

PRODUCTS TRACEABILITY – NECESSITY OF THE MANAGEMENT OF THE DISTRIBUTION CHAIN

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Abstract. European directives are strict and they regulate the obligation of products traceability in all stages of manufacture, processing and distribution. Internationally, the standards of the GSI system have proved that they can entirely solve the traceability requirements, through specialized informatics systems and networks, as well as through the manual labeling, the solutions being taken up by CEE/ONU, in their users' guides. RFID technology can be successfully used in the distribution chain because it considerably improves the stock inventory process, in its phases of data gathering and of “visibility” in the places where the traceability hasn't been performed yet.

Key words: agro alimentary safety, traceability, labeling, identification

The traceability and the management of the distribution chain

The present field is situated under the sign of an integral approach of all the levels and operators which succeed to ensure the necessary products to the final consumers, at the time and place wanted by them, totally meeting their expectations. In this context, the traceability acquires a more and more active role within the management of the distribution chain [1]. The requirements of the individual fields of industry and those of the enterprise filed are very different, although they have something in common, namely the certification without omissions of the route a raw material takes from producer, through different commercial and processing stages, to the final consumer.

Metrologically, the traceability represents the property of the result of a measure or of the value of a standard of being reported to stable references, usually presented under the form of national or international standards, through a chain of comparisons, having all the uncertainties determined. All the standards used in the confirmation system have to be accompanied by certifications, reports or data records for the measuring equipment, which should attest the origin, the measuring uncertainty and the circumstances in which the results were obtained. The supplier has to keep documented proves to attest that each standardization of the traceability chain has been performed [2].

When a product is taken into account, the traceability can refer to the origin of the materials and of its components, the history of the processing, as well as its distribution and location after delivery. The requirements for ensuring products traceability imply, mainly, the identification of the materials and parts during the whole manufacturing process, the transfer of this identification in corresponding documents, periodic records that allow the retrieval of the history of an activity or process during the whole quality loop and the archiving of the records for a certain period of time. Product traceability allows, during the manufacturing process, to retrieve the cause of an irregularity or of a deficiency, and on the other hand, during its use, to follow the product to confirm its provided life limits and to organize its maintenance, and in the case of an expertise, to find the origin of the raw material and its manufacture stages to determine the cause that led to the litigation [2].

CE regulation no 178/2002 regarding traceability and Law no 150/2004 regarding food safety for animals clearly provide the obligation of having a system for tracing food, animal food, animals allotted for food manufacturing, and any other substances incorporated in food or in animal food, system that has to be applied in all manufacturing, processing and distribution stages [3,4]. Traders have systems and procedures that allow them to present these pieces of information to the qualified authorities. Food and forage products that are marketed in the Community have to be labeled and identified in such a way to ease the traceability, with the help of papers and pertinent information, according to applicable requirements provided through specific dispositions.

Process transparency – the first step to achieve traceability

The reasons that determine the achievement of the traceability also lie in meeting the requirements and legal norms, as well as in the obligation of attentive action in the relation with the suppliers and customers. Other important criteria are the transparency of goods flow and internal logistic, as well as a management of the warehouses orientated towards traceability.

Agricultural and food policy of the European Union is governed by new concepts, as the one developed in 2002, known under the name “Healthy food for Europe’s citizens”. To sustain this concept, authorities have elaborated, approved and applied specific regulations for the most important food that constitute the daily nourishment of the European citizen. To implement these regulations, EU proposes systems of labeling that inform the consumers about products’ features and that allow their trace in the distribution chain from manufacturer to consumer, from end product to raw material.

In this context, at the European level, it has been actively promoted the realization and implementation of such standards in order to apply the traceability systems for the food field. Traceability is a collective strategy, the methodological elements of these standards representing a minimal requirement, methodologically speaking, to integrate the enterprise in such a collective step.

The GS1 (ex EAN) standard system of articles numbering is a system of insignificant codification, used to identify the units that are marketed and not to preserve the information or classifications connected to it. The information associated to these articles is inserted by users in their records and retrieve by referring to the article number. The success of the GSI system has generated an important increase of the requirement of being used in wide-ranging fields that have an impact on a large number of users, thus being necessary to gather as much information for the article identification, through bar code representation. For this kind of usage it has been adopted the GS1-128 standard (ex UCC/EAN-128), which, through the application identifier (AI), can record information at demand. The labeling systems proved to be efficient instruments in regulating the tracing norms, the GS1 logistic label representing another way of ensuring traceability for mass consumption products directly from their label.

The guarantee of a good traceability means to manage more pieces of information for each product reference, manufacturing lot, stock movement, and shipping. The labeling and the informatics interfaces often become an obstacle for enterprises, internally as well as in different logistic links. European and Romanian regulation force enterprises to equip with their own system of traceability. If, as the law stipulates, it is valid that each manufacturer is solely responsible for the quality of its products and their withdrawal from the market in cases of crisis situations, food manufacturers and traders have to collaborate and to implement standards, considered good practices, for quality and safety.

Internationally, the standards of the GS1 system have proved that they can totally solve the traceability problems through labeling, being recommended by CEE/ONU in the case of some industries essential to consumer’s nourishment. The GS1 members are offered a general methodology for implementing traceability and two solutions: through GS1 labeling and through web communication assisted by the Sabasyus application.

The standard SR EN ISO 22005:2007, **Traceability in the food chain. General principles and basic requirements for system design and implementation**, makes available for each organization from the food chain the recommendation package for implementing the traceability system. Traceability systems have to contain documents from where the product history could be retrieved and to locate a product on the whole food chain. They contribute to the research of the irregularity cause and to the capacity of withdrawing and/or claiming products when necessary. Traceability systems can improve the appropriate usage of information, the efficacy and productivity of the enterprise. Traceability system has to be verifiable at any time and to be able to establish the product origin and the organizations responsible from the food chain, and in order to be efficient, the system has to be consequently applicable and to comply with all the regulations or local, regional, national and international policies. A traceability system has to be designed in the context of a broader management system, its choosing having to result from the balance of different requirements, from technical feasibility and economic acceptability [6].

RFID technology – a new challenge in food products traceability

One of the greatest challenges of implementing a traceability system lies in the fact that products distribution has a global covering, thus it becomes difficult to precisely trace goods movement throughout the distribution chain. There is a solution that could eliminate these difficulties – an automate gathering of data named radiofrequency identification (RFID).

RFID technology dates from the Second World War, being used initially to identify allied ships and planes, distinguishing them from those of the enemies. The novelty regarding the RFID lies in the fact that it has become cheap enough in order to be placed on the packages of the marketed products, the cost decreasing each year. Even if under the circumstances in which the RFID technology can be applied only on carton packages, it will decrease the costs regarding the storage and distribution. The readers located in warehouses will receive the signals

transmitted by the labels without being necessary a manual scan, as in the case of code bars. Thus, retailers will be able to reduce the staff needed to store and distribute the goods.

This technology involves two elements: a label and a reader. The label (also named tag) contains a unique identification, which is read by the reader. Tags can be active (they constantly transmit radio signals) or passive (they transmit radio signal only in the presence of a reader). Active tags have bigger dimensions and are more expensive, because they incorporate a battery, while passive tags are activated through radio signal transmitted by the reader. After the information contained by the tag has been read, the reader transmits the information to the software system, where it will be stored. Therefore, the information about products can be stored throughout the distribution chain.

The great advantage of the RFID technology, compared with other methods of automated data gathering, lies in the fact that it allows the simultaneous reading of many products at the same time, no matter the place of the label on the package. This means that systems based on RFID can be automated on a large scale, almost totally eliminating the need of manual scan. Consequently, RFID technology becomes advantageous for operations which need a lot of manual work of data gathering or when the scanners can not read the labels because of the distance or layout. Moreover, the RFID tag can store much more information than the linear bar code, and the information can be updated.

Nevertheless, the bar code will not disappear, remaining the easiest and cheapest method of identification of individual products. RFID creates the premises for the improvement of the processes of data gathering and communication of the information needed for the products handling throughout the distribution chain. For example, solutions can be thought in order to combine bar code technology, RFID and vocal recognition, to create a flexible infrastructure which would optimally use the advantages of each technology.

The tracing of containers with RFID technology allows the recording of the “history” of these transport recipients, namely the storing of information about all the products that have circulated in a certain container. This type of traceability is very useful for retailers, who can easily locate where to find a certain product, for a rapid delivery.

With the help of the RFID tags, a supplier of fresh products (fruit and vegetables, for example) can trace where the goods have been delivered in order to accelerate the payment, or a retailer can be sure that the products are on shelves in the order they were stocked.

RFID technology can be successfully used throughout the distribution chain because it considerably improves the inventory process of the stocks, in its aspects of data gathering and “visibility” in the environments where traceability hasn’t been performed yet. Retailers, wholesalers, sellers, operators and manufacturers, they all can successfully use inventory applications based on RFID. These will eliminate the “blind points” from the warehouse because of this technology’s ability to read through packages, to be heat or humidity resistant. Thus, the costs for the workforce and safety stocks will be reduced.

Applications for tracing deliveries can be made up with the help of the tags. Products, boxes with RFID tags can be read while order-customer is setting up. Then, readings are gathered in a witness document of delivery, which can be printed, stored in the software application, incorporated in a tag or in a 2D bar code on the delivery label. The RFID application can be easily integrated in the actual business processes.

Through RFID, products can be easily identified, and, implicitly, the damaged lots, in order to be withdraw. Through automated gathering of the lot numbers from boxes, with the help of RFID at the distribution centers or in the retail area, an advanced level of traceability is being ensured, without losing time with manual operations. Thus, it is also eliminated the risk of mistaking and withdrawing lots of products that were not damaged [7].

This technology will solve the most complex and expensive problems of retailers like products loss or theft. Supported with much clearer information about the products movement on shelves, in warehouses, on the way from factories to market places, retailers will be able to avoid the situations when stocks are exhausted. So, they will be able to sell more, to satisfy the demand and to improve their services. Stores with readers will have “smart” shelves, which through the signals transmitted will warn the staff when they need to be rearranged. Nowadays, the RFID technology is adopted especially by retailers who sell expensive goods, but when the price reaches a reasonable level, the implementation will be applied to any type of products.

Most of the retailing systems were featured to store UPC bar codes on 11 digits. But, the codes used by the RFID tags, known as EPCs (electronic product codes), are made up of 13 digits. In order to allow the storage of new codes, CIO will have to extend its numerical system.

A system based on RFID leads to serious money and time savings, because of its rapidity of reading the information from packages and boxes. RFID technology is recommended for the easiness with which its

applications meet the legal requirements regarding traceability. As more and more companies implement RFID systems, the visibility throughout the distribution chain will considerably increase, from suppliers of raw materials to the final consumer, and the systems architecture will become more distributed. Instead of using a data center at the company's headquarters for processing the data which will be generated based on this technology, they will prefer processing the data in the market places.

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