

HealthyLivestock

D6.5 – Fourth Year Conference Proceedings



HealthyLivestock

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**Tackling Antimicrobial Resistance
through improved livestock Health & Welfare**

The European Union part of the HealthyLivestock project is funded by the European Union Horizon 2020 research and innovation program under grant agreement number 773436

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HealthyLivestock Final Meeting



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February 2023, Wageningen

Introduction

This deliverable serves to report the fourth-year conference proceeding of the HealthyLivestock project (Grant Agreement number: 773436-HealthyLivestock-H2020-SFS-2016-2017/H2020-SFS-2017-2).

From February 15th- 17th 2023, the project consortium met for its final annual meeting, in Wageningen, The Netherlands. Due to travel restrictions in China, our Chinese colleagues joined the meeting online.

The purpose of the conference was to bring all participants of the project together with representation from the projects Scientific Advisory Board, to present and discuss each of the Work Packages' research progress and results achieved since the consortium meeting last year (June 2022, Bologna).

The meeting focused on the outcomes of the last 3 WPs, since their results concluded later than the first WPs, as well as on other important issues regarding the last five years of collaboration.

This deliverable reports on the scientific aspects of the meeting and gives an overview on the event of the 16th of February (see below- ArMoR event), whilst the consortium meeting and General Assembly (on the 1st and the 3rd day of the meeting) are reported in D7.8



Photo: ArMoR partners during the final event in Wageningen

On the 16th of June, during the 2nd day of the meeting, the HealthyLivestock project together with The ArMoR project cluster organised a join event where science could meet industry. The event was entitled "reducing antimicrobial use in livestock".

This hybrid event took place at WICC Hotel in Wageningen and was meant to bring science and industry together to fight AMR.

It reunited more than 60 people in person, 100 online from EU and 9690 from China. In China, the event was broadcasted in 6 different platforms and, in order to answer the Chinese audience needs. The HealthyLivestock Chinese partners translated all presentations with subtitles and provided simultaneously translation online.

The rich program offered by the event, engaged not only researchers but also veterinarians, farmers, industry, policymakers, animal health companies, and other stakeholders who were interested in the topic of antimicrobial use in livestock.

*ArMOR Cluster partners, the EU Commission, FAO, FVE, EPRUMA, Copa Cogeca, Animal Health Europe, and the Schippers Group had the opportunity to give their insights on this global issue, together with 19 pitches on promising innovations to fight AMR that were presented by different projects and industries.

The first part of the event included a welcome session with presentations from the HealthyLivestock EU and Chinese coordinators, an introduction of the ArMoR cluster, and presentation of a research policy officer at the EC (DG AGRI) and from the UN FAO organisation.

During the **Second part**, ArMoR projects, invited project and industries had the opportunity to present their research, outcomes, innovations and products dealing with a wide range of solutions for antimicrobial use and antimicrobial resistance.

The **Third part** of the day took place right after a networking lunch, where posters and stands of the different projects and stakeholders were presented. This part of the event started with an interactive round table including 7 speakers representing different entities, associations and industry: EU commission, FVE, UN FAO, EPRUMA, Copa Cogeca, Animal Health Europe and the Schippers Group. The session was followed with a plenary discussion around some questionable statements.

* [ArMOR Cluster](#) = The Horizon Results Booster (HRB) is an initiative of the European Commission. It aims to bring a continual stream of innovation to the market and to maximise the impact of public funded research within the EU. Under HRB initiative, and for reasons of synergy and efficiency, a group of related sister projects, all in the field of fighting antimicrobial usage and antimicrobial resistance in livestock farming and with similar target audiences - are brought together in one cluster, named: “ArMoR –fighting Antimicrobial Resistance in livestock farming”.

[HealthyLivestock](#), [AVANT](#), [DISARM](#), [Roadmap](#), [AMRILS](#), [BM-FARM](#) and [FARM-CARE](#)

Event Programme

JOINT ARMOR CLUSTER EVENT



ARMOR




Wageningen
Thursday 16 February 2023











HealthyLivestock is funded by the European Union H2020 research and innovation program under grant agreement number 77343







Science meets Industry: Joint ArMoR Cluster meeting:
Reducing antimicrobial use in Livestock
Wageningen, Thursday 16 February 2023

9:30	5'	Opening and Welcome	
	10'	China in the HealthyLivestock project <i>Speaker: Shuming Yang</i>	
	15'	Introduction HealthyLivestock project and ArMoR cluster <i>Speaker: Hans Spoolder</i>	
	15'	EU commission <i>Speaker : Jean Charles Cavitte</i>	
	15'	AMR Multi-Stakeholder Partnership Platform <i>Speaker: Nelea Motriuc (UN FAO) (on-line)</i>	
		Pitches of current Horizon2020 projects in the ArMoR cluster, other projects and industries on reducing AMU and AMR	
10:35		<i>Introduction by the chair: Hans Spoolder</i>	
	7'	DISARM project legacy: Disseminating innovation in Antibiotic Resistance Management <i>Speaker: Helena C. de Carvalho Ferreira</i>	
	7'	The Schippers Group: Biosecurity measures to reduce AMR: theory versus practice <i>Speaker: Joost van den Borne</i>	
	7'	HealthyLivestock: Traditional Chinese Medicines in fighting AMR <i>Speaker: Janxi Li (on-line)</i>	







	7'	HealthyLivestock: Comprehensive Application Plan of Technologies on Reducing & Replacing Antibiotics in Large-scale Pig Farms of Dabeinong Group <i>Speaker: Dr. Weiping Song (on-line)</i>	 HealthyLivestock 健康养殖
	7'	ROADMAP: Rethinking the use of antimicrobials in livestock production systems <i>Speaker: Annick Spaans</i>	
11:10 – 11:35	25'	COFFEE / TEA BREAK	
		Pitches of current Horizon2020 projects in the ArMoR cluster, other projects and industries on reducing AMU and AMR	
11:35	7'	AVANT: Alternatives to Veterinary antimicrobials <i>Speaker: Alfons Jansman</i>	
	7'	HealthyLivestock: Practices of Applying Antibiotics Reduction Technologies in Broiler Farming? <i>Speaker: Dr. Yi Xu (on-line)</i>	 HealthyLivestock 健康养殖
	7'	BM-FARM: Use of biomarkers and microbiome to manage pig health and welfare and reduce AMR <i>Speaker: Edgar Garcia Manzanilla</i>	 BM-FARM
	7'	AMRILS: An integrated approach to understanding AMR in livestock production systems <i>Speaker: William Gaze (on-line)</i>	
	7'	FARM-CARE: A One-Health approach to improve biosecurity and welfare and reduce AMR in pig farms <i>Speaker: Edgar Garcia Manzanilla</i>	
	7'	HealthyLivestock: Reducing antimicrobial usage through improved pig health & welfare <i>Speaker: Stephanie Meyer (Zoetis)</i>	 HealthyLivestock 健康养殖



	7'	NeoGiANT: The power of grape extracts: antimicrobial and antioxidant properties to prevent the use of antibiotics in farmed animals Speaker: Marta Lores	
	7'	Value of AMR monitoring in veterinary pathogens and the importance of reliable and representative data Speaker: Jeanine Wiegel (Royal GD, Netherlands)	
	7'	PigChamp: Innovative digital system to monitor and control external biosecurity of livestock farms Speaker: Carlos Piñeiro	
12:50 - 14:00	70'	NETWORKING LUNCH (Market style: walking along posters and stands for food and information)	
14:00 - 14:45	45'	ROUND TABLE discussion with - Jean Charles Cavitte (EU Commission) - Rens van Dobbenburgh (FVE) - Yu Qiu (UN FAO) - Cat McLaughlin (EPRUMA) (on-line) - Adam Drosio (Copa Cogeca) - Clare Carlisle (Animal Health Europe) (on-line) - Joost van den Borne (Schippers Group)	
		Pitches of current Horizon2020 projects in the ArMoR cluster, other projects and industries on reducing AMU and AMR	
		Chaired by Bas Kemp	
14:45	7'	Effect of different hatching systems on chick quality, welfare and disease resilience of young breeder flocks offspring Speaker: Bas Kemp	



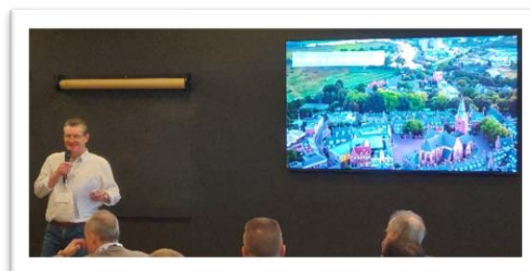
	7'	NetPoulSafe: A risk-based scoring tool to quantify and improve biosecurity in poultry production: alternative approaches to reduce AMU <i>Speaker: Arthi Amalraj</i>	
	7'	A blend of organic acids, medium chain fatty acids, slow release C12, target release butyrates and a phenolic compound contributes to maturation of the gut in newly weaned piglets <i>Speaker: Sandra Van Kuijk (Trouw Nutrition)</i>	
	7'	Piglets Treatment System BV- Health System <i>Speaker: Twan Claessens (Health Injector)</i>	
	7'	Biopigee: Support Tools from the BIOPIGEE Project to Control Salmonella and HEV <i>Speaker: Tamino Dubbert (on-line)</i>	
15:30 - 15:40	10'	Vote - for the best presented pitch - for the most promising solution to fight AMR (vote with mentimeter)	
15:40 - 16:10	30'	COFFEE / TEA BREAK (Market style/ information stands)	
16:10 - 16:30	25'	Plenary discussion Around some statements (with mentimeter)	
16:30 - 16:45	15'	Final conclusions & closure	
16:45 - 17:30		Drinks	

ArMoR event Part 1

Introduction session

Hans Spooler, European pillar HealthyLivestock coordinator (WUR, NL) – *“Welcome and introduction of the different strategies of the HealthyLivestock Project and ArMoR cluster”*

[Link to presentation](#)



Shuming Yang, China pillar HealthyLivestock project coordinator (IQSTAP) – *“China in the HealthyLivestock”*

[Link to presentation](#)



Jean- Charles Cavitte, EU commission, (DG Agriculture and Rural Development)- *“Main European policies and research & innovation activities on One Health AMR “*

[Link to presentation](#)



Nelea Motriuc, UN FAO, *“AMR Multi-Stakeholder Partnership Platform”*

[Link to presentation](#)



ArMoR event Part 2

14 Pitches of ArMoR cluster partners, other projects and industries

Helena C. de Carvalho Ferreira, DISARM project legacy
“Disseminating innovation in Antibiotic Resistance Management”

[Link to presentation](#)



Disseminating Innovative Solutions for Antibiotic Resistance Management-

A multi-actor thematic network to bridge the gap between:

- scientific research
- adoption of applied science in farm practice

A thematic network focusing on practice-led innovation-

- Providing a tool to collect existing scientific knowledge and best practices
- Facilitate their use by developing easily understandable material for practice:
 - information sheets
 - audio-visual material

Joost van den Borne, The Schippers Group (NL):
“Enhancing the efficacy of cleaning and disinfection at broiler farms”

[Link to presentation](#)



Antimicrobial resistance (AMR) is one of the biggest threats to global health, society, and economies. Due to the excessive use of antibiotics, livestock farming is currently one of the main drivers of AMR. Without systemic change, 10 million people could die from AMR in 2050.

The Schippers Group empowers livestock farmers to optimize farm hygiene, eliminating the need for antibiotics while increasing animal health and profitability.

Biosecurity: theory versus practice

Working in teams: Veterinarian, nutritionist, hygiene specialist and dedicated hygiene coaches.

KISS: Paperwork/checklists vs. see/feel/reflect

Top-down AND bottom-up

Ongoing: field studies in Argentina and Canada

Janxi Li, HealthyLivestock (CH):
“Traditional Chinese Medicines in fighting AMR”

[Link to presentation](#)



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Under the guidance of the theories of traditional Chinese veterinary medicine (TCM), the drugs are prepared or processed with materials of medicinal plant, mineral or animal tissue, and which are used to treat or prevent animal diseases, these drugs are named Traditional Chinese veterinary patent medicine.

TCM can increase the resilience to diseases through enhancing immunity, increasing resistance to infection, and promotion the elimination of pathogens in the body. The anti-bacterial activity of TCM in vivo is more than that in Vitro.

LIHPS has developed Cangpu oral liquid for treating the cold diarrhea in piglets, Shenjiang Zhili oral liquid for treating E coli-infected diarrhea in weaned piglets, and Changshan Powder for treating coccidia, with similar effect as the chemical drug (sulfaclopyrazine sodium soluble powder).

TCM products have positive effects on fighting AMR, however, the mechanism of their anti-bacterial infection diseases still needs to be further explored and explained through a lot of study.

Weiping Song, HealthyLivestock (CH):
“Comprehensive Technologies on Reducing & Replacing Antibiotics in Large-scale Pig Farms of Dabeinong Group”

[Link to presentation](#)



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Dabeinong Group (DBN Group) is a high-tech agricultural enterprise, covering feed, pig farming, vaccine, animal health, agricultural internet, etc. It has 84 pig farms, producing 10 million pigs each year.

It's fundamental to ensure pig health in order to reduce antibiotics usage. DBN Group takes the following measures to ensure pig health: providing a good farming environment; implementing strict biosecurity system; regularly monitoring the epidemic situation and providing timely vaccination; having a targeted pig health plan; providing nutritious and easily digestible feed.

By the end of 2022, DBN Group has 3.124 million pigs in store. The amount of antibiotics used for producing 1 ton of pigs is about 62.3 g, which is 16.26% lower than that in 2021.

Annick Spaans, ROADMAP:

“Rethinking the use of antimicrobials in livestock production system”

[Link to presentation](#)

**Project ROADMAP- Living Labs**

A social science-driven multi-actor and multidisciplinary project to foster transitions towards prudent AMU:

- Co-developing strategies to encourage prudent AMU: Living Labs (LL)
- 12 LL in 8 different countries and 3 sectors
- Developing, testing and evaluating locally adapted strategies

“When the goal is to co-create and develop innovative solutions to complex problems or challenges in a given setting, and solutions necessarily have to involve multiple stakeholders, Living Labs (LL) will be a relevant option to consider”.

Alfons Jansman, AVANT:**“Alternatives to Veterinary antimicrobials “**

[Link to presentation](#)

AVANT

AVANT project aims to develop and test innovative alternatives to antimicrobials for reducing antimicrobial use in livestock

- Pigs as the animal species in which most antimicrobials are used.
- Post-weaning diarrhoea as the main indication for antimicrobial use in pigs
- A variety of interventions with different modes of action

There is an urgent need to find new solutions for treatment of post-weaning diarrhea in pigs because:

- No effective vaccines are available
- The use of medical zinc oxide (2,500-3,000 mg/kg) was banned in 2022
- The use of colistin has been restricted due to the critical importance of this antibiotic in human medicine
- The main causative bacteria (ETEC) can be resistant to all veterinary antimicrobials of lower medical importance

Yi Xu, HealthyLivestock(CH)

“Practices of Applying Antibiotics Reduction Technologies in Broiler Farming?”

Presentation not available

[Link to recordings](#)



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At present, the main challenge of overuse of antibiotics lies in the relatively backward farming management and technology.

The establishment of farming management system and the improvement of core technology are the key points.

In NHLH, the following measures are taken conducting quantitative chick quality evaluation; providing pre-starter feed for newly hatched chicks; carrying out ozone disinfection of waterline and air; applying environmental humidity management and digital farming management technology; carrying out precision medicine protocol; using antibiotics substitutes such as traditional Chinese medicine and probiotics.

In the past five years, the drug cost of broiler production gradually decreased, especially in 2020. The farming management and efficiency has been greatly improved. The detection rate of drug residues before slaughter has also decreased, guaranteeing food safety.

Edgar Garcia Manzanilla, BM-FARM:

“Use of biomarkers and microbiome to manage pig health and welfare and reduce AMR”

[Link to presentation](#)



BM-FARM

BM-FARM project- “Use of biomarkers and microbiome to manage pig health and welfare and reduce AMR”:

Characterize faecal microbiome and resistome of farms based on health/welfare status using shotgun seq

Characterize biomarker profile of farms in oral fluids based on health/welfare status.

Develop multivariable indicators of farm status.

William Gaze, AMRILS:***An integrated approach to understanding AMR in livestock production systems Speaker:***[Link to presentation](#)**AMRILS**

AMRILS project:

Developing a conceptual framework to improve understanding of AMR in livestock systems: translating research into policy and practice.

Interdisciplinary UK: Argentina collaborative project focusing on feed-lot beef production in a One Health context.

Systematic review and meta-analysis investigating the relationship between AMU and AMR in feed-lot systems

- Field trial focusing on different feed-lot management systems and selection for AMR in the gut microbiome.
- Experimental evolution approaches to understanding selection for AMR by in-feed antibiotics in faeces and soils.
- Work on conceptual frameworks for considering AMR across the One Health continuum.
- Stakeholder focused work to understand cross-sectoral communication relating to AMR.
- Economic analyses of the cost benefits of different management strategies

Edgar Garcia Manzanilla, FARM-CARE:***“A One-Health approach to improve biosecurity and welfare and reduce AMR in pig farms”***[Link to presentation](#)

FARM-CARE project:

- Understand the impact of pig mixing and remixing on AMR spread to agricultural fields via slurry.
- Understand the impact of biosecurity on AMR spread to farm workers and their households.
- Develop innovative machine learning tools predictors of stress and disease in piglets.
- Assess the relative socio-economic merits of the interventions.

Stephanie Meyer, (Zoetis) HealthyLivestock:***“Reducing antimicrobial usage through improved pig health & welfare”***[Link to presentation](#)

Modular platform to improve animal health:

- While farmers might focus on productivity, animal welfare is a topic of increasing importance, driven by consumers and politics.
- An initial collaboration focussed on a UK Government-supported project on pig behaviour.
- This project utilised Innovent's Qscan video imaging technology to provide new information on pig movement and behaviour as a predictor of disease.
 - Tail biting is a hot –yet unsolved- topic through the EU markets as politics continue in stopping tail docking as standard prevention.
 - Innovent developed an algorithm to predict the onset of tail biting and therefore allows intervention before an outbreak occurs.

Marta Lores, NeoGiANT:***“The power of grape extracts: antimicrobial and antioxidant properties to prevent the use of antibiotics in farmed animals”***[Link to presentation](#)

To overcome the challenges related to AMR derived from the misuse and abuse of antibiotics in farmed animals' production (in feeding, health and reproduction areas) and, in parallel, to improve the waste management in the wine sector, NeoGiANT offers innovative solutions. They are based on the known potent natural antimicrobial and antioxidant activities of grape marc extracts, due to their arsenal of phytochemicals, in particular their phenolic compounds content. Suitable bioactive molecules from white grape marc are identified, with a validation of their benefits (in-vitro and in-vivo) to produce final formulations to be used in animal production. These polyphenolic extracts are produced as a complement or alternative to classical compounds with antimicrobial and antioxidant capacities. NeoGiANT products are based on 3 pillars: (i) the use of local biomass sources, (ii) cost-effective, efficient, and sustainable products, (iii) functional ingredients obtained in sustainable circular economy production systems. In addition, they will meet consumer demand for animals' health solutions without side effects for the animals, as well as environmentally friendly products.

Jeanine Wiegel, Royal GD, Netherlands

“Value of AMR monitoring in veterinary pathogens and the importance of reliable and representative data”

[Link to presentation](#)



AMR is monitored in commensal indicator *Escherichia coli* from livestock as part of European monitoring. As part of the Dutch program for poultry health, AMR is monitored in veterinary pathogens from diseased poultry (clinical isolates) among which *E. coli*. A study was performed to assess the reliability and representativeness of the available results of AMR monitoring in clinical *E. coli* from diseased broilers from the Netherlands.

Monitoring of commensal *E. coli* is part of a European monitoring program and a harmonized method is used. For monitoring in clinical isolates there is no harmonized method available. This study analysed available data and aimed to identify factors that should be taken into account when presenting overviews of antimicrobial susceptibility for use in veterinary medicine. For clinical *E. coli* from broilers, it is advised to include age and treatment in the dataset and to exclude isolates from previous treated birds when generating overviews. Also, for isolates from broilers in the age group of 3 to 5 weeks and previously treated broilers it is advised to base a choice for antimicrobial treatment on antimicrobial susceptibility results of the causative agent instead of overviews of antimicrobial susceptibility.

This project was funded by ZonMw.

ArMoR event Part 3

Networking Lunch, Round table, 5 pitches and plenary discussion

NETWORKING LUNCH:

Stands

- FAO
- HealthyLivestock
- AVANT
- NeoGIANT
- Trouw Nutrition
- PigCHAMP



ROUND TABLE:

[Link to recording](#)

Chair:

- Jan Vaarten, FVE

Speakers:

- Jean Charles Cavitte (EU Commission)
- Rens van Dobbenburgh (FVE)
- Yu Qiu (UN FAO)
- Cat McLaughlin (EPRUMA) (on-line)
- Adam Drosio (Copa Cogeca)
- Clare Carlisle (Animal Health Europe) (on-line)
- Joost van den Borne (Schippers Group)



Discussion topics:

Rens van Dobbenburgh (FVE)

Around 20 years ago FVE chose One Health as one of its strategic priority topics. A few years thereafter FVE put AMU and AMR at the top of the Federation's agenda.

- Overlooking this period, what do you see as main achievement, and what do you believe is the most important bottle neck for further reduction of AMU in livestock?

Jean Charles Cavitte (EU Commission)

As seen in the pitches of the ArMoR projects, the EU Commission invests in various research projects that contribute to reducing the use of antibiotics in livestock.

- What do you believe should be the focus of future projects? Should it be on technological innovations, or on other aspects like dissemination, communication, behavior change, ...?

Yu Qiu (UN FAO)

The FAO AMR Multi-Stakeholder Partnership Platform aims to catalyse a global movement for action against (AMR). The EU has the ambition to be a best practice region. Nevertheless, in Europe, and even more at the global level, differences in AMU in livestock are large.

- What would you recommend ensuring that research results arrive at the places where they are most needed?

Cat McLaughlin (EPRUMA)

A special feature of EPRUMA, the European Platform on the Responsible Use of Medicines, is that it brings together different stakeholders, such as farmers, vets, and manufacturers of animal medicines and diagnostics. What I didn't see among your member organisations are retailers or consumers.

- Don't you think they should also be involved in the platform?

Adam Drosio (Copa Cogeca)

One of the pitches of this morning was about the EU Horizon 2020 project DISARM "Disseminating innovation in Antibiotic Resistance Management". Your organization participated in this project. Can you tell what you think is most essential for getting innovative solutions to tackle AMR to your member's.

- What advice would you give to researchers to make it easier for farmers to use the results.

Clare Carlisle (Animal Health Europe)

On the Animal Health Europe website, I noticed that your organisation's strategic focus comprises One Health, Innovation and Sustainability. All very important for fighting AMR. About sustainability it says: By making a wide range of tools available we can support more efficient agricultural practices ...

- Do you think that sustainability and efficiency are sufficient compatible?

Joost van den Borne (Schippers Group)

On your website I read: "We believe in a world where livestock farming drastically reduces the use of antibiotics to combat Antimicrobial Resistance (AMR). We believe in a world without AMR". How realistic is this?

- Should we not better focus on "keeping effective antimicrobials available and accessible" for people and animals in need.

5 Pitches of ArMoR cluster partners, other projects and industries

Arthi Amalraj, NetPoulSafe:

“A risk-based scoring tool to quantify and improve biosecurity in poultry production: alternative approaches to reduce AMU”

Presentation not available

[Link to recordings](#)



Disease prevention in the form of improved biosecurity compliance is one of the most promising ways of reducing antimicrobial usage (AMU). Broiler farms consuming more antimicrobials were found to have lower biosecurity scores (scoring done with Biocheck.UGent <https://biocheckgent.com/en>), indicating that biosecurity can help in reducing AMU (Caekebeke and co-workers, 2021). The aim was to develop and validate a weighted risk-based scoring tool to measure biosecurity in breeder, turkey, duck, free-range layer and free-range broiler production in a standardized and reproducible manner. Questionnaires were drafted each with (turkey=102, duck=108, breeders=119, free-range broiler=100 and free-range layer=126) questions regarding the implemented biosecurity measures and full points gained only when a measure is applied correctly. On occasion, points will be earned by not performing a certain action (e.g., not sharing equipment with other farms). Answers to questions get converted to scores ranging from 0 (total lack of biosecurity) to 100 (full application of biosecurity). The tool works on the principle of avoiding efficient disease transmission. Different measures were prioritized and weighed on the basis of their relative importance for the prevented transmission.

Sandra Van Kuijk, Trouw Nutrition:

A blend of organic acids, medium chain fatty acids, slow release C12, target release butyrates and a phenolic compound contributes to maturation of the gut in newly weaned piglets

[Link to presentation](#)



At weaning, a piglets' gut microbiota and barrier function are not mature yet and can be negatively affected by the weaning process. As a result, piglets may experience gut related problems, such as diarrhoea. Nutraceuticals for managing gut health often rely on organic acids and medium chain fatty acids; second generation products build on this backbone. One such evolution is a blend of organic acids, medium chain fatty acids, slow release C12, target release butyrates and a phenolic compound (MCOA) since they exert beneficial effects on gut microbiota and pig performance during the weaning transition. Knowing this, the current research aims to study the mode of action of MCOA in newly weaned piglets.

Twan Claessens, Health Injector:
“Piglets Treatment System BV- Health System”

[Link to presentation](#)



Health Injector

Piglets Treatment Systems has developed a modular (digital) barn system called Health System in which the pig is central. The system offers an innovative solution at the individual animal level for the administration and registration of vaccines and antibiotics, health monitoring and animal welfare. The health system has a unique and innovative value proposition that distinguishes them from their competitors; an innovative medication syringe, named the Health Injector.

With the Health System we can create a Health passport for every individual pig.

Tamino Dubbert , Biopigee:
“Support Tools from the BIOPIGEE Project to Control Salmonella and HEV”

[Link to presentation](#)



BIOPIGEE was an EU-co-funded One Health European Joint Programme that identified and investigated biosecurity measures against Salmonella and HEV in European pig farming and slaughterhouses. Although single or mixtures of biosecurity measures against Salmonella in pig farming have been investigated, a promising protocol of biosecurity measures was not yet obvious, nor clearly proven to be effective for European production systems. To limit occurrence and persistence of the hepatitis E virus (HEV) in farms, farm internal biosecurity measures may play a role, but how and which measures may influence this is largely unknown. Additionally, feasibility and cost of implementation always play a role in decision making of improving farm biosecurity, but resources on this are scarce.

Plenary discussion

The interactive discussion started with a surveys (“wooclap”) For the online and in person participants.

Statements discussed in the plenary discussion:

- **“Further reduction of antimicrobial use in livestock is not dependent on research.”**

Survey results: Agree 13%, Disagree 83%, Don't know 5%

- **“Farm animal welfare will only be improved when no extra costs are involved.”**

Survey results: Agree 9%, Disagree 91%, Don't know 0%



Annex 1: Digital and printed poster presentations

1. Ana Carolina Abrantes

“OUTLINE OF A SUSTAINABLE CAPTIVE LARGE GAME MANAGEMENT PLAN”

[Link to poster](#)

Briefly, zoonotic diseases, those affecting wildlife, including large game species have been highlighted as an important risk to human health. Promoting the motto ‘Prevention is better than cure’, the New Animal Health Law is essentially aimed at improving animal health to support sustainable production, reducing negative effects of diseases, and suggesting preventive and control measures under the One Health approach. For large game populations in fenced enclosures framing the essential sanitary procedures in this case is dubious. But, in our opinion, stricter and tailored sanitary control measures should be implemented by game managers under the technical supervision of veterinarians. From this point of view and with practical experience, the objective of this work is to propose a schematization of a game management plan in fenced game populations.

2. Alfons Jansman

“AVANT - Alternatives to Veterinary ANTimicrobials”

[Link to flyer](#)

AVANT is a multi-actor inter-sectorial project aimed at developing alternatives to antimicrobials for the management of bacterial infections in pigs, especially diarrhoea during the weaning period. Use of an antimicrobials in animals adds to the public health threat of multidrug-resistant bacterial infections in humans. Alternatives for the treatment of major bacterial diseases in livestock will help to mitigate the public health risk.

3. Alfons Jansman

“AVANT - Survey on antibiotic resistance and acceptance of alternatives”

[Link to infographics](#)

AVANT develops and tests alternatives to antibiotics for bacterial infections in pigs. The survey was conducted in 5 European countries, with more than 2300 participants. (Veterinarians, Farmers and Consumers).

4. Deepthi Vijay

“Perspective of stakeholders on Antimicrobial Usage and Resistance in the Dairy Chain from Punjab, India”

[Link to poster](#)

The public health issues such as antimicrobial resistance and injudicious antibiotic use in the dairy sector need to be addressed in-depth from the perception of associated stakeholders. The understanding of the specific behaviours of the key actors can be achieved through focus group discussions (FGDs) and key informant interviews (KIIs) and are crucial for identifying risk factors. The FGDs and KIIs were conducted with a strategic sample of four stakeholder groups (114 participants) associated with antibiotic usage in the dairy sector of Punjab. The FGDs were conducted among veterinarians (n = 56), para-veterinarians (n = 28), and KIIs were conducted among chemists (n = 18) and dairy quality managers (n = 12) during 2020–2021. FGDs and qualitative interviews of various stakeholders depict existing risk practices in the fields that may promote antimicrobial resistance.

5. Yu Qiu

“Reduce the Need for Antimicrobials on Farms Initiative (RENOFAM)”

[Link to poster](#)

If not addressed, AMR threatens to compromise progress towards the Sustainable Development Goals (SDGs). IFAO supports countries in building efficient, inclusive, sustainable and resilient agrifood systems that contribute to the 2030 Agenda.

During the Third Global High-Level Ministerial Conference on AMR, held in Oman in November 2022, FAO Director-General QU Dongyu referred in his opening remarks to the calls of the Global Leaders Group on AMR in August 2021 and the 2022 session of the Sub-Committee on Livestock of the FAO Committee on Agriculture (COAG) to reduce the need for antimicrobials in agrifood systems.

In line with these calls, FAO is working on the Reduce the Need for Antimicrobials on Farms (RENOFARM) initiative.

This is a 10-year global initiative to provide comprehensive support to Members in reducing the need for antimicrobials in their agrifood production. This initiative will directly contribute to the implementation of Muscat manifesto and commitment to promote the development, review, and implementation of national action plans.

6. Arthi Amalraj

“Biosecurity compliance in poultry production in Belgium and Netherlands: neglected measures and reasons”

Poster not available

Biosecurity practices in poultry production are often known quite well, but compliance is not optimum. Project Netpoulsafe is a EU Horizon 2020 project with participants from seven European countries, designed to stimulate knowledge exchange between all relevant stakeholders and to find support measures to motivate farmers and farm workers to improve and maintain high biosecurity levels in poultry farms. In order to better understand the reasons and identify ways for improvement in biosecurity in the framework of project Netpoulsafe, 192 poultry farmers were interviewed in the 7 countries about the common biosecurity measures implemented on their farms. Another focus point was to identify main difficulties encountered by the farmers to implement the indicated biosecurity

7. Arthi Amalraj

“A risk-based scoring tool to quantify and improve biosecurity in poultry production: alternative approaches to reduce AMU”

Poster not available

Disease prevention in the form of improved biosecurity compliance is one of the most promising ways of reducing antimicrobial usage (AMU). Broiler farms consuming more antimicrobials were found to have lower biosecurity scores (scoring done with Biocheck.UGent <https://biocheckgent.com/en>), indicating that biosecurity can help in reducing AMU (Caekebeke and co-workers, 2021). The aim was to develop and validate a weighted risk-based scoring tool to measure biosecurity in breeder, turkey, duck, free-range layer and free-range broiler production in a standardized and reproducible manner. Questionnaires were drafted each with (turkey=102, duck=108, breeders=119, free-range broiler=100 and free-range layer=126) questions regarding the implemented biosecurity measures and full points gained only when a measure is applied correctly. On occasion, points will be earned by not performing a certain action (e.g. not sharing equipment with other farms). Answers to questions get converted to scores ranging from 0 (total lack of biosecurity) to 100 (full application of biosecurity). The tool works on the principle of avoiding efficient disease transmission. Different measures were prioritized and weighed on the basis of their relative importance for the prevented transmission.

8. Mona F. Giersberg***“Tracking group-level and individual activity of broiler chickens hatched in three different systems”***

[Link to poster](#)

Broilers usually hatch in hatcheries without access to feed and water, which might affect their welfare negatively. Alternative approaches have been developed, e.g. providing chickens with feed and water in the hatchery or hatching eggs on-farm. Information on the behaviour of chickens hatched in these systems is limited. Changes in broiler activity are a promising indicator for various welfare threats, such as sickness and lameness. The aim of this study was to assess effects of hatching system on broiler activity at group-level and individually by using sensor technology.

The results indicate that hatching system affected broiler activity at specific ages. Effects found at group-level in large groups could not be reproduced at individual level in small groups of broilers. It can be concluded that activity levels, although measured automatically and continuously, seem to be highly dependent on the tracking method used among chickens from the three different hatching systems. Further studies particularly on tracking individual activity of broiler chickens from different hatching systems using a larger number of replicates are necessary

9. Felipe Martínez-Pastor***“First evaluations of extracts from grape marc as antibiotic substitutes in semen extenders”***

[Link to poster](#)

Artificial insemination (AI) with is widespread in animal production, either for breeding (85-95% of females in swine, dairy cattle, turkey, and many aquaculture species) or for genetics dissemination and breed conservation. Since microorganisms can contaminate semen, antibiotics are systematically used in semen extenders as prophylaxis. Millions of liters/year are used only in the EU (>8 ML for swine, >3 ML for cattle), therefore, millions of females exposed to broad-spectrum antibiotics. Moreover, antibiotic residuals are released into the environment by post-AI semen reflux from females, or in the water in aquaculture. Antibiotic replacement in semen extenders is an urgent issue because they likely contribute to antimicrobial resistance. The NeoGiANT project (<https://neogiant.eu>) aims at using antimicrobial polyphenol-rich extracts from grape marc in animal health, nutrition, and reproduction. Work package 6 (WP6) is dedicated to testing the extracts on spermatozoa from boar, chicken, and sturgeon.

10. Carlos Piñeiro***“Innovative digital system to monitor and control external biosecurity of livestock farms”***[Link to poster](#)

Biosecurity is a growing concern in swine industry in Europe due to current health situation. The advance of African Swine Fever in European countries and the rising of hypervirulent strains of Porcine Reproductive and Respiratory Syndrome virus (PRRSv) in Spain [1], where this study has been developed are two of the major issues.

However, accurate and fast biosecurity evaluation was impossible until now. Nowadays, most of the companies evaluate biosecurity using paper visitors' books, scoring systems based on surveys or on-site evaluation by specialists [2]. These systems are very useful and understandable for farmers, but they are not capable of detect and avoid biosecurity breaks on real time basis. To try to address this challenge, digital technologies can be now applied in commercial farms in order to collect movement data and generate biosecurity information data.

11. Gonzalo Abad***“Case study of real-time control of health and of the use of antibiotic in pig farms with a digital technology”***[Link to poster](#)

New technologies applied to animal production facilitate the development of new applications for data collection and analysis (1). Moreover, livestock policies are focus on reducing the use of antibiotics (2). A novel control system has been developed to monitor health status of pigs, and in consequence, improving efficiency and reducing healthcare costs of pig farms.

The use of digital technologies can solidly support decision-making process about health control and medicines use. The user can find out the incidence and prevalence of pathologies present on the farm and their distribution over time. Information about the convenience of using a specific medicine or active ingredient, as well as the warning of withdrawal periods, or the accumulated amount of antibiotic can be easily obtained, which helps in reducing them.

Digital technologies allow real-time control of the pathologies present on a farm and the treatments and actions carried out for their control.

12. Eموke Pall***“Raising technology induced spatial dynamics of antimicrobial resistance and zoonotic risk in E. coli isolated from swine”***[Link to poster](#)

Swine are amongst the most important large-scale farmed meat animals, by which a partial coverage of the growing global food demand is managed. Moreover, low-input and organic swine farming continuously expand, proven its beneficial effect on animal welfare and meat quality. In both systems, swine represent a source of E. coli for people by direct contact and food products, the bacteria pathogenicity increasing with its antimicrobial resistance. The study aimed at comparing the dynamics of antibiotic resistance of E. coli strains from pigs raised under intensive and extensive technologies, presuming that under extended antibiotic use on the industrial farm, the number of resistant strains will be higher, than on low-input homesteads located 5 and 10 km from this posing an increased risk for humans.

13. Diana Olah**“EFFECTS OF LOCAL PLANT EXTRACTS ON POTENTIALLY PATHOGENIC PORTED BACTERIA IN SWINE ON A LOW-INPUT FARM”**[Link to poster](#)

In an era of antibiotic resistance, plant extracts stand as potential alternatives or adjuvants to synthetic antimicrobials, reducing the load of multidrug-resistant pathogens in the veterinary field. This study aimed to document the natural potential of locally available traditional medicinal plants in the case of bacterial infectious diseases occurring in swine raised on low-input outdoor farms from North Western and Central Romania.

The results as such indicate that some of the tested plant extracts may exert an antimicrobial activity on microorganisms carried by swine and further studies are worthy to be done. These plants could enhance the welfare of the animals by naturally reducing the load of potentially pathogenic, antibiotic resistant bacteria, as an alternative to classical antibiotic therapy.

14. Anniek Bus**“In vivo testing of the NeoGiANT extract-based formulations in livestock and aquaculture.”**[Link to poster](#)

In light of emerging antibiotic resistance in humans and animals and increasingly limited efficacy of current conventional antibiotic treatments, extra effort is expected from livestock farmers to use as few antibiotics as possible. In addition, alternative and broader approaches to treat infections are urgently needed. In order to fight AMR and support livestock farmers in keeping animals with fewer or no antibiotics, NeoGiANT offers an innovative solution based on the known potent natural antimicrobial and antioxidant activities of grape marc extracts, due to their arsenal of phytochemicals. Feed supplemented with the extract will be produced and fed to cattle, swine, poultry and aquatic animals. The effect of the extract based formulations will be evaluated based on health, performance parameters and disease prevention properties.

Since this project is still in an early stage, we cannot present any conclusions yet. However, the extract is developed, and the in vivo trials will start very shortly. The target products to be developed will be designed to control a large number of diseases of paramount importance in animal production, both in livestock (cattle, swine, poultry) and aquaculture. As a result, NeoGiANT aims to provide effective alternatives to the main antibiotics used in farmed animals, contributing to the goal of reducing their use. At the same time, the speed of emergence of new antimicrobial resistances (AMR) will be reduced, and existing antimicrobial resistances will be better controlled.

Printed posters abstracts

15. Maria Celeiro

“NeoGiANT - INNOVATIVE ANTIMICROBIAL AND ANTIOXIDANT SOLUTIONS BASED ON GRAPE MARC POLYPHENOLIC EXTRACTS FOR ANIMAL PRODUCTION”

NeoGiANT aims to provide effective alternatives to the main antibiotics used in animal production, contributing to the goal of reducing their use, by limiting them only to the treatment of severe infections and not as an indiscriminate preventive action. The main objective of NeoGiANT is to develop and validate innovative natural formulations with antimicrobial and antioxidant properties from the valorisation of white grape marc, to be used in cattle, swine, poultry and farmed fish. These innovative solutions are based on the known potent natural antimicrobial and antioxidant activities of grape marc extracts, due to their arsenal of phytochemicals, in particular their phenolic compounds content.

All ready-to-use obtained extracts are innovative bioactive ingredients obtained from white grape marc. The set of operational parameters including extractive volume, marc mass and its ratio with a dispersant were efficiently optimized. The high polyphenolic load of the NeoGiANT extracts allow their use to formulate products for the feeding, health and reproduction areas that will contribute to fight against AMR. These extracts will be produced as an alternative to more classical compounds with antimicrobial and antioxidant capacities, becoming functional ingredients obtained in sustainable circular economy production systems.

16. Bas Rodenburg

“PPILOW: innovations for improving the welfare of pigs and poultry in low-input and organic farming systems”

PPILOW is a multiactor project aiming to co-create with end-users innovations for improving the welfare of pigs and poultry in low-input outdoor and organic farming systems. The PPILOW participatory approach involves National Practitioner Groups (NPG) in co-building innovative breeding and rearing strategies and techniques on this purpose. Firstly, the project gathers a comprehensive inventory of the ethical, socio-economic and technical factors that are essential to improve poultry and pig welfare in organic and low-input outdoor production systems, providing a shortlist of potential levers of improvement that are experimentally- and on-farm-tested within the project. The NPGs also co-build and test with PPILOW partners mobile applications for assessing and benchmarking animal welfare status on-farm, and tools for evaluating the sustainability of the tested lever based on the One Welfare concept.

Promising results of the project on the limitation of feather pecking in laying hens and aggressive behaviour in non-castrated pigs, of parasite development from pigs reared in low-input farms by the use of plant extracts, and for favouring piglet survival are currently obtained, which could help limiting the use of veterinary products, not only in low-input and organic farms, but also in conventional farms. Ultimately, the PPILOW project will also bring data on the feasibility of using such levers of improvement of pig and poultry health and welfare, and human well-being within the scope of the One Welfare concept.

Annex 2: Links to: event recording, Digital posters, presentations and photo gallery

Links to:

- [The event recordings](#)
- [Presentations links](#)
- [Electronic poster links](#)
- [Event photos gallery](#)