RIBMINS

Risk-based meat inspection and integrated meat safety assurance

Newsletter

Issue no. 3 - January 2023

RIBMINS network during the project conference in Córdoba (Spain) in April 2022.

A word from the RIBMINS leaders

Welcome to the third RIBMINS newsletter. We are now in the fourth and last year of our COST Action, and we have made interesting progress in our work.

This issue brings an update of our achievements during 2022 and plans for 2023, as well as interviews with several stakeholders. Currently, we are delivering this COST Action mainly in a hybrid format. We hope to meet you physically or online at some of our events planned for the last year.

RIBMINS as an EU COST action will end in September 2023. We intend to keep the network going in the future and continue our joint work on the development of risk-based meat safety assurance systems.

Bojan and Lis

Bojan Blagojevic, Chair
University of Novi Sad, Serbia.

Lis Alban, Vice-chair
Danish Agriculture and Food Council, University of Copenhagen, Denmark.

Content

Upcoming events 2023

- 26-27 April 2023, Brussels, Belgium
  Stakeholder meeting (on-site)
- 29-30 March 2023, Bucharest, Romania
  Final RIBMINS conference (hybrid)
- 13-16 June 2023
  Training school (online)

  Check up for updates here

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Edited by: RIBMINS

Update on work in progress 2021-2022

▶ WG1 - Scope and targets of meat safety assurance system (MSAS)

Leader: Ivar Vågsholm (Swedish University of Agricultural Sciences, SE), vice-leader: Simone Belluco (Istituto Zooprofilattico Sperimentale delle Venezie, IT)

WG1 activities have been focused on discussing and divulgating topics related to MSAS scopes, responsibilities and relevant elements within the WG, and also across the WGs and to the scientific communities through scientific publications and the COST Action conference in Cordoba. The most relevant topics include: the role of food chain information across MSAS, private standards, vertical integration of the meat supply chain, identification of cost-effective ways to monitor and handle residues of antimicrobial origin along the chain, and also *Salmonella* epidemiology in the pork chain and *Toxoplasma gondii* risk-based control options in MSAS.

▶ WG2 - Controls and risk categorization at farm level

Leader: Diana Meemken (Free University of Berlin, DE), vice-leader: Truls Nesbakken (Norwegian University of Life Sciences, NO)

In WG2, two systematic literature reviews on the effectiveness of pre-harvest meat safety interventions in pigs and broiler have been published in peer-reviewed journals. A systematic review with reference to relevant zoonotic pathogens in bovines is currently being completed. Publications on the status quo and proposals for improvement of food chain information and harmonised epidemiological indicators in broilers, pigs and cattle will also be produced. In 2023, a virtual training school on MSAS will be organised, with a special focus on risk categorisation of farms and abattoirs.

▶ WG3 - Abattoir level controls and risk categorization of abattoirs

Leader: Dragan Antic (University of Liverpool, UK), vice-leader: Kurt Houf (University of Ghent, BE)

Three papers in scientific journals have been published from the ongoing work. A virtual training school on farm and abattoir interventions was organised by WG2 and WG3 and held online in June 2022. A survey of European competent authorities, on the current situation regarding risk categorisation of abattoirs in Europe, was successfully completed with >50% response rate and the results will be published in the forthcoming special issue of Food Control based upon RIBMINS activities.

▶ WG4 - Impact of changes and alternatives to traditional meat inspection

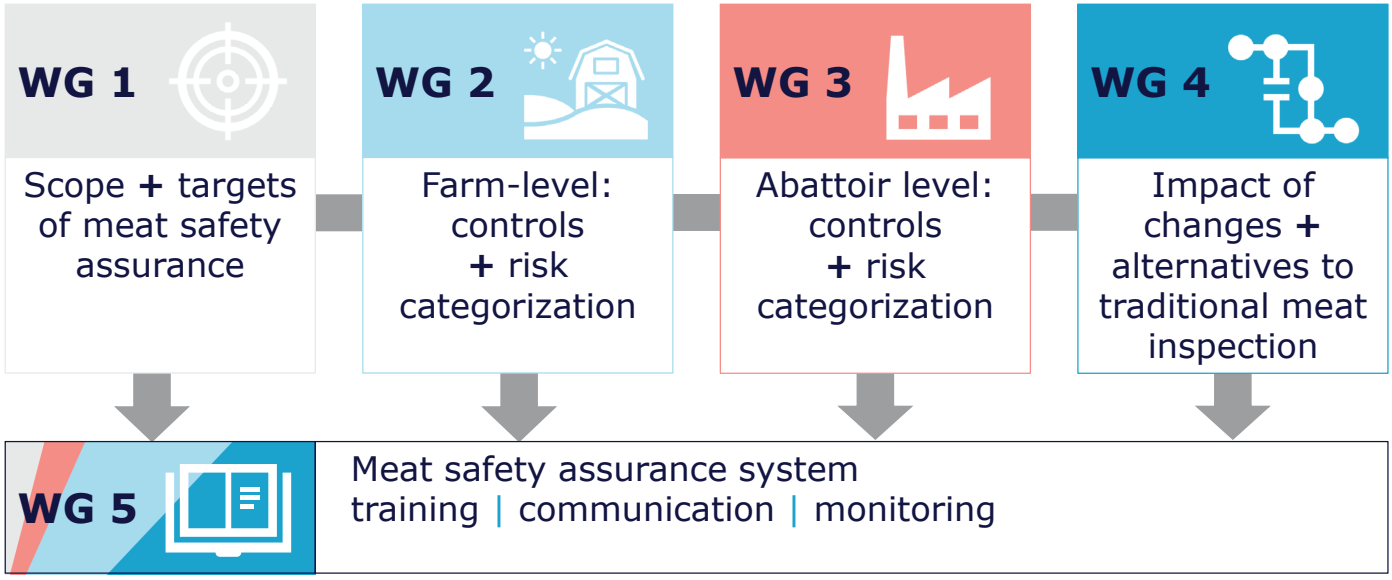
Leader: Ole Alvseike (Animalia, NO), vice-leader: Miguel Prieto-Maradona (University of Leon, ES)

During year 3 of RIBMINS, WG4 arranged one meeting in Madrid exploring new visions for MSAS, and another meeting in Helsinki focusing on best practices in zoonotic surveillance and control programs. Three scientific papers have been published, describing variation in meat inspection practices in Europe. Another paper addressed how legislation can become more innovation-friendly. Two systematic literature reviews are ongoing addressing benefit-cost analyses of MSAS tools and surveillance and control systems. Moreover, several new first authors with Pan-European and overseas co-authors of RIBMINS members have worked in new constellations.

▶ WG5 - Meat safety assurance system, training, communication and monitoring

Leader: Sophia Johler-Illic (University of Zurich, CH), vice-leader: Claudia Guldimann (Ludwig-Maximilian Universität München, DE)

During 2022, WG5 has intensified communication and outreach efforts. A survey assessing the demographics and training needs of official veterinarians (OVs) in Europe has been conducted and answered by 1,790 OVs from 30 countries. In addition, a live document providing an overview of RIBMINS training materials in meat safety assurance systems was established and is constantly being updated in collaboration with WG1-WG4. To make the risk-based meat safety assurance system (RB-MSAS) easily accessible to OVs, WG5 members have also submitted for publication a review manuscript that outlines key concepts.



Short Term Scientific Missions (STSM) 2021-2022

STSM are funded institutional visits that aim at supporting mobility and collaboration between individuals and institutions, while contributing to specific objectives of the project. Three STSMs were conducted in 2021 and 2022.

STSM experiences

Theofilos Papadopoulos
University of Cartagena, Spain

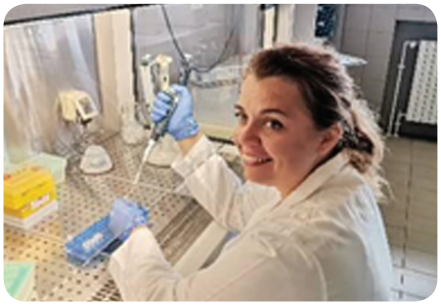
STSM at Aristoteles University (18th August - 8th September 2021)

"The main objective of this STSM was to get experience in traditional and molecular methods used in isolation, typing and subtyping Staphylococcus aureus (SA) and Methicillin resistant Staphylococcus aureus (MRSA) to perform Quantitative Microbiological Risk Assessment (QMRA).
The work conducted by Prof. Daniel Sergelidis' group was highly relevant to the project I was involved at EFSA, and I thought that this was a great opportunity for me to apply for an STSM. During my stay at Thessaloniki, I received guidance on the entire workflow process regarding sampling, isolation, typing and subtyping of SA and MRSA.
I also collaborated with Official Veterinary Surgeons from the State Region of Central Macedonia and visited one abattoir to perform sampling from small ruminants' nasal cavities. This trip was incredibly useful for me as I gained experience in performing baseline studies for QMRA."

▶ Read more about Theofilo's experience

Weronika Korpysa-Dzirba
National Veterinary Research Institute, Poland

STSM at the University of Turin (6th-16th June 2022)



"The aim of the STSM was to learn how to perform molecular detection of Sarcocystis spp. in cattle and wild boars. It was a great opportunity to enrich my knowledge about Sarcocystis spp. and to be able to implement analysis on this parasite's prevalence. The training was conducted during the routine laboratory work that is daily performed in the Laboratory of Inspection of Food of Animal Origin, which allowed me to observe also other analyses performed in this unit. This training gave me the possibility to meet experts in the field of Sarcocystis spp. analysis and there was time for interesting and inspiring scientific discussions. It was also an opportunity to start a collaboration which, in the future, may result in scientific publications and international projects."

▶ Read more about Weronika's experience

Coral Barcenilla
University of León, Spain

STSM at Teagasc (30th June-30th August 2022)

"The main objective of the STSM was to explore the use of long read sequencing (Oxford Nanopore Technology - ONT) to characterise class I integrons on complex microbial communities sourced from various environments of the meat production chain. During the training, I have successfully fulfilled the research aim of the project and acquire experience in terms of sequencing knowledge. In addition, new useful insights were gained regarding bioinformatic analyses performed with long read amplicon-sequencing data. I am grateful to RIBMINS COST Action to give me the opportunity to carry out this work, and to all the people that helped me during the stay. I would also like to encourage other young researchers to take part of this stimulating opportunity, which will be very enriching from a professional and personal point of view."

▶ Read more about Coral's experience

2nd RIBMINS Scientific Conference

The 2nd RIBMINS Scientific Conference took place on 7-8th April 2022 in Córdoba (Spain).

After two years of online meetings, the network met on-site, a long-awaited moment that was very much enjoyed by attendees. The University of Cordoba, under the lead of **Prof. Elena Carrasco Jiménez**, organised the conference following a hybrid format, also allowing participants to join online. A total of 143 participants (59 live, 84 online) from 36 countries (33 European, New Zealand, USA and Brazil) participated in this event. The conference program, book of abstracts, presentations and posters are accessible **here**.

The conference was a valuable opportunity to discuss the most pressing challenges of meat safety assurance and inspection in Europe and, to gain an overview of the progress and prospects of each of the RIBMINS working groups. **Rens van Dobbenburgh**, the president of the Federation of Veterinarians of Europe, highlighted the crucial role of veterinarians in assuring food safety along the whole food chain. **Arja Helena Kautto** (Swedish Food Agency) presented the opportunities of digital transformation in "on distance" meat safety assurance and meat inspection at slaughter and game handling. The shortage of official veterinarians in meat inspection and the shift towards digital agriculture in sustainable animal production systems was highlighted. **Steve Hathaway** (New Zealand Food Safety Authority), emphasised the need for international risk-based harmonisation and the current difficulty to compare risk-based harmonisation of microbiological standards in trade because of differences in the legislation, sampling methods, etc.

RIBMINS Network visiting Córdoba during the social event.

The ensuing talks and vivid discussions during the conference centred on stakeholder involvement, the role of the government and the industry in risk-based innovation, and strategies for implementation of new technologies in post-mortem inspection.

The RIBMINS project, as an EU COST Action, ends in September 2023 and until then, the network is working with high dedication to close the remaining data gaps by answering key research questions, involving all stakeholders in the discussion and implementation of the results and, while providing a wealth of freely accessible training materials.

Training school on farm and abattoir interventions in a risk-based meat safety assurance system

As a part of capacity building and network developing activities to combine and strengthen European-wide research efforts on modern meat safety control systems, a training school was organised and held online from 20th to 22nd June 2022. The primary aim was to train the students in one of the main components of a risk-based meat safety assurance system, farm (pre-harvest) and abattoir (harvest) interventions.

The virtual format allowed an increased number of participants compared to a physical event, totalling 50 trainees from 25 European countries plus New Zealand. The applied selection criteria ensured gender balance and a broad representation of different areas of work, such as academia (28), competent authorities (11), national institutes (7) and food industry (4), with 96% of trainees being veterinarians. There were 23 trainers from academia, authorities, EFSA and industry covering a wide range of topics on farm and abattoir interventions, with lectures, ten workshops and discussions.

The participants showed great interest and commitment in the presented topics and their feedback was overwhelmingly positive, finding the training school "inspiring, valuable and interesting". All training material has been made freely available on **RIBMINS website**.

Views from the stakeholders

We contacted some of our stakeholders to get their views on different aspects of the MSAS, risk-based inspection, risk communication and RIBMINS outputs.

Carolina Cucurella
European Livestock and Meat Traders Union, UECBV

In European countries, differences exist in the roles and duties of meat inspection auxiliaries and in the education and training of official veterinarians. Do you think that these differences can affect meat exports?

The training and roles of official veterinarians and auxiliaries are well defined and laid down in the EU Official Control Regulations, ensuring common rules. Several third countries rely on the EU official control system for the products they import, and this means they accept the differences that could exist among EU members despite the harmonisation strived for in the legislation. Some third countries have specific requirements and need to assess in a bilateral way whether the competent authorities in each EU Member State meet those requirements before approving it for exporting, focusing on the official control system rather than on the veterinarians' and auxiliaries' training. In some cases (exporters to China or USA) competent authorities and operators need to adapt their procedures. Therefore, the possible differences between EU Member States do not affect the EU exports.

James Ramsay
European Food Safety Authority, EFSA

What activities has EFSA developed to address food risk perception versus actual risk in consumers?

We are at the stage now in Europe where taking account of risk perception to inform food-related risk communications is a matter of legislation, as per the recent update to the EU Food Law. Social research forms the basis for this and helps us guide the choice of topics we communicate about. Our #EUChooseSafeFood campaign is a good example: it focuses on specific food safety areas such as food hygiene or foodborne diseases with messages oriented towards consumers. We selected these messages based on research we carried out about awareness and concern, thereby ensuring we communicate with the public about food risks in a relevant and engaging way.

Ian Jenson
Meat and Livestock Australia

From your perspective, what are the key differences between the meat inspection system in Australia and in the European Union?

I'm not an expert on European systems! But I do know about the systems in Australia, which exports around 70% of beef and sheep meat product (the sectors I work with) to many countries around the world, including Europe. Australian systems, at farm and processing are based on both government and producers/processors taking responsibility. For example, while there is legislation about farm activities (e.g., use of agricultural and veterinary chemicals), an industry quality assurance programme provides training, requirements and auditing for compliance. In processing, there is a minimum standard that is followed by all processors, and then for export there may be additional requirements. There is a lot of prescriptive requirements for the EU market which are regularly audited.

Derk Oorburg
Vion

How do you see that artificial intelligence supported systems for meat inspection in Europe could generate a business case for private food business operators?

Inspection processes of meat (PM) or animals (AM) consist of huge amounts of observations. Luckily most of these show full compliance, exactly what the inspector expects to see. For prioritising the inspector's attention to the relevant issues, tools such as Artificial Intelligence can be of great support. What is ok can move on, what is not, gets tagged and is presented to the inspector for further evaluation. Resources well spent, I would say. In the Netherlands we already have Artificial Intelligence in place during the unloading of pigs and it is a big success.

Have a look at https://youtu.be/ElAQNAZheDU for further information.

Scientific Publications

Food chain information in the European pork industry: Where are we?

The food chain information (FCI) is required for animals admitted to slaughter. In 2011, EFSA proposed the integration of FCI with several harmonised epidemiological indicators (HEIs) in order to control foodborne hazards along the pig meat chain. To date, only two hazards have been included in FCI: *Trichinella* spp. and *Salmonella* spp. *Trichinella* spp. monitoring is mandatory at the abattoir level with sampling frequency depending on farm risk in EU countries, while *Salmonella* spp. control programs are implemented just in a few countries, frequently on a voluntary basis and with different approaches. In countries where the *Salmonella* status of the farm is included in the FCI, risk managers have the opportunity to categorise incoming pig batches into high- or low-risk categories and, therefore, select the most appropriate slaughter process and implement tailored hygienic measures when high-risk pigs are to be slaughtered. This is an example of the usefulness of the implementation of the FCI with HEIs. Moreover, modernisation with good quality FCI linked to herd health planning would not only improve food safety but would also expand our knowledge on the prevalence of these zoonotic agents in pig populations. .

▶ *To know more, please have a look at the paper* ***here*** *(Bonardi-2021)*

Meat safety legislation and its opportunities and hurdles for innovative approaches: A review

To ensure good hygiene during the slaughtering and processing of red meat, legislation prescribes, prohibits, and sets targets for abattoirs and cutting plants that FBOs must comply with. Most legislative phrases can be divided into *descriptive* or *prescriptive* texts. Descriptive formulations describe "how things are" and prescriptive formulations describe "how things ought to be". However, the strictness of such phrases may create limits and reduce the freedom to develop new technologies or different systems for dressing of an animal. The same happens with meat inspection methods for detecting food safety hazards, if not up with the times nor adapted to different regions, and therefore, acting as hurdles for innovation. This reflects the need for "functional demands" with an objective and measurable description of *what to achieve* (aim) rather than *how to achieve* it (method) when developing legislative texts. In this review, normative formulations from EU, New Zealand and USA legislation possibly hampering innovative approaches in the handling of food-producing animals are listed and commented on, suggesting alternative text formulations providing better opportunities for innovation.

▶ *To know more, please have a look at the paper* ***here*** *(Nagel-Alne-2022).*

A European survey on post-mortem inspection of finishing pigs: Total condemnation criteria to declare meat unfit for human consumption

This study reports the results from an online survey conducted in 2020 involving 26 European countries with the objective of mapping post-mortem condemnation criteria for ten different findings and their application to declare pig meat unfit for human consumption. As the collected data suggest, there is a large variety in the total condemnation criteria applied among countries. This constitutes a challenge regarding future harmonisation of the judgment criteria. Nevertheless, an evidence-based harmonisation is advisable, focusing on the food safety impact related to the various findings in order to safely avoid unnecessary condemnation.

▶ *To know more, please have a look at the paper* ***here*** *(Vieira-Pinto-2022).*

Prevalence and persistence of multidrug-resistant Yersinia enterocolitica 4/O:3 in tonsils of slaughter pigs from different housing systems in Croatia

In this study, the prevalence and persistence of *Yersinia enterocolitica* isolates were investigated in pigs, pork cuts and minced meat collected from different housing systems in 2019. Phenotypic and genetic characteristics of the isolates were compared with those collected in 2014. The overall prevalence of *Y. enterocolitica* in pig tonsils was 43%, ranging from 29% in pigs from large integrated farms, 40% in pigs from small family farms, to 52% in pigs from medium-sized farms, and the difference in prevalence was not affected by the biosecurity category of the farms, except for small family farms. At retail, all samples tested negative, likely due to high hygienic standards in abattoirs, which indicates a low risk to consumers. A higher prevalence of multidrug-resistant *Y. enterocolitica* 4/O:3 isolates was detected in the tonsils of pigs from large integrated farms compared to the other farm sizes, likely due to more antimicrobial pressure on large farms. Lastly, a comparison of genetic profiles and antimicrobial resistance patterns showed a high concordance of *Y. enterocolitica* isolates from those collected in 2014, with predominant resistance to nalidixic acid, chloramphenicol, and streptomycin.

▶ *To know more, please have a look at the paper **here** (Zdolec-2022)*

Systematic review and meta-analysis of the efficacy of interventions applied during primary processing to reduce microbial contamination on pig carcasses

This systematic review and meta-analysis, based on 30 years (from 1990 to 2021), assesses the effectiveness of abattoir interventions in reducing indicator bacteria counts and the count of *Yersinia spp.* on pig carcasses. Overall, the results suggest that scalding, singeing, washing with hot water and/or lactic acid, and dry chilling effectively reduce the counts of indicator bacteria (Enterobacteriaceae and aerobic colony count) on pig carcasses, and rectum sealing on carcasses reduces the prevalence of *Y. enterocolitica*. All these effective interventions should be recommended for commercial use in abattoirs as a fundamental part of integrated pig meat controls. However, most of the data were generated from highly heterogeneous trials and many gaps in the literature were noticed, especially when compared to other meat species (e.g., beef).

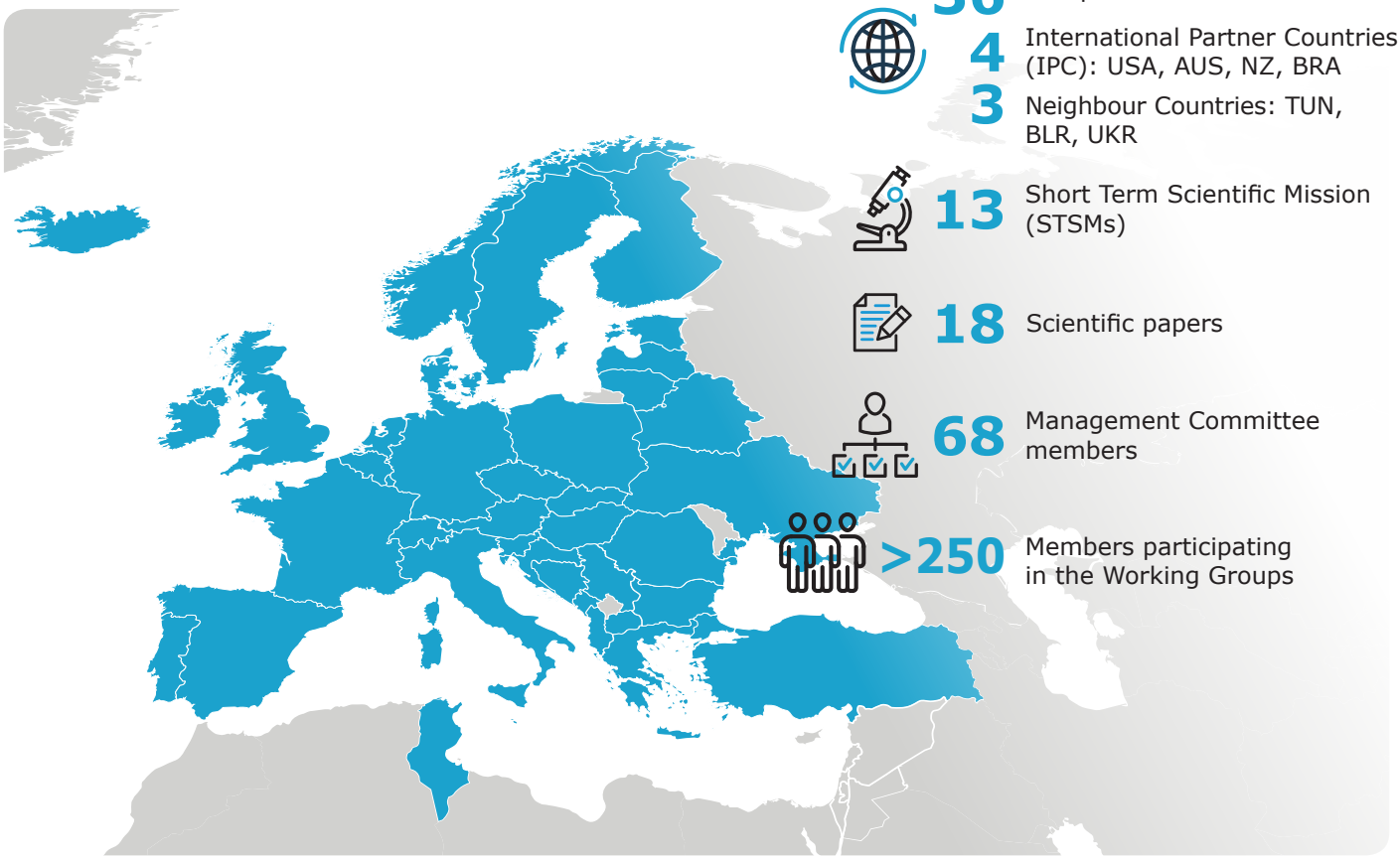
▶ *To know more, please have a look at the paper **here** (Zdolec-2022)*

Additional post-mortem inspection procedures and laboratory methods as supplements for visual meat inspection of finishing pigs in Europe—Use and variability

The paper illustrates the results of a survey conducted in 2020 on how visual meat inspection of finishing pigs and any eventual other procedure such as palpation, incision, or other laboratory tests are applied by official veterinarians in Europe. The results showed a great variance between the 26 responding EU countries. Visual meat inspection was generally applied, but if not, the main reason was export requirements. There was considerable variation in the use of palpation and incision, and the most important reasons for applying them in addition to visual inspection were findings detected in ante- or post-mortem inspection. There were country-specific factors affecting the use of palpations and incisions, other post-mortem procedures and the laboratory methods applied, but variations were reported even between veterinarians within the same country.

▶ *To know more, please have a look at the paper **here** (Laukkanen-Ninios, 2022).*

RIBMINS in numbers



36 European countries

4 International Partner Countries (IPC): USA, AUS, NZ, BRA

3 Neighbour Countries: TUN, BLR, UKR

13 Short Term Scientific Mission (STSMs)

18 Scientific papers

68 Management Committee members

>250 Members participating in the Working Groups

Beyond RIBMINS

A Virtual Network Support has been established by Ole Alvseike (WG4 leader). Currently, about 40-50 colleagues from the fields of risk-based meat inspection, food safety and meat safety assurance systems meet monthly online to present and discuss relevant topics in these areas. This networking forum is a low threshold offer where professionals from academia, competent authorities and industry meet.

▶ If you are interested in joining, please get in touch: **ole.alvseike@animalia.no**

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