LIMS in Feed Analysis

"They're good with food…"

Important steps in the complex task of inspecting and testing feed at the Austrian Agency for Health and Food Safety (AGES) in Vienna are supported by a system supplied by LISA.lims. The deputy head of the AGES Institute for Feedstuffs, Dr. Karl-Walter Wagner, spoke with us about the system's applications and merits in handling official and regulatory tasks.

Dr. Wagner, could you briefly explain what tasks AGES performs in the area of feedstuffs analysis?

Dr. Wagner: In the agricultural division of AGES, we carry out testing on official samples, in other words we are responsible for testing and inspecting. Our animal feed monitoring department, which has its own controlling body, is mainly involved in sampling and analysis and in on-site inspections at producers. Our use of LIMS therefore starts with the sampling process, when the data is entered on a mobile device and then uploaded to the LIMS. This data includes both declared and non-declared substances, i.e. anything found in the feed that is undesirable or illegal. The contents of these substances are then tested on the basis of a multi-year, risk-based control plan, which is standard across the EU. Important steps in all these analytical processes are assisted by LIMS.

What are the particular problems you encounter with capturing and processing data in feedstuffs analysis?

Dr. Wagner: The official samples are a special case, because the options provided for entering declared substances must be flexible. What makes this more difficult in our area of analysis is that the nominal values are variable. And feed producers are permitted a range in the values declared, since the content of the ingredients also tends to vary from the table values. There are no EU rules on tolerance levels; these levels are still set by the individual countries.

But EU limits on undesirable substances are not trivial either. Sometimes there are upper limits specific to particular animals, and sometimes the limits apply to whole groups of feedstuffs. But by and large we have been able to map the complexity of the variable nominal values and differentiated limits in the LISA LIM system. The declared substances are still entered manually from the labels on the feed containers, while undesirable substances are automatically imported into the LISA tables and structures in advance. Afterward, the limits are calculated.

Does the system tell you when limits have been exceeded?

Dr. Wagner: Precise and visible handling of limit overruns was one of the most important criteria we specified. As is true with all official samples, it is essential that the person performing the analysis is informed if any limits are exceeded. When this happens, there are certain tests that must be performed. And when limits are exceeded you have to consider the degree of uncertainty in that particular measuring method. This is always shown on the AGES test report. These uncertainties of measurement are calculated from specific method and analysis tables in a special function. Owing to the principle of the presumption of innocence, it was necessary to customize the interpretation of these measurement uncertainties in LIMS.

Can you give us an example of a typical feed analysis and any particular characteristics it might include?

Dr. Wagner: Feedstuffs present us with a special situation, because we have to analyze both homogenous products and mixed products with very different blending ratios. This meant that we had to create the appropriate differentiation options in the system parameters. Nominal values and tolerances are now defined in the system in addition to the limits for undesirable substances.

As a rule, mixtures are drawn as separate samples. When a sample is activated in our laboratory, that's more or less when the LIMS-assisted analysis procedure starts: it defines which lab will carry out the various analyses. The labels and dockets are then prepared in the mill room, the samples are divided into sample beakers and labeled and then sent over to the labs. The LIMS documents the shipping of the samples and their receipt by the lab – both of which are important for calculating the processing times. When the samples arrive at the lab, the data is entered in the LIMS. Here there are two variants: either the calculation is made directly in LISA, which offers significant advantages for the complex procedures we use in wet chemistry. In other cases we have so far relied on the analysts themselves; they decide

when they're performing the external calculations whether and when any further analysis is needed. We are not currently using the dynamic testing option contained in LISA, which carries out standard test procedures automatically in defined cases when guide values are exceeded. Instead, our analysts still decide whether anything requires further analysis. However, their decision is now assisted by dynamic messages that are automatically generated by this same dynamic testing mechanism for particular results and constellations.

Your analyses are relevant for legal, even criminal procedures. How do the LIMS-assisted analyses meet these special requirements?

Dr. Wagner: In the case of control samples, most are assessed individually, but if there is any doubt then we repeat the test in order to verify the data, and we may even also refine the procedure, although this is always based on the method officially prescribed by the EU. We also have a special solution based on Austria's own feedstuff regulations when billing queried substances to producers. We're only allowed to bill the costs of analyzing the queried parameters. As a consequence, we needed some special functions in LISA for recording what was being queried and what needed to be billed. The smooth functioning of this procedure is an important factor in AGES' basic financing. One particular feature we set up allows inspected companies to have access at low cost to the uncontested analysis results, for example those that can be used for internal operational and quality control.

The storage of samples is also controlled via LISA. When samples are contested or legal proceedings are ongoing, the retention periods can be long. At regular intervals LIMS generates a report of samples that are "negative", so that the "B" sample held by the customer can be disposed of.

Your LIM system has been up and running since early 2006. How would you describe your experiences so far, and what sort of things do you expect from LISA in the future?

Dr. Wagner: During the pilot phase we noticed that a lot of validation effort arises when we differentiate between official and private analyses. Aside from feed, this differentiation really only exists in agriculture and food. In everyday use, we are now noticing additional benefits in many areas. They range from the mobile entry of sample data, which reduces the number of errors, to the significantly more transparent processes of distribution, labeling, and status monitoring, all the way to the report function and the ability to integrate photos and graphics in a report. An additional option that we are currently testing in the agricultural division is the possible integration of the LISA WebInfo module, which we could use for the companies and

producers we're inspecting to inform them of analytical results quickly and conveniently from LIMS.

In which wider system environment is the LIMS in the agricultural and feedstuffs division embedded?

Dr. Wagner: The standardized technical and organizational basis for the LIMS application in the feedstuffs division is the AGES Information and Management System (AIMS), which is also based on LISA, and which we have been implementing in stages since 2002. This type of overarching system became necessary following the merger of eighteen former federal institutes and agencies, not just to handle the data resulting from the amalgamation into AGES, but also to standardize all the main analytical processes and make them transparent and usable across all divisions. Our massive combination of analytical skills along the entire food chain produces about 900,000 samples and some seven million parameters every year. By using ORACLE technology in conjunction with our specially adapted LISA architecture, we've succeeded in creating a quick and convenient system for managing this huge volume of laboratory data while complying with all regulations.

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