

Topic: Food Chain Management  
Poster presentation

## **QUALITY CONTROL AND TRACEABILITY OF CROP AND FORAGE PRODUCTION**

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### **Problem Statement**

There has been an increasing demand to extend the more or less developed quality control system of food product processing to the raw material production and supply in latest decades. Especially after it was obligatory to apply the HACCP system by food processors and traders. This would lead to getting closer to the fully introduced food and feed safety in the whole plant-animal processing line and partially the contrast between the fore-part and end-part of food chain; the former is slightly explored, the latter is almost overregulated. The picture of applied quality control systems is very diverse nowadays; strict application and monitoring is used in the processing of horticultural crops, but in the case of field crops, especially cereals and forage crops it is far from being effective.

### **Objectives, Procedures and Results**

To examine the possibilities of the development of a quality control system in the whole plant-feed-animal-food chain and to explore its weak (or out of regulation) parts, we have started a research program with the contribution of industrial partners. Our aim is to create a base specification that helps to apply the ISO 22000 standard and to develop a quality control and tracing system specified for Hungarian circumstances. To examine the process we made a case study from the characterization of arable fields of our examinations, by the analysis of produced forage and its byproducts, beside the food safety evaluation of pigs fed by the produced forage to the appraisal of check-backs of consumers.

Six members formed the research consortium; University of Debrecen Centre of Agricultural Sciences and Engineering, Institute of Food Science, Quality Assurance and Microbiology led the work of the research team and participated in the examinations. Revision of applied quality assurance systems and development of new GAP system was made by QTT Kft. The Nagisz Rt. participated in the examination of the whole plant production – feed production – animal breeding – meat production chain, and the Árpád Agrár Rt, the Szabolcs Gabona Rt and the Remete '96 Kft. made studies in the analysis of plant production and feed production. In the first step of the research the consortium members designated the winter wheat and maize cropping areas and grasses involved in the traceability study. The QTT Kft. tested and valued the quality assurance systems applied by the partner companies. The valuation of the production areas by the aspects of food and feed safety we made two kinds of soil sampling; first the 0-20 and 20-40 cm layers were sampled to survey their physical and chemical characteristics (especially their toxic and potentially toxic element content) and pesticide residue contents both as average and point samples. Second, we made a deeper vertical sampling to 300 centimeters depth of soil and we separated 10-12 layers in

the profiles based on their physical properties. The element content was determined by a Perkin-Elmer Optima 3300 DV Inductively Coupled ICP-OES equipment, pesticide residue analysis was performed by GC and GC-MS equipment in the Soil and Plant Conservation Service of Miskolc. Furthermore, we sampled the harvested winter wheat and maize yield, also for determine their potentially toxic element and pesticide residue content. The harvested yield was stored by the consortium members until their use in feed mixtures.

The examinations were performed both on intensive and bio productions sites and we have found that the examined fields are suitable for producing safe foods, although in the case of intensive cultivation some accumulation of pesticides and heavy metals is observable in the deeper soil layers. Our measurements proved that this contamination did not affect the quality of plant products.

The QTT Kft. made the GAP documentation of the plant production processes and it was applied and revalued by the producers. Based on the initial systems and the experiences of application we made the general model of this GAP system, what helps the initiation of ISO 22000 standard and can be applied by any plant producer businesses adapted to their specialties.

The evaluations were continued in the animal husbandry, in pork production by Nagisz Zrt. The production of feed materials and the breeding of animals were made in factories certificated by ISO22000. Pork was made in slaughterhouse of Debreceni Hús Zrt., certificated by ISO9001 and HACCP, accredited by SGS Hungary.

The meat industry made its consumers (commercial chains) to fill out a questionnaire about their opinions on the necessity of applicable quality standards. This questionnaire purposely focused on the quality of product and did not deal with other questions, e.g. technical questions of trade.

The opinions of both inland and export partners are definitely positive about the quality of meat product and the ambition for the development of quality assurance system. Besides, several establishments were found by the answers. The most important were:

- Results show that commercial lines are not suitable to promote the interests of final consumers. Essentially the technical aspects of trade are important for them (e.g. accuracy in transport, price, terms of payment). They have not got almost any feedback about the product quality (above the requirements of contract) or the consumer's demands.
- Widen range of own branded products hinder the ambitions of producer on the satisfaction of latent demands of consumers, so consumer can not react upon the product development.
- Consumer do not got any information about the extra quality or food safety related properties of the product, so if the primary production applies higher level of quality assurance system as its buyer requires, it must use additional expenditures to communicate it to their final consumers.
- Buyers, interested in hospitable and institutional food, do not specify their demands on hygiene and quality, just requires the adherence of requirements of Codex Alimentarius Hungaricus, although it is widely known that its adherence is a general requirement in food trade. This causes that they expectations are only formal, so the demands on "menu specific raw material" do not formulate.

## Conclusions

On the first elements of food chain nowadays it is hard to inform the final consumers about the application of non required quality control systems. This induces companies to maintain as low level of quality assurance system as their buyers requires – and it means rather loose regulations in several cases, mainly in plant production. The production of high value added goods requires suitable and well operating quality assurance system, what we have processed in the case of our

experimental companies, and proper communication to the final consumers about these systems and their importance.