

# IAG section Feed Microscopy

Newsletter 2019



Dear colleagues and relations,

The year 2019 can be characterised by two developments: circular economy and microplastics. The European Commission has just launched its Green Deal, which would have impacts on all sectors of society and life. One element is to develop and promote a circular economy in all sectors of production. The precise implementation in a range of industrial sectors, however, is different from a circular agriculture or a circular production of feed and food. For example, reuse or refurbishing of car components, batteries or building material is different from the retention options in feed and food production. A range of by-products of the first phases of the food production finds historically its way in compound feed. Challenges are the application of by-products which remain in phases closer to the end-user, such as bakery by-products. Mixed by-products containing (even traces of) animal proteins are generally prohibited as feed ingredient. However, solutions are needed for really closing the loops. Major hazards originate from the domains of biology (swine fever, mad cow disease) and physical entities (packaging material). Here, visual inspection is an important measure for a further introduction of circular agriculture. The examination for animal particles is a classical but still important example.

There is a recent boost in attention to microplastic. The editorial of last year's Newsletter was attributed to microplastic. A lot of new information was collected and published this year. Basically detection is a matter of visual, or to be precise, microscopic examination, but identification would be based on spectroscopic methods. Gains in insight for quality assurance of monitoring methods are achieved as well. Besides major challenges for prevention of further pollution and for characterisation of putative hazards, the combination of the best of different analytical domains demands creative innovations.

This Newsletter will touch several issues. There is more to follow and IAG section Feed Microscopy will show up at several occasions with these and other issues.

The board of IAG section Feed Microscopy wishes you a pleasant time reading this Newsletter.

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## Presidents address

Dear colleagues,

It is with great pleasure that I take the opportunity to address this “End of Year Greetings Letter 2019” to you, this year –again- in the frame of the Newsletter.

In my point of view, the following subjects highlighted the year 2019:

### *Activity of the board:*




On the topic of animal protein method revision, the opinion of the board was considered by the EURL-AP (allowed by EC) in producing their final version of the method in February.

Also, the animal protein-NRLs with a national network were contacted with the question to cooperate in the organisation of the annual IAG Proficiency Test on animal proteins and possible improvement for their purposes, in order to support those networks. The result of this small inventory is that the relevant NRLs will organise their own quality support, and the current participants are happy with the situation and do not need any changes.

Our aim was also to finalize the work on the Ambrosia method and on the IAG Homepage.

The scientific officer produced training samples for packaging material and organized 2 ring tests.

-The board had its first meeting in Krefeld on 3.4.19 with the purpose of:


-  preparing the Annual Meeting (contacting members for presentations, sharing tasks and presentations among the board members)
-  discussing the possibility to prepare an IAG presentation for the Feed Conference in 2020, possibly on packaging material (does it have an influence on our RT schedule?)
-  defining other scientific tasks (minimum information necessary on Ring Test reports, validation of methods).

### *Activity of the association – Annual Meeting:*







Our IAG Annual meeting was a success again, with 40 participants from 11 countries, 18 scientific presentations, 2 guided excursions and a lab visit. The organization, timing and hosting was perfect with the great help from the LAVES group in Stade. An active participation of our members in all our activities contributed to a most interesting meeting. Thank you !

In our round table of presentation, the new hazards –packaging material and micro-plastics- was a recurring topic. Several participants announced monitoring programs and mentioned the need for standardized methods and proficiency testing in this up-coming field. But, the traditional demands are still present: ergot, ambrosia, animal protein, purity, composition and verification of the declaration. Some institutes deal with problematic hays, others with faeces and wood in feed. Some of our participants also analyse food or fertilizers on top of analysing feed, which brings us to discuss problems over the whole food chain.

Thanks to scientific and illustrated presentations and discussions, our proficiency as experts is maintained and improved in fields as diverse as:

-  adjusting our techniques to particular matrices, such as extruded products (hydrolysed starch),



-  being aware of the climate changes and their consequences (new invading plants; hay quality)
-  establishing measurement uncertainties and detection limits in visual methods
-  following the development in the European regulation and standardized methods
-  supporting flexibility and synergies (combination and scheme of methods; screening versus targeting) when facing new problems
-  using our knowledge of matrices to give advice in sampling and sample handling
-  combining information from the most different backgrounds (botanists, veterinarians, chemists, legal experts, feed producers, lab technicians, etc...)

All presentations as well as the ring tests reports will be summarized later in this Newsletter.

In accordance with the IAG rules, an election round happened in 2019. Two members of the board (the scientific officer, Leo van Raamsdonk, and the website manager, Jeroen Vancutsem) were re-elected for 4 years.

Year 2020 will be very interesting with the possibility to attend and participate actively in the Feed Conference in Vienna in June, and our Annual Meeting on the 8-10 September in The Netherlands. The Annual Meeting will be completed with a half-day of practical workshop.

Hoping to see all IAG members actively participating in our many specialities, I wish you all a very good start in 2020!

Yours sincerely

Geneviève Frick



*Participants of the annual conference in Stade, June 2019.*

## Editorial: quality assurance



Safety is an intrinsic part of the production of feed and food. The different domains of the disciplines of monitoring and detection methods demands different principles for quality assurance and control. Analytical chemistry is intensively explored and applied and guidelines are well available. Molecular biology is applied for (micro-)biological issues. Monitoring of physical items is partly based on visual observations, including but not limited to microscopy. In terms of actual monitoring, visual methods includes targets or contaminants such as bone fragments or other particles of animal origin, botanic ingredients, starch grains, pollen, plant seeds, spore bodies of moulds (sclerotia), or “Besatz”.

Methods for visual or microscopic examination include other assumptions than those used in analytical chemical methods. This has several reasons.

Inhomogeneity plays a different role because the units to be detected are large in the view of their logic visibility. The resulting minimum size of the detection unit is in principle larger than  $1\ \mu\text{m}$ , so many times larger than chemical molecules. The a-priori presumed consequence is a larger variation among replicates compared to chemical methods at comparable contamination levels. Principally the entire sample is examined when applying non-microscopic visual methods for sample material exceeding approximately 1 mm (Regulation (EC) 152/2009, Annex II). Test portions are usually not applied for these samples. This implies that measurement uncertainty is not an issue in those cases: the result applies to the entire sample. In the last years, however, a methodology has been developed for examining only a subsample for targets in the millimetre range or larger (weed seeds, sclerotia, etc.). The consequence is that measurement uncertainty resulting from unavoidable inhomogeneity needs new principles of evaluation. A first presentation of these specific issues was given in the IAG section Microscopy Newsletter of 2018. Other parameters such as sensitivity will need a dedicated framework for evaluation as well. The sensitivity of visual methods is in the ppm range or higher ( $25\ \text{ppm} = 0.0025\%$ ). Levels in the ppb range can be assumed to be below the detection level.

Counts or numbers are the principal result of all monitoring methods in the domain of visual or microscopical research. In those cases that particles can be handled physically, the selected materials can be weighted and a derived parameter in percentage (w/w) can be reported. In the micron range (microscopy) physical handling is not an option and the counts remain as only result. As a consequence for **Accuracy**, frequently applied parameters such as level of detection and level of quantification cannot be applied automatically. Their functionality needs to be evaluated and





established at first. An example of the relationship between pre-treatment and the final result in terms of numbers, influencing the applicability of a limit of detection, was evaluated and reported in the report of the IAG annual proficiency test for animal proteins in 2014<sup>1</sup>. Statistical analysis of results can deviate from the usual procedures. Also the parameters for **Precision** need a modified definition. Repeatability and reproducibility have to be replaced by the parameters accordance and concordance, adopted from the domain of microbiology. Concordance was recently applied to the data of the IAG proficiency test animal proteins 2019, with a design identical to that of the test of 2018. The procedure and results are discussed in the report of the test on animal proteins of 2019. The summary is included in this Newsletter.

There is no device that provides the identity, such as a mass spectrometer or Biacore reader, in the vast majority of cases. The detection and identification is performed by the microscopic technician based on knowledge and experience. In all cases the performance of the method and the performance of the technician has to be addressed separately. Both aspects contribute to the quality of a visual method, but in their own way.

This synthesis of the discipline of visual research and microscopy indicates the need to develop dedicated quality standards. The first bits and pieces have been collected this year, and the actual development of a Quality Guideline is planned for next year. These guidelines will include quality assurance and validation of methods. Besides this, quality control of the daily application of methods will get attention.

## Workgroup quality guidelines

The development of Quality Guidelines needs to be based on a broad knowledge and experience of experts. Therefore, a working group will be started, under the coordination of Wageningen Food Safety Research.

The members of this group will be involved in the preparation of one or more drafts of future Quality Guidelines. It is the intention to organise a workshop next to the annual meeting of IAG section Feed Microscopy in September in the Netherlands. This workshop could include two half days, one for exchange of information and points of view, and a second half day for making choices and decisions. It is intended to prepare a final version at the end of 2020.

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<sup>1</sup> L.W.D. van Raamsdonk, V.G.Z. Pinckaers, I.M. Scholtens, T.W. Prins, H. van der Voet, J.J.M. Vliege. IAG ring test animal proteins 2014. Report 2014.011. RIKILT, Wageningen, pp. 47.  
<http://edepot.wur.nl/323884>



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## The annual conference of IAG section Feed Microscopy 2019

### Opening

#### ***Introduction to the Lower Saxony State Office of Consumer Protection and Food Safety (LAVES), Stade (Dr. Lutz Bötcher & Dr. Ragna Schadewaldt)***

LAVES was founded in 2001 and has six testing institutes in the whole of Lower Saxony. In LAVES, round about 900 employees are involved in consumer protection. They are entrusted with tasks in the areas of food and utensil inspection, feed inspection, meat hygiene, veterinary drug monitoring, eradication of animal diseases, disposal of animal by-products, animal welfare, ecological farming, market surveillance and technical process monitoring.

#### ***Round-table discussion "What happened last year?" (All)***

The participants presented shortly their main findings from the past year.

#### ***Problematic Hays (Geneviève Frick)***

A study on hay contamination was organized in Switzerland in 2016 and 2018. A method for analysis was developed by Agroscope. The method focusses on the presence of *Colchicum* (autumn crocus), *Senecio* (ragwort) and plants present in higher concentrations (1-2%). 4 cases were presented: a sample with the presence of *Rhinantus* (rattle), a hay with 2% *Lathyrus* and 1% *Vicia*, a hay with a strange odour, possibly caused by added biogas residues that was refused by pony's and a second cut hay from which two cows died.

#### ***Regulation (EU) 2017/625 and consequences for IAG-methods (Jeroen Vancutsem)***

A presentation on the possible impact on the use of IAG-methods by implementation of regulation 2017/625 was given. The status of IAG-methods was also discussed. As a conclusion it can be stated that no problems are expected for the use of existing IAG-methods.

#### ***Microscopic analysis of extruded fish feed - limitation and possibilities (Piotr Czajkowski)***

The extrusion of feeds is mainly used for fish feed. After extrusion ingredients are much more difficult to identify.

#### ***Packaging materials in official feed samples from Lower Saxony (Tina Eggers)***

An overview from 2013-2019 of the results on analyses of packaging materials was given. In total 454 samples were analysed and in about 1/3 of the samples packaging materials were detected of which 91% with a content <0,05%. In recycled feeds more often packaging materials were found and in recent years an increase of the presence of hard plastics is found.

#### ***A lawsuit concerning a microscopic result (Dr. Renate Krull-Wöhrman)***

The history of a lawsuit concerning a sample with *Ambrosia* contamination was presented.

#### ***Authenticity of spices (Leo van Raamsdonk)***

Some examples of fraud in spices were given:

- organic *Althaea* (marshmallow) root with 60-70% root of *Atropa belladonna*
- adulteration of curcuma with maize starch
- adulteration of saffron with safflower and crocus

Problems were detected with 78% of the saffron, 73% of the black pepper and 55% of the nutmeg by adulteration with other plant material, sand, or foreign starch

#### ***Marble wooden chips declared it free of coniferous tree (Lotte Hougs)***

A method for the identification of marble chips was presented. The method enables to identify coniferous marble chips with an LOD of 0,1%.

A question on the determination of the measurement uncertainty on ergot analysis was also raised.

***Proficiency test animal protein (Leo van Raamsdonk)***

See further in this newsletter.

***Research and development of methods other than microscopy for PAP detection and characterisation (Olivier Fumière)***

The PCR methods for the detection of porcine and poultry PAPs in feed are validated but not yet published until the legislation will be adapted on demand of the European Commission.

Research on protein extraction, selection and detection for PAP-detection with LC-MS is ongoing.

***Quality control of microscopic methods (Leo van Raamsdonk)***

See further in this newsletter.

***Questions of IAG-participants to the board (Geneviève Frick)***

Q: Is identification of asbestos fibres in feed additives with clay necessary?

A: Until now identification of the observed particles is not necessary.

Q: Which directives should be followed when insects in feed are found?

A: At LAVES samples are analysed for compliance with hygiene legislation (EU-regulation 183/2005)

***IAG-affairs, election, PT schedule (Leo van Raamsdonk)***

See further in this newsletter for PT organisation.

***EURL-AP Validation study on an insect PAP isolation method (Pascal Veys)***

The EURL-AP organised a study in which insect particles were isolated by a double sedimentation with PE/TCE.

***Proficiency test composition of feed (Leo van Raamsdonk)***

See further in this newsletter.

***Summary of the EURL-AP PT 2018 and EURL-AP workshop 2019; (Geneviève Frick)***

An overview was given of the EURL-AP PT 2018. In one of the samples starfish was added. The results of the PT are published on the website of the EURL-AP. An overview of the EURL-AP meeting was also given.



Stade.





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## Annual ring test animal proteins 2019

L.W.D. van Raamsdonk, B. Hedemann, C.P.A.F. Smits, T.W. Prins, J.J.M. Vliege, 2018. *IAG ring test animal proteins 2019*. Wageningen, Wageningen Food Safety Research, WFSR report 2019.015. 31 pp.; 7 tab.; 16 ref.

The annual proficiency test for the detection of animal proteins in animal feed of the IAG - International Association for Feeding stuff Analysis, Section Feeding stuff Microscopy was organized by Wageningen Food Safety Research, The Netherlands. The aim of the proficiency test was to provide the participants information on the performance of the implementation of the monitoring methods for their local quality systems. A further aim was to gather information about the current practices in the application of the microscopic method. The current 2019 version of the IAG ring test for animal proteins addressed all analytical sections of the methods for microscopy and PCR as published in Regulation (EC) 51/2013 amending Annex VI of Regulation (EC) 152/2009 together with accompanying SOPs.

Three of the four samples used in the proficiency test contained poultry material at the legally required technical limit (0.1% w/w; Regulation (EC) 152/2009), or fish meal at a spike level of 2% (w/w), or both. A fourth sample was left blank. A pig feed, containing 3% (w/w) of bakery by-products and a ruminant feed were used as matrix. None of the samples was labelled as fish feed.

A total of 44 participants subscribed to the proficiency test animal proteins. Two participants did not submit their results and one submitted PCR results only, leaving 41 sets for microscopic evaluation. 18 sets of ruminant PCR results were submitted as well.

### **Microscopy**

All participants were requested to determine the presence or absence of land animal and/or fish, to indicate the type of material found and to describe the method used to achieve these results.

In total eight participants (19.5% of 41 participants) deviated from the official method by applying an incorrect number of determination cycles and/or drawing incorrect conclusions (e.g. "presence" for five particles, "absence" for ten particles). Therefore, all evaluations were based on the actual number of particles reported by all participants.

Incorrect positive results (positive deviations) were expressed in a specificity score and incorrect negative results (negative deviations) were expressed in a sensitivity score. An optimal score is 1.0. The results are analysed in two ways: numbers below threshold (between 1 and 5 particles per determination cycle inclusive) have been considered positive (complying to the zero tolerance) and as alternative considered as negative (for matching the official evaluation).

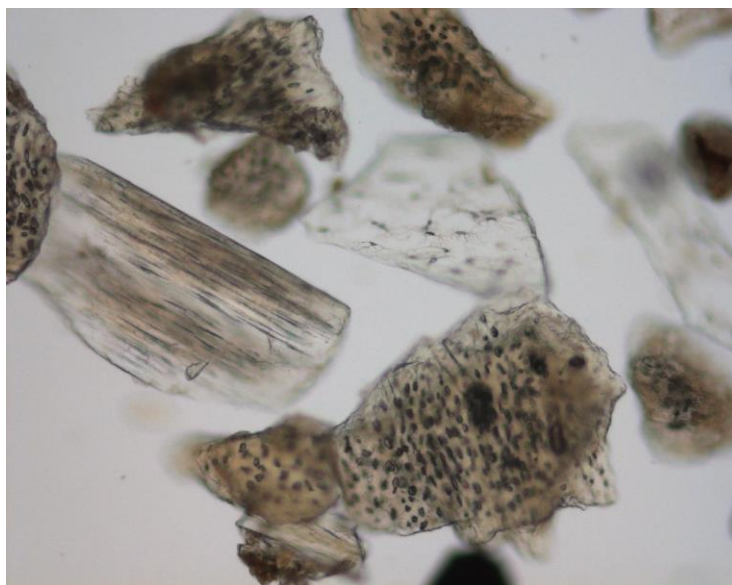
For all samples several participants did not detect terrestrial animal particles in the presence of fish meal (sensitivity 0.95) in contrast to the optimal result in the absence of fish meal (1.0), or erroneously reported terrestrial animal material when absent (specificity 0.93 and 0.90 in the presence or absence, respectively, of fish material). The absence of fish material in the presence of 0.1% poultry PAP resulted in a specificity score of 0.90. 37 institutes participated in both in the 2018 and 2019 studies. Based on their results an intra-laboratory reproducibility, expressed as concordance between 2018 and 2019 was calculated. Especially for the results representing specificity low concordance was found. This indicates wrong observations seemed incidental in most cases.

The documentation for and training of microscopists for correct identification of particles of animal origin would deserve further attention in order to guard specificity and avoid incidental errors.

Evaluation of several aspects of the application of the current microscopic methods would be beneficial for improving harmonization among the laboratories applying the microscopic method.

### **PCR**

In the two samples without addition of ruminant PAP, but still containing the bakery by-products, ruminant DNA was detected by qPCR as far as analysed by the majority of the participants. The list of recognised sources such as milk and milk products, and ruminant gelatine can be extended with bakery by-products, which is important for the recycling of food by-products.



*Bone fragments of cod (left), herring (upper right) and chicken (below).*

## **Annual ring test composition 2019**

L.W.D. van Raamsdonk, C.P.A.F. Smits, J.J.M. Vliege, 2019. *IAG proficiency test composition 2019*. Wageningen Food Safety Research, WFSR report 2019.014.

A proficiency test was organized for the microscopic determination and semi-quantification of botanic ingredients in the formulation of an animal feed, in the framework of the annual proficiency tests of the IAG - International Association for Feeding stuff Analysis, Section Feeding stuff Microscopy. The organizer of the proficiency test was Wageningen Food Safety Research, The Netherlands. The aim of the proficiency study was to provide the participants information on the performance of the local implementation of the method for composition analysis of feed.

The current proficiency test was focusing on label control of a ruminant feed. Results were considered under- or overestimations when exceeding the limits of the IAG uncertainty interval model.

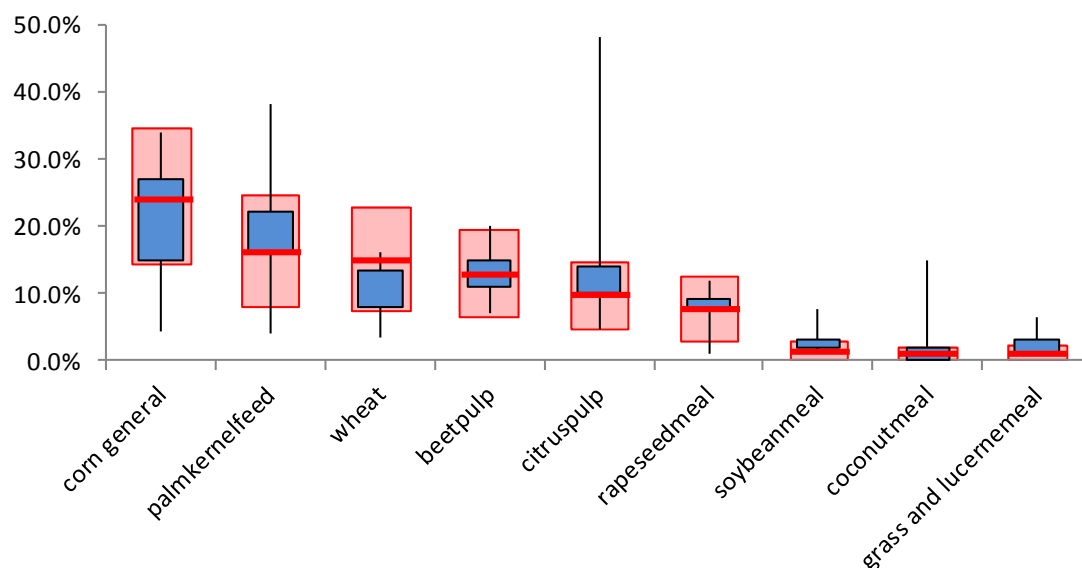
A total of 22 sets of results was returned.

The formulation as declared by the label showed the correct composition. The reported shares of the ingredients with a lower limit in the IAG estimations model higher than zero were within the limits of the uncertainty model in 87.9% of the total number of estimations. The correct estimations of all reports of the shares of nine ingredients is 80.3%. Six out of 22 participants delivered an errorless composition, which is 27%. Besides this, six participants made one error, three made two errors and two participants made three errors. There is no clear correlation with the method applied. Only three participant reported an indication of the correctness of the label. The current information on the



capability of botanic composition analysis reveals that this technique is valuable as part of the enforcement of feed and food safety.

The current lack of a complementary system for the analysis of chemical composition (ash, proteins, fat, dietary carbohydrates, fibres, etc.) could be a drawback for the overall performance of the technique for botanic composition analysis. Besides a proper method description and up-to-date descriptions of ingredients, well developed skills of technicians are vital for a good performance. The use of an expert system as tool for maintenance and dissemination of expertise might improve future performance.



*The results of the IAG proficiency test composition 2019. Y-axis: share of ingredient. Blue bars:  $P_{25} - P_{75}$  percentile interval, vertical line: minimum – maximum range. Red background: upper and lower limit interval of the IAG uncertainty model, horizontal red line: share of the ingredient.  $N=22$ .*

The analysis of composition in terms of ingredients is important for detecting economic fraud and for monitoring feed safety. Botanic composition analysis and label control of feed is regulated in Regulation (EC) 767/2009. This technique can support traceability (Regulation (EC) 178/2002), for detection of fraud (Regulation (EC) 882/2004; Decision (EU) 2015/1918) and for categorization (Regulation (EU) 1308/2013; Regulation (EU) 2016/1821). In a broader view, composition analysis in the entire food chain can improve the effect of monitoring actions. The legislation on food labelling (Regulation (EC) 1169/2011) obliges to provide more detailed information to customers on composition and related topics.



## Scheme of ring tests 2020

The IAG section Feeding stuff Microscopy organizes annually several ring tests for the evaluation of composition or detection of prohibited constituents in animal feed. The board of the IAG section Feeding stuff Microscopy and WFSR have agreed to organize together the 2020 ring test for the following situations:



- Test IAG-2020-A. Detection of the presence of animal proteins in a set of four samples. This test was already organised by WFSR in previous years (see abstract in this Newsletter). Targeted protocol: Regulation (EC) 152/2009, consolidated version of February 12, 2013. Cost for participation: € 275.
- Test IAG-2020-B. Declaration of the composition of a compound feed (one sample). This test was organised from 2014 on by WFSR as well (see abstract in this Newsletter). Targeted protocol: IAG method A2. Cost for participation: € 75.

Proposed test:

- Test EURL/IAG-2020-C. It is the intention to organise a test with two samples of cereals containing certain levels of ergot sclerotia. This PT will be organised in cooperation with the EURL myco- and plant toxins, hosted by WFSR. A final decision has to be made on details of the organisation. Intended costs: € 150.

The single sample for the composition test will be part of the animal protein test. On behalf of the IAG section Feeding stuff Microscopy, WFSR will invite you for participation in these ring tests. WFSR will encourage you to subscribe to all three tests, although this is not mandatory. Participation in all three tests would cost € 500; in this case a discount of 10% will be granted, resulting in a total cost of € 450 for the total set of three tests.

The samples for test IAG-2020-A and IAG-2020-B will be sent around April 2020. Also a questionnaire will be sent by E-mail, together with instructions and relevant documentation on protocols. A time slot of four weeks is planned for the analyses of the samples by every participant. This means that early May all results are expected to be returned to WFSR. The samples of test IAG-2020-C will be sent in autumn and results need to be reported before the end of the year. All results are intended to be reported at the annual meeting of the IAG working group Microscopy in the Netherlands in September 2020 (tests A and B) or in 2021 (test C). The final reports will be published later in either 2020 or 2021. All communications of the evaluation will be fully anonymous.

If you are interested to participate in one or more ring tests, please return the application form, which accompanies this newsletter, to [leo.vanraamsdonk@wur.nl](mailto:leo.vanraamsdonk@wur.nl). **Subscription closes Saturday February 29<sup>th</sup>, 2020.** You are requested to make a payment after receiving the invoice from WFSR. Make sure that the reference number, your name and your institute's name are mentioned upon payment. This information is necessary to avoid loss of payments that cannot be linked to participating institutes.

*After submitting the application form, the participation for PT 2020-A (animal proteins) and for 2020-B (composition) is final. For PT 2020-C (ergot sclerotia in cereals) the intention to participate can be expressed. All intended participants will be contacted for approval after a final decision on details is made. The cooperation of IAG with a EURL in the organisation of a PT is unique and negotiations need to be worked out carefully.*





## Feed conference 2020, Vienna.

On behalf of the Austrian Agency for Health and Food Safety (AGES) it is an honour to welcome you to the 7th International Feed Conference 2020 in Austria. The conference will be held at AGES headquarters in Vienna from 24th to 25th of June 2020.



**Feed2020**  
International Feed Conference  
Vienna, Austria | June 24-25, 2020

Feed2020 is the seventh in a series of conferences held biannually and has been initiated by the European Union's leading reference laboratories and research institutions in animal feed.

The availability of sufficient and safe feedingstuff is a key challenge in modern agriculture. While the challenge of undesirable substances in feed remains a major issue, the globalisation of the feed business has further reinforced the need for efficient tools for traceability of feed ingredients. Moreover, the constantly increasing demand for food from animal origin, along with limited resources triggers the need for evaluating new sources of feed ingredients such as insects and efficient feed production. Additionally, the impact of climate change on feed production should also be taken into account. Keeping the feed safe and sustainable therefore requires a multidisciplinary approach, bringing together all stakeholders, including the industry.

With the six different topics of this International Feed Conference, the organizers tried to cover the current interesting areas for animal feed:

- Feed safety
- Quality of feed including feed processing
- Feed fraud and feed authenticity
- Impact of climate change on feed production
- Sustainability and circular economy in the area of feed
- Impact of feed on animal health and welfare

For further information on the selected topics see „Scientific program“

In today's world, sharing of scientific knowledge, research findings, laboratory methods and strategies within the scientific community has become a necessity. The aim of this conference is to bring scientists, researchers, laboratory personnel, policy-makers from governmental and non-governmental organizations and people from industry on a single platform where they can share their knowledge, scientific experiences and experiments on subjects crucial to animal feed. With the participation of international experts, we hope that productive discussions will stimulate new creative ideas to translate new discoveries into better practice and application.

We look forward to your active support and participation by submitting an oral presentation or poster.

Register now for the Feed2020 and join us as we look at the emerging topics in Feed Science.

Language: The conference will be in English. No interpretation will be provided.

**Visit the Feed Conference from June 24 to 25, 2020. Further information is available at**

**<https://feed2020.ages.at>**





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## Closing remark.

Dear reader,

We hope that you enjoyed reading the articles in this Newsletter. Even more, we hope that the included information will be useful for all your activities in the coming year. The board members, and naturally all other members, of IAG section Feed Microscopy will help to answer your questions. So, you are invited to contact us. We wish you Merry Christmas and a prosperous New Year.

Board of IAG section Feed Microscopy.

# Save the date!

The next annual meeting of IAG section Feed Microscopy will be held on:

**Tuesday 8<sup>th</sup> to Thursday  
10<sup>th</sup> of September 2020.**

Together with MasterLab (Nutreco) the IAG-board will cordially invite you to join the annual IAG-meeting – organized by MasterLab in the Netherlands – The organization of this meeting is just in the beginning. Information about the place and location will be published as soon as possible!



Take this great opportunity to meet your colleagues, to participate in exchange of information and discussions on relevant issues of an important area of monitoring.

The official invitation letter by our colleagues of MasterLab and the official agenda of the IAG-Meeting will be published by time.