

CURRENT FOOD SAFETY CHALLENGES

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Abstract. Food defence is a relatively new trend that broadens the visions of food safety and is based on a specific methodology for determination of risk exposure. The author presents in this paper a detailed procedure that may be taken over by companies involved in the food chain to implement the TACCP.

Key words: *food defence, food fraud, food safety, risk, HACCP, TACCP*

1. Introduction

The IIIrd millennium brings challenges in all areas, and food sector is one of the most controversial as the consumer tends to keep a natural, healthy diet, while the manufacture seeking to sell products at a selling price as affordable as possible and make profits as high as possible, replaces traditional food products with processed ones, sometimes even artificial or, at worst, falsified ones.

Foods that are not safe for consumption may have major consequences for consumers and organizations around the world. Now that foods cross many borders, the growing demands of consumers, growing responsibilities of food chain actors, increase of legal requirements and globalization of trade have caused a change in the visions in the area of food safety. The policies of the European Union concern a number of strategies aimed at providing consumers with safe foods 'from farm to fork' [3].

2. Methods of ensuring food safety

Food safety can be ensured through a range of various direct interventions such as food quality control, as well indirect ones, such as environmental protection measures, improvement of nutritional quality of foods, of consumer's education.

A key tool in this respect is the application of the HACCP system (Hazard Analysis Critical Control Point) in production and marketing of foods.

2.1 HACCP method

The HACCP method was made public at the National Food Safety Conference held in 1971, and was later adopted by the FDA (Food and Drug Administration) for inspection of civilian food industry companies.

As this system evolved, it has proven its important role in obtaining and selling safe food products for human health, proving their practical values in ensuring their safety in the area of catering, food industry, tourism and trade.

The Codex Alimentarius Commission encourages use of the HACCP method by businesses and its regulation through an adequate legislative framework in the Member States. In this respect, the recent EU legislation recommends applying the HACCP-based quality management systems in countries wishing to export foods to the European Union [5].

Most food manufacturers in the Republic of Moldova have focused on the model of the food safety management system described in the international standard SM SR EN ISO

22000:2006 Food Safety Management Systems that includes the HACCP principles and enables food chain actors to build a management system for safe consumer products to be obtained.

However, the HACCP principles address the control of unintentional food contamination risks that may appear in the course of food manufacturing, storage, delivery and marketing.

2.2 TACCP method

The new concept of 'Food Defence' involves ensuring food security by defending foods from intentional contamination or compromise of any kind whatsoever [6, 7].

The first reference to this concept of intentional contamination was made in the United States of America. The expression was meant to define and distinguish this area, especially following the past and current confusions. Specifically, Food Defence refers to protection of foods against intentional contamination, Food Security relates to meeting the food safety needs for a country's population, and Food Safety means food safety and food protection against unintentional contamination. Therefore, it has been realized that, in the food chain starting with the farmer and ending on the consumer's table, mankind can always be exposed to terrorist interventions on foods [8].

A reference framework for this concept was introduced in the IFS on Food (International Featured Standard), version 6.1 of November 2017. This standard sets out in Chapter VI requirements for food defence, and namely 'food defence responsibilities shall be defined. The key personnel shall be responsible or shall have access to the top management team. Sufficient knowledge in this area shall be proven. A hazard analysis and a relevant risk assessment for food defence shall be carried out. The critical areas for security need to be identified based on this assessment and on the legal requirements [9, 10].

Bioterrorism consists in using or threatening with using viruses, bacteria, fungi, toxins or microorganisms with the disclosed intention of causing a disease or death of human beings, animals and plants seeking to achieve certain objectives. Threats to food products may result from: intentional contaminations with toxic materials, sabotage of the food chain, overdose, individuals or groups of people having or not having links with the company concerned, contractual relationship with suppliers and/or customers, dissatisfied people with whom employment contracts were terminated [4].

Vulnerable points may be identified by regularly assessing hazards, examining processes, and resistance against intentional attacks from the part of individuals or groups is improved by means of preventive activities.

Deliberate attacks may involve unpredictable agents or materials or strategies. The nature of the agent intended to be used is influenced by the nature of the food itself, such as its physical state, chemical composition, packaging and shelf-life [1].

Reducing vulnerability and increasing resistance can be achieved through access to materials, processes, services and spaces, as a whole, and through their regular control.

The TACCP (Threat Assessment Critical Control Points) methodology is aimed at ensuring prevention of deliberate and international food frauds. It may take the form of replacing ingredients, passage of a food product in another, false or misleading statements about economic gain that could affect public health, product manipulation, false or incorrect labelling, etc [9,10].

Application of TACCP principles prevents negative impacts on the reputation of the 'brand' through sales of safe products, increase in credibility of the company without consequences for the health of consumers.

Hazard analysis and assessment is intended to identify all food safety hazards, their elimination or reduction to their acceptable level, and the control measures needed to sell safe food products.

3. Practical recommendations

In this context a food defence team shall be established and a team leader shall be appointed. The team shall be multidisciplinary and experienced.

Threat assessment for food includes the following steps [11]:

- defining the system of analysis (access control, access of persons, motor vehicles, etc.);
- identifying the risk factors in the system;
- risk assessment for potential attacks;
- proposing prevention measures.

The leader of the food defence team together compiles with the team members a list of potential terrorist threats, for which the risk level will be subsequently assessed.

The risk factors in the analyzed system are identified and then hazards are analyzed and assessed to determine the risk exposure for potential attacks.

To ensure correctness and adequacy of the hazard identification process, the food defence team considers the following:

- Bad intentions of a person or a group of people;
- The desire of attackers to get an immediate impact of illness (acute and not chronic);
- Possibility to discourage criminals with respect to packed products or packing;
- Technical/technological knowledge of attackers;
- Securing the products (physically, electorally, personally);
- Conduct of bioterrorism risk analysis for each production line;
- Special attention throughout the production flow.

The hazard analysis and assessment will take into account severity and likelihood of occurrence (frequency) of each identified hazard, given that control (or preventive) measures have not achieved their purpose.

The hazard levels are established depending on the severity and likelihood of occurrence areas whose security was identified as critical shall be protected adequately so that unauthorized access is prevented, with due regard to the hazard analysis and associated risk assessment.

If significant hazards for food protection have been identified, an Intervention Plan for situations of potential terrorist threats is developed based on the scale. For each Intervention Plan for situations of potential terrorist threats actors responsible for its development, approval and implementation are identified by organizational decisions.

Simulations are carried out on a regular basis by the company's personnel responsible for emergencies.

The personnel working at critical points as well as the intervention team is trained both theoretically and practically,

Depending on the possible hazard, simulation exercises include: checking video surveillance systems; access to production areas; checking electronic systems and carrying out activities included in emergency plans and checking the response capacity of the intervention team.

Implementation of the plan related to the type of risk found requires approval of the company's management.

The Commission for assessment of the situation of potential terrorist threats is established. Once the situation is put under control, the Commission meets to assess the current (simulated) situation and the activities carried out during the intervention.

The following is analyzed:

- cause of the incident that may affect food safety
- severity of the impact of the incident that may affect the food safety
- measures taken to limit and remove the consequences
- the way in which the intervention actions are carried out
- the way in which the Intervention Team responded to the implementation of the

Intervention Plan

- the need for intervention and protection materials to be replaced
- the need to modify the Intervention Plan.

Therefore, the Report on response capacity in case of terrorist attacks is prepared.

In order to keep the food defence process under control, the company shall assume the following:

- Check of the level of food protection on an annual basis by simulating an intentional, potential attack.
- Regular training of employees on food defence.
- Distribution of employees with experience, seniority and trust to the key points.
- Training and constant accompanying of visitors, inspectors, supply, sales and transport personnel in the premises of the organization.

4. Conclusions

This article aims primarily to highlight the main trends in the food security area arising in the XXIst century due to economic globalization. Food safety extensions, and namely Food Defence, were outlined. This publication seeks to make food chain actors aware of the importance of care for bioterrorism that can impact food safety and have large consequences. The described stages of the Food Defence implementation through the TACCP method will provide support to the food safety management systems implemented at the Moldovan companies.

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