP principle 6 as stated by EC Regulation 852/04 "establishing procedures, which shall be carried out regularly, to verify that the measures outlined in subparagraphs (a) to (e) (HACCP principles 1-5) are working effectively". The pre-audit analysis of FBOs documentation is the key stage to identify "markers" useful to address the on-site official inspections. With regard to the non-compliances management, the audited large-scale retail was used to resolve the non-compliant situations without doing a cause analysis of the non-compliance occurrence. According to the actions in the event of established non-compliance laid down in EU Regulation 625/17, the CA shall take any action necessary to

determine the origin and extent of the non-compliance and to establish the operator's responsibilities, as well as appropriate measures to ensure that the operator concerned corrects the non-compliance and prevents further occurrences of such non-compliance. Moreover, in Italy according to the State-Region agreement (117/CSR, 2012) the corrective actions put in place by FBOs must consist of four phases: 1) non-compliance remedy (including, if appropriate, the identification, segregation, and treatment of contaminated/at risk foodstuff) 2) identification and removal of non-compliance's causes 3) check that the process is under control 4) preventing measures application. In the opinion of the authors, it is very difficult for FBOs to apply the previous four stages, due to the restricted cultural maturity and to the economic burden, especially for large scale retail trades which are usually structured, and complex companies dislocated on the national territory, but it is essential that CA supported FBO's in developing the food safety culture according to EU Regulation 2021/382. It is to be said that the Quality Assurance Office/HACCP team are often composed of highly qualified and skilled professionals without a strategic role recognised in their organization. This condition might limit the actions of the team causing the professionals motivation to decrease and food prevention and safety goals more difficult to be achieved. On the topic AC can play a useful role toward OSA underlining the important function of the Quality Assurance Office/HACCP team which should effectively collaborate with the other technical management Offices (*i.e.* Purchase Maintenance and Management Offices designated to choose refrigerated exhibiting equipment or to make intervention of department restyling).

According to Kostantinos (2017), nowadays technology plays an important role in food safety audits. FBOs have to maintain necessary food safety checklists and quality insurance documents which requires the management of large amounts of data. Furthermore, the access to these data and documents and their analyses is fundamental for a successful audit (Kostantinos, 2017). The use of web conferences in auditing processes can help auditors to dialogue easily with FBOs and to access to company's data in real time. In fact, the innovative approach here described, allows FBOs and all the other persons legally authorised to represent the food business to join audit via web conference from their own head office shortening geographical distances, having every self-check plan data/documents available and getting information and evidences collected

in audit in real time. If on the one hand the remote mode can make the dialogue among the participants in the meeting less convivial and more distant, it must be said that in many cases the audited companies have asked to authorize participation, in addition to the top management, also to all the directors of the stores in Turin as they believed that the audit could represent a moment of constructive discussion and an opportunity for training useful for management staff. Because of the benefits obtained from the use of the remote mode, the authors believe that it is particularly suitable for being used beyond the COVID emergency, in the ordinary official control activity in which the Competent Authority operates.

The main critical aspect related to this innovative approach is the waste of energy, time and costs for both actors involved. On average, 15 human resources from the veterinary service are devoted for about 5 hours only on the day of the audit, to which the hours of study and organization of the phases preceding the audit and the drafting of the audit report are to be added together with the evaluation of corrective actions implemented by the FBO in the phases following the audit. It must be said that in a long-term perspective, this method may promote a cost reduction of the official control which would be done in each supermarket in different times. On FBO side, according to what was declared during the audit, a lot of energy, time and resources are used to prepare the audit day as far as the check of the hygiene and maintenance requirements of the premises, structures and equipment of the stores is concerned, as well as on the hygienic-sanitary training of the employees of the departments.

Conclusions

The audit methodology here described may be useful, even though it is expensive in terms of time and energy used, for both CA and FBOs, regardless of the period of the COVID emergency. The so-structured official control allows the auditors to collect both documentary and on-site evidences at the same time, reaching a broader vision of auditees (not limited to single supermarkets), including the functional organization of top management and relations with the various departments (*i.e.* Quality Assurance and HACCP, Technical and Maintenance Management Offices, etc.) and a compliant with reality FBOs risk classification. Concerning the auditees, the innovative audit allows FBOs to have an all-round evaluation of its food safety system (FSMS), including the various company

functions (starting from the top management positions down to the staff of the stores) including the formal feedbacks, obtained from the document analysis, and from management applications collected during the inspections of the stores thanks to the verification of the actual training of the staff through interviews and performances carried out by the employees.

In the opinion of authors both audit actors, CA and FBOs, may have advantages by applying the official control methodology presented: auditors and auditees may collect "markers" and evidences useful to enhance the FBO's food safety management system resulting in a greater prevention.

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