June 20, 2011 (Monday) Pre-Congress Seminars

Ministry of Rural Development **Kossuth Lajos tér 11. Budapest V.**
CONFERENCE ROOM **Monday 10:00 – 18:00**

1.3. NEW QUALITY AND SAFETY REGULATIONS AND DEVELOPMENTS ON THE AGRIFOOD AREA

Seminar Chair: Zoltán Kálmán, Ministry of Rural Development, Hungary

15.20 Multi-dimension Possibilities for Traceability in the Food Chain
József Surányi, *Budapest Corvinus University, Hungary*
Zoltán Erdős, *Qualiment Ltd, Hungary*

Surányi, József (Hungary)

Food technology engineer, economic engineer, participating in numerous post-gradual courses. Main areas of responsiblity are food quality management system, food safety and environmental management. Worked at Coca-Cola Beverages and since 2003 has been employed at METRO Cash & Carry in Hungary. Had of Quality Assurance Department, member of the EOQ, member of the Food Safety Working Group of Hungarian EOQ.

Multi-dimensional Possibilities for Traceability in the Food Chain

József Surányi, Budapest Corvinus University, Hungary
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TRACEABILITY

The importance of traceability

One of the key elements of very important expectations regarding food production is the traceability. Its role is connected with the appearance of food-safety related problems: it provides an opportunity to uncover the underlying causes, identify those parties who are involved (suppliers or customers) as well as the products that are affected. Because of these factors its importance is not negligible either from a commercial or a security aspect.

Traceability is connected to one particular product and within this product to one particular production lot, where the lot can be e.g. one day's production or one production batch. The more detailed lot specification is the more effective system and thus the products that are affected can be limited to the smallest areas possible. This brings not only financial and logistical benefits but also technical and informational burdens.

Traceability is necessary all along the whole food-chain. The most frequented areas, where its demand is the highest are:

- food production
- retail and wholesale
- customers and final consumers
- authorities involved in food safety

By an actual project, all the parties involved are being surveyed with questionnaires to identify what traceability requirements they gave and to gather all the necessary information.

Basics of traceability

Traceability used to mean identifying the origin and route of one particular product both legally and considering the expectations. The "from – to" is a linear model, which might be used as a basis but is not enough for suitable application. A more sophisticated and detailed traceability procedure is required for filtering out problematic lots and to establish further measures.

The depth of traceability

We have to be prepared for a situation that in the case of a complicated product - with numerous ingredients - the quantity and batch of some ingredients may vary within one batch of production. Producers may run out of one or more ingredients during the production of a particular batch, thus even if one batch of a product may count as one lot, the ingredients may still originate from different batches.

The accurate administration of recipes and ingredients may be confusing even in the short run. If one ingredient appears in small quantity **in several production lots**, the scope of the products affected increases exponentially. The same happens if one ingredient is accumulated during several days and is used together afterwards, or if it is used again (e.g. rework the products of the previous day that had problems with their appearance only). In these cases several lots may be combined. If one ingredient is used in several lots, the food safety hazard will involve different products and production lots, thus the time requirement of finding the products concerned, the time and quantity of the product recall may pose considerable demand on the producers.

Therefore exact traceability needs to be deeper than one particular production lot; it has to go back to ingredients and their butches as well. Since traditional paper and pencil methods are not suitable for this purpose, **technical and IT** methods have to be applied (IT, on-line measurements, RFID, quadratic code identification, identification in equipment and products, logical codes, /EAN/ etc.)

More detailed traceability costs more, but the potential recall involves less quantities. The optimal solution (optimally detailed traceability) depends from probability of recall situations. For decision, a "cost and risk" analysis is preferable.

COMPLEXITY

Complexity of the producer

In one particular production facility, traceability can be represented in a complex graph, the movement and connection of the different products and ingredients may have several branches. The attached pictures may point out the complexity of such a **logical network**.

This is even increased if the production is carried out in several steps, e.g. in the meat industry: there is a slaughterhouse, raw material preparation, processing and packaging areas.

Complexity of the customer

The customer group of one product may varied, which makes for example product recall quite problematic. A specific production facility may deliver to wholesalers (warehouses, distribution centres), retail chains, independent retail outlets, caterers (e.g. school kitchens) and may operate their company own brand outlets. One specific product may be found in any of these.

Complexity of the food chain

For example we purchase a cold buffet. If we look only at the cured, fried meat, it is involving at least three production areas: the spice company mixing spices, the meat factory, and the kitchen producing cold buffet. In our three graphs all partners are connected with their own complexity.

If we consider how many spices are used in different mixes and how many can appear on one cold buffet - we can easily see that in case of necessity we need the help of special equipment and software (or time – see guar gum).

APPLICATION

One complementary dimension: time

If we know when we switched the raw material lot, when we run out of an additive, how the cooling parameters turned out (time, duration, temperatures), when and at what temperatures the product were kept, what quantity was used, who operated the packaging equipment, we can reconstruct the **history of the product**, we can retrace the time and place of the fault that occurred, the quantity involved. So the high resolution and the time-wise data stream may help finding the wherefores and causes and reduces the amount of the products potentially problematic that is to be withheld.

For this purpose we need recorded time moments. We need **real-time tracking** of the production parameters – which is nowadays not impossible either technologically or on the software level. We have already several elements at our disposal and possibilities to gather information (e.g. cooling, temperature data). These data can be attached to items and filtered for example by SAP. The internal clock of the computer can be used to attach a time stamp to all data automatically by default. Later these data can be filtered by product name and time.

Information package in the food-chain

According to our concept, even if information is available there is no time to look u p individual cases (except for an audit or crisis). However data processing can be automated. Even though it requires software development, such solutions will have to play a major role in the future.

In such a system every handover point (primary production, different phases of production, and members of the retail chain) would be required to provide a uniform "**traceability package**"**.** The data package could be processed with a "**collector program**" simply by pressing a button. The organization may decide that which part of the processed data may be placed at the disposal of the partners or kept non-public, as part of the internal control, strictly for internal use. A uniform standard needs to be made in the food chain so that the parties involved may gain ample information according to the same principle.

Though the majority of these tasks are ahead of us, many smaller steps are in development. Temperature data collection start at METRO Hungary when the products are still in the truck and the door is not even opened yet! (and it won't be, if the temperature is not suitable)

Summary

Material flow graphs and synchronized collection of production data together with automated data processing may elevate traceability to a new service level. Restricting the data string to one specific problem point in the production, listing involved products, choosing product to be withheld or to be saved may provide several new services not yet foreseeable. Thus not only food safety requirements but also rational management demands could be met. The system could be expanded with **daily production logs**, **production accounting**, **stock management,** complaint management and remedial action data services, efficiency and analysis and other product-, parameter- and time-based analyses. We hope that we will meet more and more (part) solutions in the future.

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