Standpoint and mission statement IAG section Feed Microscopy

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Aim of feed microscopy

The microscopic examination and evaluation of feeds and feed materials is targeted to the proper identification of ingredients of plant, animal or anorganic (mineral) origin. This is an important discipline in the entire area of feed research and covers for, among others:

- Proof of identity and purity of feed materials,
- Establishment of impurities or prohibited contaminants, and quantification thereof,
- Recognition of undesired elements or plagues, which are unintentionally present, such as insects and moulds,
- Indication of the composition of compound feeds, and estimation of the share of the recognisable ingredients.

With these technical possibilities, microscopy is an important legal tool for enforcement of regulations, with the mere notification that some of those regulations can only be enforced exclusively by microscopic inspection. In addition, the results of microscopic investigations are in a range of situations complementary to analytical chemical research. Multidisciplinary research is necessary in most cases in order to clarify and understand obtained results, and to trace causes and origins for pro-active and risk-based monitoring.

Specific examples of microscopic, or in broader terms, visual research include detection of animal proteins (Regulation (EC) 999/2001), botanic impurities (Directive 2002/32/EC), and prohibited ingredients such as packaging materials (Regulation (EC) 767/2009).

Basic requirements for feed microscopy

In contrast to the instrumental analysis of analytic chemistry, the visual identification of a large diverse range of materials relies heavily on the knowledge of biology and adjacent disciplines. Also the application of procedures for preparing the sample in such a way that specific fractions can be selected, identified and evaluated needs sufficient experience. The analyst can gain routine in a day-by-day process of investigating sample material, which is a long and intensive process. Sources for expertise can be found among handbooks, training by experienced scientists, collections of reference materials and dedicated expert systems on a computer. Guidance from supervisors with experience in the specific requirements of visual and microscopic investigations is strongly recommended.

IAG section Feed Microscopy

A platform on microscopy of feed materials of German institutes organised in the Association of German Agricultural Analytic and Research Institutes (German abbreviation VDLUFA), together with microscopists from other European countries resulted in the foundation of a section Feed Microscopy in the International Association for Feed Analysis (German abbreviation IAG). The activities of the section include meetings at an annual basis or more frequently if necessary, with the following aims:

- Exchange of information and experiences in the daily practice of sample investigations,
- Presentation and discussion of the results of ring tests, which are meant as necessary support of lab accreditations,
- Development and formalisation of new methods, in the framework of European Union law enforcement, or in other legal contexts,

- Expression of opinions on actual issues in the area of feed research, both for composition and safety, in national or EU framework,
- Training sessions or courses for developing expertise and exchange of experiences.

Current situation and prospects of feed microscopy

The more recent development of highly sophisticated analytical equipment for chemical analysis, high throughput processes, and budget savings resulted in a lower volume of microscopic investigations. The principles of the General Food Law (Regulation (EC) 178/2002), which put the primary responsibility for feed quality and safety in the hands of the producers, resulted generally in a lower public investment in law enforcement. In addition, the shift from ingredient-based to nutrient-based strategies in animal farming, the change from open to half open declaration (Regulation (EC) 767/2009) and optimization of production processes resulted in a lower demand of microscopic and visual investigations.

However, recent incidences in economic fraud and unintentional contamination of feed materials gained new needs for microscopic research.

Recent developments in the area of feed safety and quality are:

- An increasing realization that a range of prohibited components can be managed by controlling their source: plant toxins originate from seeds or whole plants, mycotoxins originate from moulds, etc. Recent developments are the increasing interest in monitoring ragworts (*Senecio*) and autumn crocus (*Colchicum*) at early stages of the feed production chain, monitoring of mould infections in grain batches and in new seed producing species added to Directive 2002/32/EC (*Ambrosia*, *Abrus*).
- There is a slight increase in the interest of monitoring physical contaminants (Regulation (EC) 767/2009 Annex III). New methods for the detection of packaging materials have been published or are in development.
- Composition analysis by visual inspection and microscopic research can support fraud investigations and chemical analysis: microscopic procedures include the possibility to divide a sample in several different fractions, which can be identified and can be the basis for targeted chemical analysis.

Besides the renown disciplines of chemical analysis and DNA analysis, biological and physical contaminants and parameters are evenly important for feed safety, of which monitoring has a legal basis. It is the quest of the future practice of monitoring feed safety to perform smart combinations of multidisciplinary research in order to meet sufficiently the high demands on feed safety and quality. Visual and microscopic research is among the necessary disciplines. Besides this, the microscopic procedures as used in feed safety research can be applied successfully in other areas, such as food safety, economic fraud, customs and forensics.

Aim and scope of IAG section Feed Microscopy

Based on its historic position, current activities and future opportunities, as presented, IAG section Feed Microscopy will state the following aims:

- Promoting the exchange and application of visual and microscopic techniques in the area of feed research, and if possible in other areas of law enforcement.
- Stimulating opportunities to apply established research methods in other areas such as food research, medical research, customs and forensics.
- Promoting the development of visual and microscopic methods for supporting legal monitoring.
- Seeking possibilities to be partner in multidisciplinary research in the mentioned areas.