

Analysis of the mechanisms responsible for food safety problems in the food supply chain management

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Abstract:

Having analysed the causes of food safety problems in the supply chain, we suggest that Radio Frequency Identification (RFID) technology be used as a possible solution. This will allow for food products to be tracked throughout the supply chain by means of an EAN-UCC-based electronic management system.

I. The origin of food safety problems

Firstly, there are risk factors at every stage in the supply process, from production to processing, and from packaging to distribution and consumption. Every link in the supply chain may be exposed to varying degrees of contamination that may jeopardise the efficiency of the whole chain and compromise the safety of the food. Secondly, the consumer may not be sufficiently aware of food safety or possess the necessary knowledge, techniques and equipment to evaluate the risks. That is a direct cause of some food safety problems.

II. The mechanisms responsible for food safety problems in each link of the supply chain

1. At farm level, the very source of the food supply chain, the extensive use of chemicals or biological substances is a serious latent risk. Food producing plants and crops are impacted to various degrees by different forms of pollution. These include insecticides, chemical fertilizers, waste water, residual gas and industrial waste. When people then eat these contaminated products, not only is their own health at risk, but there is also a more general increase in food-borne illness. The chemical or biological contamination of food products is usually a long-term accumulation process in the food production chain, and the negative impact on human health usually only appears after a long period. This is therefore an important challenge in the food safety evaluation process.

2. At processing level there are two important problems in China, namely the size of the food companies (too small) and their lack of organisation. At this level, that represents one of most destructive factors in terms of food safety. The excessive or abusive use of additives is also a major reason for food safety problems. In addition, questions raised by the use of new raw materials and recent technologies and procedures cannot be neglected.

3. At distribution level: many food products that have not yet been processed or that are only in the first phase of processing can be found in the markets or sold directly on street corners. If measures are not taken to control and monitor these methods of distribution, food-safety related incidents will be unavoidable. The logistics of refrigeration have not been sufficiently developed in China and refrigeration equipment is rudimentary. Though the interregional or international commerce of food products may meet consumer needs, it may increase the risk of contamination from microbes or toxic substances.

4. At consumption level, eating products out of season and the habit of eating meals outside the home are both more frequent now than in the past. Food consumption overall is on the rise making

mass food safety an important topic. Since consumers lack the means of evaluating the quality of a food product before consuming it, they become unwitting “guinea pigs.” The quality or toxicity of the food only becomes apparent after consumption. Consumers are therefore unable to protect themselves.

III. Possibilities for optimising the food supply chain

Setting up a food safety tracking system using technology and electronic management is an essential step towards safer food. Firstly, the electronic management of the supply chain is a necessary technical support for food safety. Offering the client an efficient and rapid Internet service will improve the efficiency of information transmission throughout the supply chain so that every product may be rapidly located at each phase: production, processing and distribution. Secondly, the EAN-UCC system provides a tracking platform for food safety. Thirdly, RFID technology is an excellent way to ensure the traceability of a product throughout the process. In a complex supply network with many individual steps, the RFID system works to make every link in the chain more secure, from the source to the consumer, and provides a standard of quality for the implementation of food safety tracking processes.

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