

## Chapter 12

# Information Technologies in Quality Management Systems of Meat Product Chains

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### ABSTRACT

*At the beginning of the 21st century, the question of food safety is playing an accentuated role in the meat product industry. Important issues within this topic are the risk of bioterrorism, impurities in the food chain, and the ascendancy of consumer needs. The solutions to these problems are the introduction of modern quality assurance systems, product identification, and traceability. This chapter reviews the possibilities of IT support for these systems, as well as the potential advantages and their incidental costs. Within the tight frame of this paper – omitting the descriptions of technologies – we discuss the most important criteria of systems which may be able to solve today's meat industry problems.*

### INTRODUCTION

Increasingly, consumers tend to worry about the safety and origin of foods. Recent scandals related to the safety and origin of foods, sometimes overreacted to by the press, have fundamentally shaken consumer confidence in foodstuffs available at shops. The manufacture, distribution and

retailing of foodstuffs became an extraordinarily complex business activity. This extraordinary complexity makes it necessary to develop overall controlling processes that are indispensable if we want to safeguard the quality product of safe and excellent foodstuffs. With a background like this, the complete food chain must provide for the implementation of the strictest quality standards and safety regulations. Therefore, in every phase of the food chain, from the purchase of

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raw material through manufacture, distribution and sales, whether we examine a retail shop or a supply unit, the quality demands up to the actual products, processes and handling methods should be fulfilled. At the same time, since consumers do not really have an overlook of the technology and circumstances of product, only confidence in a manufacturer can help in choosing his food. Problems of food safety can be solved by keeping (and enforcing) applicable regulations, by introducing modern quality assurance systems, by making possible the traceability of products and their identification - beyond any doubt. The safety of product lines and tracing of products cannot be solved without using information systems of a certain level. In any case, one could greatly improve the level of food safety and the information supply by installing the newest technologies and informatics facilities at every participant in a product line in the meat industry.

For creating effective quality management systems we have to study the practical circumstances. In this chapter we discuss some features of the identification technologies and information systems and its application in the Hungarian meat industry. The information technologies are developing very quickly and we highlight a few promising technologies such as the Internet of Things, Digital Business Ecosystem, and the Cloud Computing. The objectives of this chapter to describe the usable identification technologies, software support for quality management and food safety supported by databases and information systems. It also gives some results of a survey which show that there is gap between theory and practice.

Our research focused on the IT support and development of quality management systems in the Hungarian meat industry especially food tracing systems, utilized identification systems and those which may become applicable in the future. We discuss information technology tools which examined the establishment of Hungarian domestic meat industry enterprises.

## **BACKGROUND**

Problems of food safety can be solved by keeping (and enforcing) applicable regulations, by introducing modern quality assurance systems, by making possible the traceability of products and their identification - beyond any doubt. The safety of product lines and tracing of products cannot be solved without using information systems of a certain level (Schiefer, 2008). In any case, one could greatly improve the level of food safety and the information supply by installing the newest technologies and informatics facilities at every participant in a product line in the meat industry. In commodities and especially in food commodities, the establishment of tracking and tracing capabilities meets many barriers that have prevented their broad based use beyond what is legally required (Fritz and Schiefer, 2009). The formalization of the quality (and traceability) knowledge in enterprises was clearly determined by Kim (Kim et al., 1995). Golan et al. define traceability in terms of depth (levels of the supply chain). Peres et al. review the modern analytical techniques, with special regards to molecular biology techniques (Peres et al., 2007). Wolfert et al. describe explicitly, that a sector spanning system has not yet been developed (Wolfert et al., 2010). Fritz and Schiefer write about the decision complexity and about the aspects of the higher level traceability in their paper (Fritz and Schiefer, 2009). There are lots of publications and case studies from the various sectors. For example, Hoffmann and Doluschitz introduce the improvement of an information management system in organic pork production chains (Hoffmann and Doluschitz, 2009).

Quality management of meat product chains can't be solved without high level identification. The identification of food items is based essentially upon two categories of identifier. Primary identification based on the use of biological markers and feature extraction based upon anatomical, physiological, biochemical or molecular, including DNA methods of identification. Secondary

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