

Traceability and Authenticity of Feed Materials – Report on QSAFFE Work Package 2 Activities

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Feed Materials Traceability and Authenticity in QSAFFE

At present the complexity of food and feed production systems is steadily increasing and particularly feed trade is subjected to globalisation. In addition, feed materials are obtained from new sources or are produced by new technologies. These facts may contribute to new and unforeseen risks for animal and human health.

In a crisis situation due to contamination or adulteration of feed materials, the identification of origin (Figure 1) can be essential in regard to feed safety as well as food safety for following reasons:

- A risk (e.g. reduced animal welfare) has been associated with a particular product but the reason is not identified
- A particular contamination was already identified but the analysis of the contaminant is difficult/impossible and/or expensive

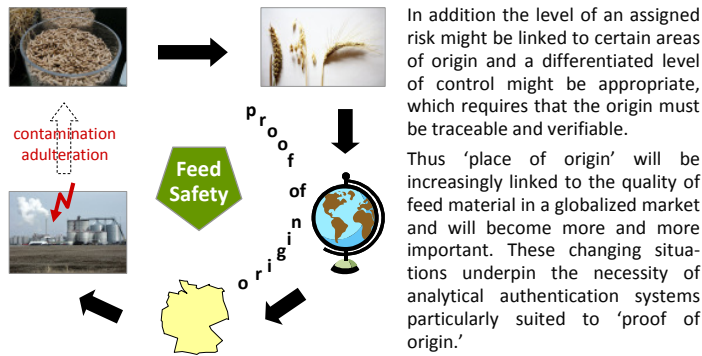


Figure 1: Proof of origin – botanical and geographical identification

QSAFFE Work Package 2 Activities

Work Package 2 of the EU research project QSAFFE (Quality and Safety of Feeds and Food in Europe, www.qsaffe.eu) will develop and improve systems of traceability and authenticity of feed materials. This will be achieved by application of different analytical techniques in order to identify useful tools in tracing origin and composition of feed materials.

Investigated analytical techniques

- Isotope Ratio Mass Spectrometry (IRMS)
- Fourier transform infrared (FT-IR) spectroscopy
- Near-infrared (NIR) spectroscopy
- Fourier transform near-infrared (FT-NIR) microscopy
- Raman spectroscopy
- Direct Analysis in Real Time - time-of-flight mass spectrometry (DART-TOF-MS)
- High resolution mass spectrometry
- Proton-transfer-reaction mass spectrometry (PTR-MS)

Work Package Participants

- Federal Institute for Risk Assessment, Germany (BfR)
- Queens University Belfast, United Kingdom (QUB)
- Institute of Chemical Technology, Czech Republic (VSCHT)
- Walloon Agricultural Research Centre, Belgium (CRA-W)
- RIKILT – Institute of Food Safety, The Netherlands
- Joint Research Centre, Belgium (JRC)
- China Agricultural University, China (CAU)
- Provimi Holding, The Netherlands
- John Thompson & Sons Ltd, United Kingdom (THOMPSON)



Figure 2: Work Package 2 Participants are coming from 5 EU countries and China

Distillers Dried Grains and Solubles (DDGS)

- QSAFFE Work Package 2 will focus on the analyses of DDG and DDGS (Figure 3)
- According to the EU feed catalogue [1] Distillers Dried Grains (DDG) are the products of alcohol distilling obtained by drying solid residues of fermented grains (e.g. corn, wheat, barley). Distillers Dried Grains and Solubles (DDGS) are DDG to which pot ale syrup or evaporated spent wash was added.
- Besides the traditional source from breweries, DDGS are nowadays also produced from the fuel-ethanol industry
- DDGS are characterized by their high nutrient content (proteins, fat), since grain constituents other than starch are concentrated in the distillation residues [2]
- As a result of overgrowth of fuel-ethanol industry, DDGS became a global commodity (Figure 4) [2]



Figure 3: Different DDGS samples derived from corn

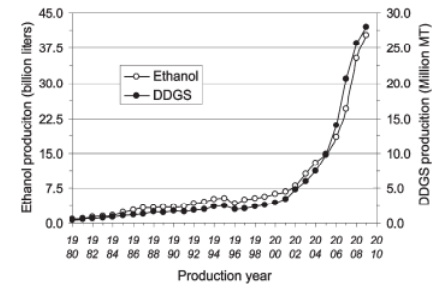


Figure 4: U.S. annual production of ethanol and DDGS, published by K. Liu [2]

DDGS analyses - different botanical and geographical origins

After checking of general applicability of the selected analytical methods, DDGS of different botanical origins (e.g. corn, wheat and barley) and different geographical origins (e.g. Europe, China, North America) will be analyzed (Figure 5). By this, different analytical approaches will be investigated for their capability to prove the authenticity of feed materials.

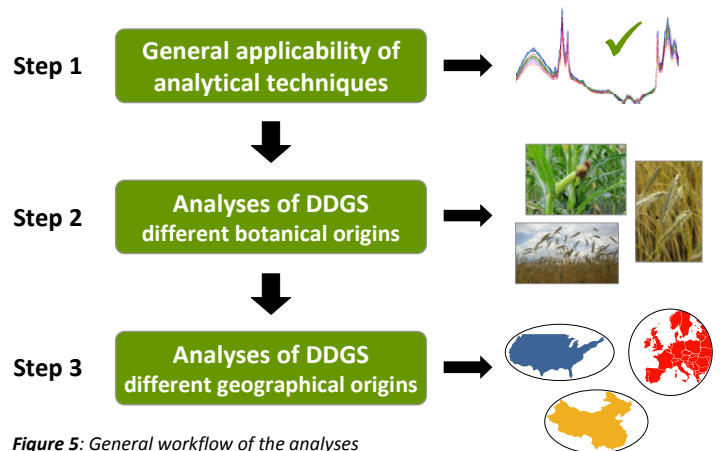


Figure 5: General workflow of the analyses in QSAFFE Work Package 2 with 3 steps

Literature

- [1] Commission Regulation (EU) No 575/2011 of 16 June 2011 on the catalogue of feed materials, Official Journal of the European Union L159/65, 2011.
- [2] Liu K. Chemical Composition of Distillers Grains, a Review. J Agric. Food Chem. 2011, 59, 1508-1526.