



# Workflow for the identification of 'unknown' substances in animal feed

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## Background

Regularly biological effects or instrumental signals are observed in animal feed samples that cannot be explained by the presence of a chemical substance that is included in targeted mass spectrometric methods. In order to identify the compound responsible for the biological effect or unexpected signal (the unknown substance), a workflow is developed based on multi-disciplinary research. This includes analytical chemistry (mass spectrometry, NMR), biochemistry (biosensors, bioassays, DNA analysis), physical chemistry (microscopy) and knowledge of bioactive compounds. The workflow was assessed using an artificial (left) and a real case (right).

## Workflow

The starting point of the search for 'unknowns' substances can be different: (a) a case from the field, for example negative health effects, (b) an observed effect in a bioassay and (c) a suspect signal in a chemical analysis, e.g. high resolution mass spectrometry.

Every case starts with a case manager, assembling a multidisciplinary team to solve the case. The interactive scheme helps the team to make decisions and provides information (articles, operational procedures etc.). When closing a case, a report is created showing the applied approach, expert discussion, results and evaluation of the approach. A structured report will help solving cases in the future more efficient.

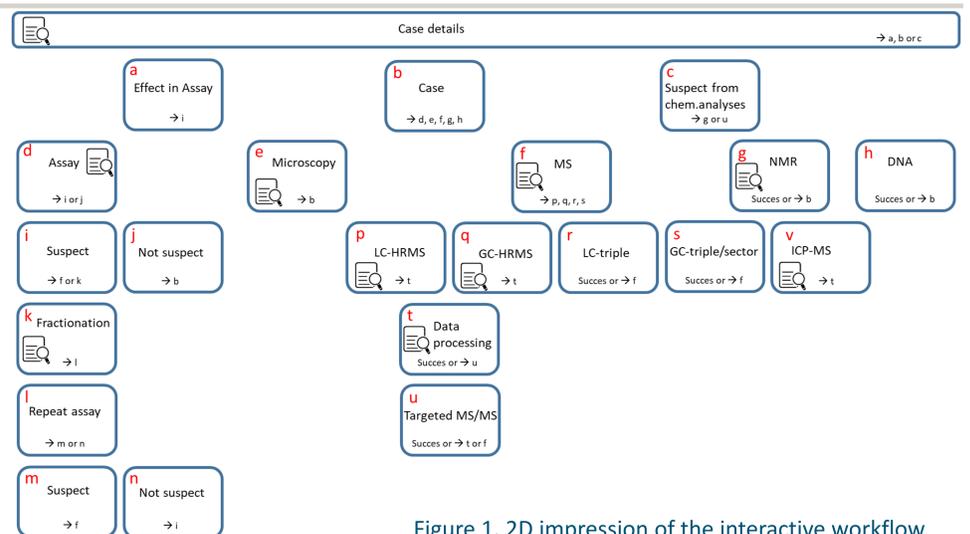
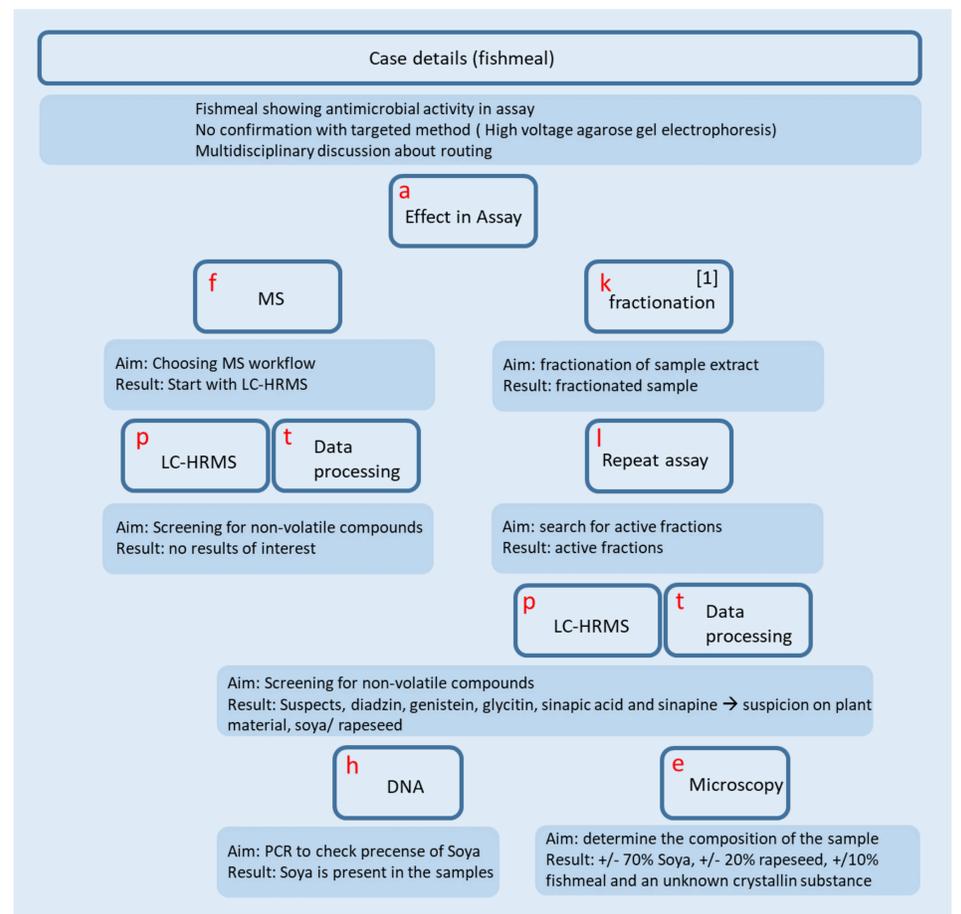
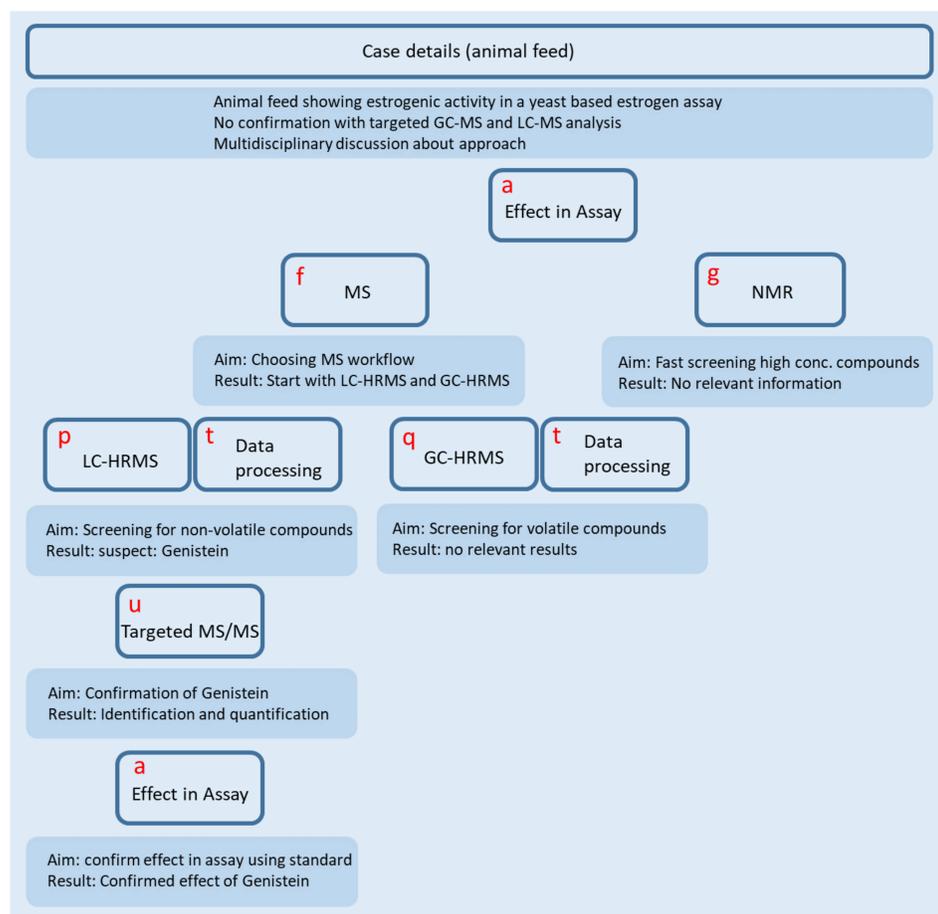


Figure 1. 2D impression of the interactive workflow

## Assessment of the workflow

The followed approach of two cases is shown below. The first case (left) is an artificial case (animal feed). The second case (right) is a real case (fishmeal). The artificial case is successfully finished. The real case is still ongoing, but the first very interesting results are presented.



## Conclusions

The identity of the 'unknown' substance in the artificial case was successfully confirmed. The real case is still ongoing. So far, it is clear that most of the "fishmeal" sample consists of soya and rapeseed (fraud). Further research will focus on the fraud and isolation and identification of the crystallin substance. We experienced that the success rate of identification of the unknown substance increases when multidisciplinary research is applied in which biochemistry, analytical chemistry and physical chemistry are combined.



## References

## Acknowledgements