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QUALITY AND SAFETY ASSURANCES IN SUPPLY CHAIN OF PACKAGING INTENDED TO COME INTO CONTACT WITH FOODSTUFFS

Abstract: Packaging supply chain consist of enterprises concerned packaging life cycle. In the paper are presented fundamental requirements and results of own research on the implementation of selected activities affecting quality assurance in the supply chain of packaging for food contact. Utilizing the category tree method company profiles were developed using such measures as: a systematic review of packaging materials and packaging safety hazard analysis, reviewing the complaints, carry out audits of suppliers, monitoring of storage conditions of packaging materials and packaging. For the purposes of this analysis were use variables describing companies such as: type of business, size, territorial area of activity, the use of systems and standards that ensure safety or quality.

Keywords: packaging supply chain, food packaging safety and quality

9.1. Introduction

Supply chain in process recognition due to EN 14943 is the sequence of actions, which might concern manufacturing, transport and marketing bringing added value. Whereas as the structure it consist of group of enterprises realizing collective actions necessary to meet the demand on particular products in whole chain of goods flow – from the moment of obtaining raw materials to providing to end-consumer (*Słownik terminologii logistycznej* 2006). The structure of packaging supply chain is formed by enterprises related to whole packaging life cycle (BIX L. and others 2009).

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Food packaging supply chain might be considered as the part of food chain, according to EN ISO 22000:2005 “Food Safety Management System - Requirements for any Organization in the Food Chain” food chain is defined as: “the sequence of stages and processes taking place in production, processing, distribution, storage and handling of food and its ingredients starting from primary production to consumption”. Organizations belonging to food chain create chain starting from feed producers, primary product producers (farms, fisheries, livestock producers), food manufacturers, retailers, restaurateurs and caterers, service providers, transport and storage, as well as delivery services. In addition, the food chain also applies to enterprises and organizations that are indirectly involved in the food business, including equipment suppliers, cleaning agent, sterilization and disinfectant suppliers, packaging materials suppliers, and suppliers of materials that come into contact with food products.

In literature packaging supply chain is analyzed mostly from the point of view of factors affecting the chain, packaging in this chain is considered as the added value for all chain stakeholders (SONNEVELD K. 2000, LISIŃSKA-KUŚNIERZ M. 2010, LISIŃSKA-KUŚNIERZ M. 2011).

Packaging supply chain might be considered in terms of logistics. In this chain are present physical flows, accompanied by information flows, sequences of processes, relations between subjects, in and out of the system or structures, surroundings influencing on chain.

Physical flows in supply chain are in progress from raw materials and packaging elements suppliers to packaging materials and packaging producers, packaging materials and packaging distributors or directly to packaging users, which in packing process are shaping packaging or filling in ready packaging. Packaged products are forwarded to consumers. Consumers are transferring packaging waste to enterprises from the sector of waste management.

On packaging supply chain stakeholders are influencing surroundings like legislative bodies, government agencies, national and international organizations, associations of producers, distributors and consumers.

Together with the physical flow of packaging materials and packaging in the chain should be provided the flow of necessary information and documentation. Fig. 9.1 shows the flow of information in the supply

chain of packaging intended to come into contact with food. To ensure the safety of transferred materials with them should be passed by declaration of conformity with legal requirements. Additional, non-mandatory documents are: quality certificate issued by National Institute of Public Health - National Institute of Hygiene, specifications, certifications, test reports. Exactly in the opposite direction of physical flow feedback should be provided about the safety of packaging materials, detected hazards and risks associated with them. The transmission of such information is not mandatory.

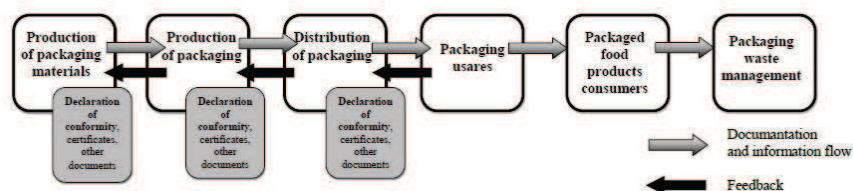


Fig. 9.1. The flow of information and documents in the packaging supply chain.

Source: own work.

9.2. Food packaging materials and packaging safety and quality assurance process

The process of safety assurance might be called the sequence of actions directed on confidence assurance that requirements concerning safety of packaging materials, packaging and packaged food products are fulfilled (LISIŃSKA-KUŚNIERZ M. 2011).

The fundamental of Polish and other European Union countries' market is the rule that the producer or other subject introducing product on the market is responsible for this product. The producers are obliged to launch on the market only safe packaging materials and packaging. In order to ensure the safety of packaging materials and packaging manu-

facturers and other participants in the supply chain are obliged to (Regulation EC 1935/2004, LISIŃSKA-KUŚNIERZ M., KAWECKA A. 2013):

- The use in the manufacturing process only permitted substances present on the positive list.
- To control the final product in terms of meeting the requirements of the relevant sensory attributes and permissible limits for global migration and specific migration of packaging components.
- Applying the principles of Good Manufacturing Practice (GMP) in enterprises engaged in producing and distribution of materials intended to come into contact with food. The companies involved in the production, distribution of food is mandatory implementation of GHP (Good Hygien Practice), GMP and HACCP (Hazard Analysis and Critical Control Point).
- The proper labelling of placed on the market food contact packaging.
- In the case of intention to apply a new substance not listed on the positive list, the entrepreneur is obliged to apply to the European Food Safety Authority (EFSA) for authorization for its use.
- Dispose of documents showing that the used materials and final products placed on the market comply with the requirements specified in the regulations.
- Submission of a written declaration of conformity, confirming that the packaging materials and packaging are in conformity with the rules applicable to them.
- Taking responsibility for materials and articles placed on the market which are not comply with the legal requirements and caused damage.

Facultatively producers and distributors of packaging materials and packaging implement Good Hygiene Practices (GHP) and Hazard Analysis and Critical Control Point (HACCP) system and other systems like quality management system according to standard ISO 9001 or food safety management system according to standard ISO 22000.

Producer and distributors which received information that launched packaging material or packaging is not safe must immediately notify the

appropriate supervisory authorities, that mean the appropriate local health inspector, and allow withdrawal of the product from the market by providing accurate information that identifies the material or lot of material, information that could be useful in tracing the trade of identified materials or article. Therefore, at all stages of the procedure should ensure traceability of materials and articles intended to come into contact with food in order to facilitate control, the recall of defective products, consumer information and the attribution of responsibility. Business operators should at least be able to identify the businesses to which, or from which materials and products were delivered.

9.3. Research on safety and quality assurance activities implementation in enterprises of food packaging supply chain

The main goal of conducted research was the evaluation of the realization stage of selected actions influencing on quality and safety in food packaging supply chain. The research was conducted on the group of 150 representatives of enterprises creating packaging supply chain: food packaging materials producers, packaging producers, distributors (in total 50 enterprises) and 100 food packaging users. The research has a form of survey. On the basis of declarations made by representatives of companies studied their implementation of selected activities relevant to the safety and quality process. The selection of these actions has been proposed by experts in the field of packaging and food safety in the pilot studies and after literature review (KAWECKA A. 2013).

Realization of selected activities is not required by legal regulations, but it has essential influence on packaging materials and packaging quality assurance. Chosen actions are facultatively required by standards and systems, these are (*GLOBAL STANDARD BRC/IoP* 2008, LISIŃSKA-KUŚNIERZ M., CHOLEWA-WÓJCIK A. 2011):

- systematically reviewing the analysis of the hazards to the safety of packaging materials and packaging,

- reviewing the complaint,
- carry out audits of suppliers,
- monitoring of storage conditions of packaging materials and packaging.

On the basis of declarations submitted by companies representatives about implementations of selected activities presented in Table 9.1 results were obtained. Research has revealed that in most activities the majority of studied companies had implemented selected activities affecting the safety and quality of food packaging materials and packaging. In most cases (besides microclimate conditions monitoring in storage areas) producer were the group which more willingly implemented mentioned actions than distributors or users. Only in one action carried out by packaging materials and packaging the supplier auditing gain less than 50% of indications. The rest of the activities always was indicated by more than 50% of companies. That might confirm importance of chosen actions.

Table 9.1. Implementation of activities affecting quality of packaging materials and packaging.

Activities affecting quality of packaging materials and packaging	Packaging materials and packaging producers	Packaging materials and packaging distributors	Packaging materials and packaging users
Reviewing the hazard analysis to the safety of packaging materials and packaging	76,9%	72,7%	67,0%
Reviewing the complaint	84,6%	63,3%	62,0%
Carry out audits of suppliers	74,4%	36,4%	57,0%
Microclimate conditions monitoring in storage areas	53,8%	54,5%	80,0%

Source: own study

Using the method of classification trees, such variables describing the company were taken to analysis:

- Type of business, dividing companies on:
 - packaging materials and packaging producers,
 - packaging materials and packaging distributors,
 - packaging materials and packaging users (food production, food retail, catering).
- Size of enterprise, dividing analyzed companies on:
 - micro (to 9 employees),
 - small (from 10 to 49 employees),
 - medium (between 50 and 249 employees),
 - large (more than 250 employees).
- Territorial area of activity, dividing the surveyed companies to offer their products on markets
 - local,
 - national,
 - international.
- Use of safety or quality management systems and standards, dividing enterprise on:
 - applying systems concerning food safety GMP/GHP, HACCP, ISO 22000,
 - applying other systems ISO 9000, BRC, BRC/IOP, IFS, ISO 14000,
 - not using any systems.

A systematic review of the hazard analysis for safety of packaging materials and packaging to the greatest extent was led by companies that have implemented systems other than food safety (e.g. ISO 9000, BRC, BRC/IOP, IFS, ISO 14000) and had implemented food safety systems (GMP/GHP, HACCP and ISO 22000). Classification tree showing a group of companies in most different from each other in conducting a hazard analysis is shown on Fig. 9.2.

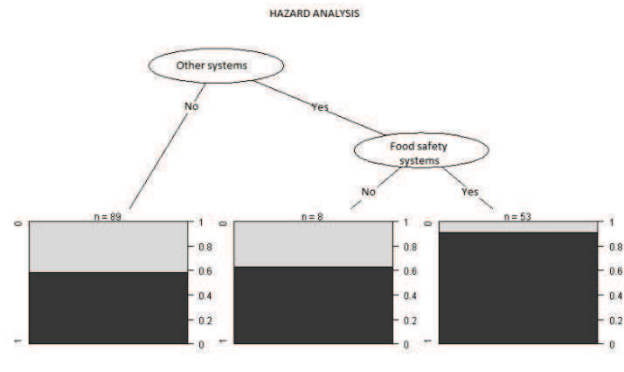


Fig. 9.2. Classification tree showing a group of companies conducting systematic review of hazard analysis of packaging materials and packaging safety.

Source: own study

The smallest share among the enterprises conducting a hazard analysis were companies that do not have implemented quality and safety management systems.

Figure 3 presents groups of companies due to reviewing the complaint. According to the data presented the smallest group of companies conducting a systematic review of the complaint concerning products they offered were those with no systems ISO 9000, BRC, BRC/IOP, IFS, ISO 14000 implemented, involved in food production, retail and catering. The largest group of enterprises conducting complaints' review were those that had implemented the system in addition, they did operate on the international market.

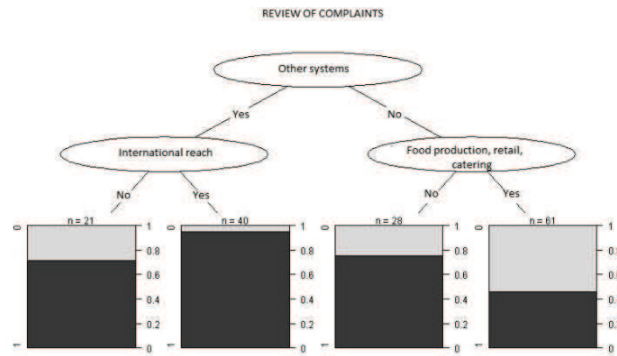


Fig. 9.3. Classification tree showing a group of companies conducting systematic review of complaints.

Source: own study

The partition into a group of companies conducting audits of suppliers is shown on Fig. 9.4.

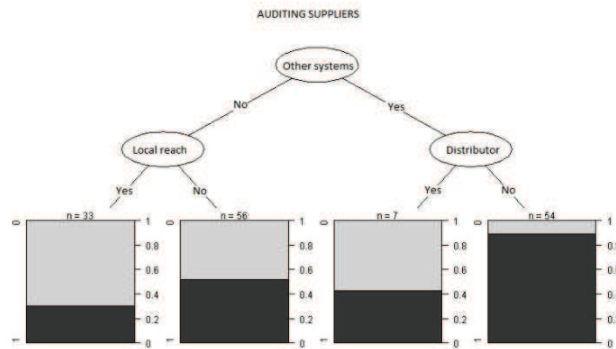


Fig. 9.4. Classification tree showing a group of companies conducting audits of its suppliers.

Source: own study

The biggest group of companies using suppliers auditing as supervising activity are enterprises with implemented quality and environment management systems and standards (e.g. ISO 9000, BRC, BRC/IOP, IFS, ISO 14000), which were operating locally.

On Fig. 9.5 is presented division on to enterprises conducting storage microclimate conditions monitoring.

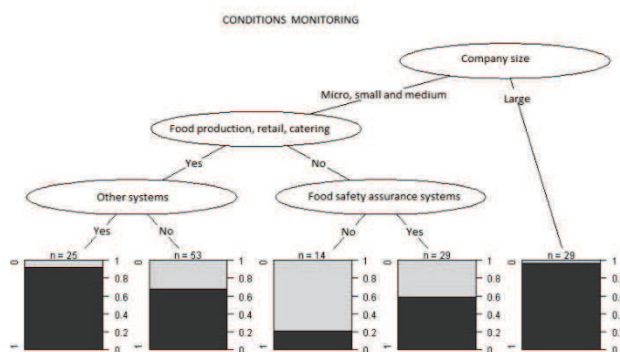


Fig. 9.5. Classification tree showing a group of companies having storage microclimate conditions monitoring.

The biggest group of companies having storage microclimate conditions monitoring were large companies, moreover this activity was conducting by medium, small and micro companies from food production sector, food retail and catering with implemented voluntary systems (e.g. ISO 9000, BRC, BRC/IOP, IFS, ISO 14000). The lowest share of companies conducting conditions monitoring was in group of packaging materials and packaging producers and distributors without implemented safety assurance or management systems like GMP/GHP, HACCP and ISO 22000.

9.4. Summary

Food packaging supply chain is a part of food chain and enterprises involved in food packaging turnover are obliged to fulfill additional requirements. Not all of requirements determining correct course of the process of safety and quality assurance are clearly stated in legal regulations. Chosen activities, such as systematic review of hazards analysis to the packaging materials and packaging safety, reviewing the complaints, carry out audits of suppliers, monitoring of storage conditions of packaging materials and packaging due to literature review and experts opinion are essential for food packaging materials and food packaging safety and quality assurance.

The classification tree analysis shows that selected activities were carried out mainly by large companies, operating internationally and also by enterprises with implemented safety or quality management systems and standards.

The high level of implementation of activities affecting safety and quality assurance confirm importance of these actions. It might be concluded that entrepreneurs are characterised by a high level of awareness concerning quality assurance of offered products.

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