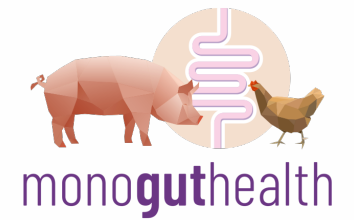


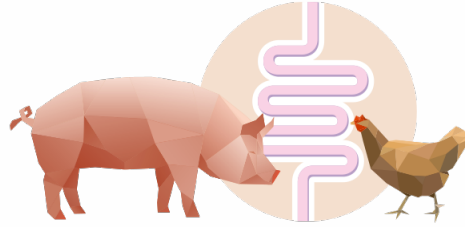
WELCOME



Session 50 (part 1) — 8:30 – 12:30
Session 62 (part 2) — 14:30 – 17:30

SUSTAINABLE SOLUTIONS TO SUPPORT AND SUSTAIN GUT HEALTH IN MONOGASTRIC LIVESTOCK (WITH THE MONOGUTHEALTH PROJECT)





MonoGutHealth

European Training Network (ETN) Project

An Interdisciplinary approach for enhancing livestock resilience through nutritional strategies

G. Bee¹, M. Siwek², C. Metges³, P. Lawlor⁴, M. Therkildsen⁵, N. Everaert⁶

¹ Agroscope, Swine Nutrition Unit, la tioletre 4, 1725 Posieux, Switzerland, ² Bydgoszcz University of Science and Technology, Jędrzeja Śniadeckich, 85-064 Bydgoszcz, Poland, ³ Forschungsinstitut für Nutztierbiologie (FBN), Institut für Ernährungsphysiologie, Wilhelm-Stahl-Allee 2, 18196 Dummerstorf, Germany, ⁴ Teagasc, Department of Pig Development, Moorepark, P61 C997 Fermoy, Ireland, ⁵ Aarhus University, Department of Food Science, Agro Food Park 48 Building 5911, 8200 Aarhus, Denmark, ⁶ KU Leuven, Department of Biosystems, Kasteelpark Arenberg 30, 3001 Leuven, Belgium

3 September 2024

EAAP 2024 - Firenze, Italy



This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 955374.

RATIONAL OF THE PROJECT

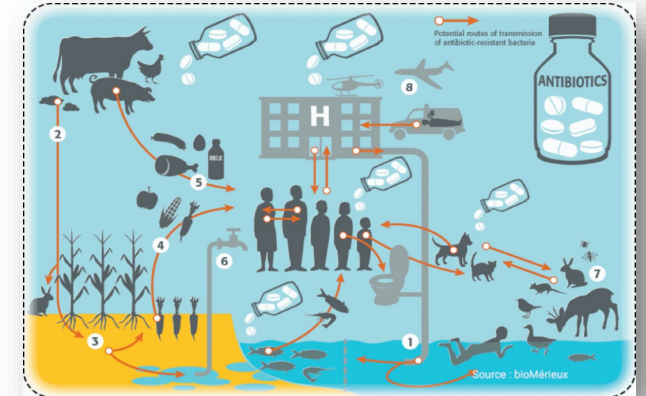
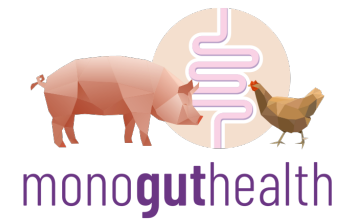
CHALLENGE

- The consequences of **excessive medication in livestock production** are well known and of immense concern worldwide.
- **Overreliance on antimicrobials** together with the negative impact of livestock production on the **environment** are the main factors fuelling the **consumer's negative perceptions** regarding animal production and animal products today.

SOLUTION

- The simplest but likely best solution to drastically reduce the need for medication in livestock production is to create **optimal rearing conditions for raising healthy animals**

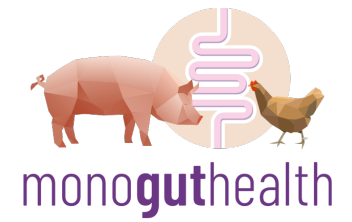
Programming **gut development** and **microbial colonization early in life** through targeted **early life interventions** to reduce animal losses, production diseases, improve welfare, enhance production efficiency, and ensure food safety



Dewulf J et al. Cambridge Univ. Press; 2020:99-124.

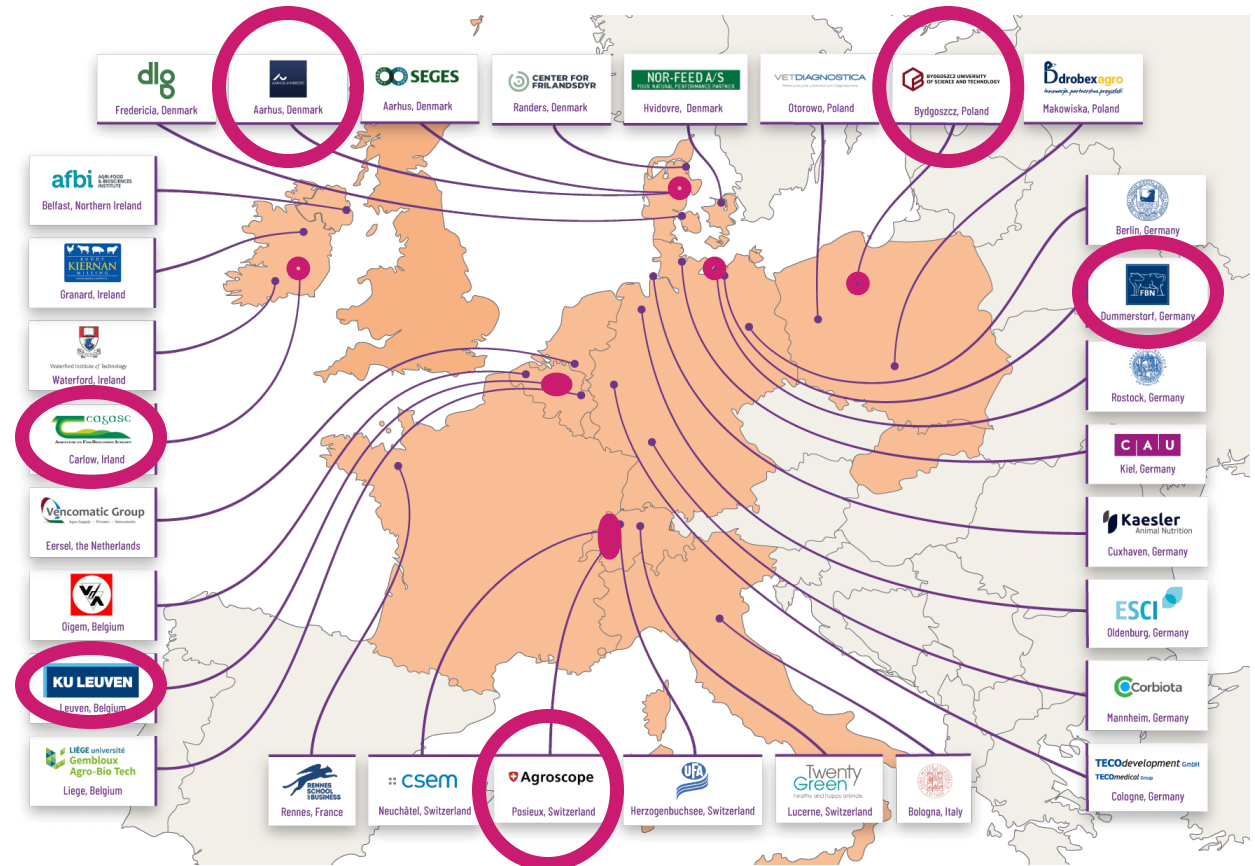


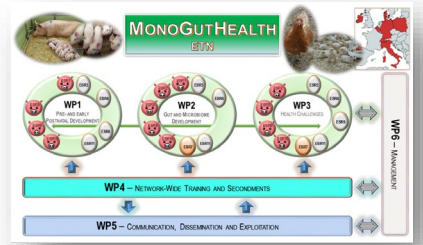
CONSORTIUM OF MULTIDISCIPLINARY EXPERTISE



The interdisciplinary approach of the project requested the expertise in the field of

- Nutrition
- Feed chemistry and technology
- Product quality
- Molecular biology
- Microbiology and parasitology
- Bioinformatics
- Biological modelling
- Extension services



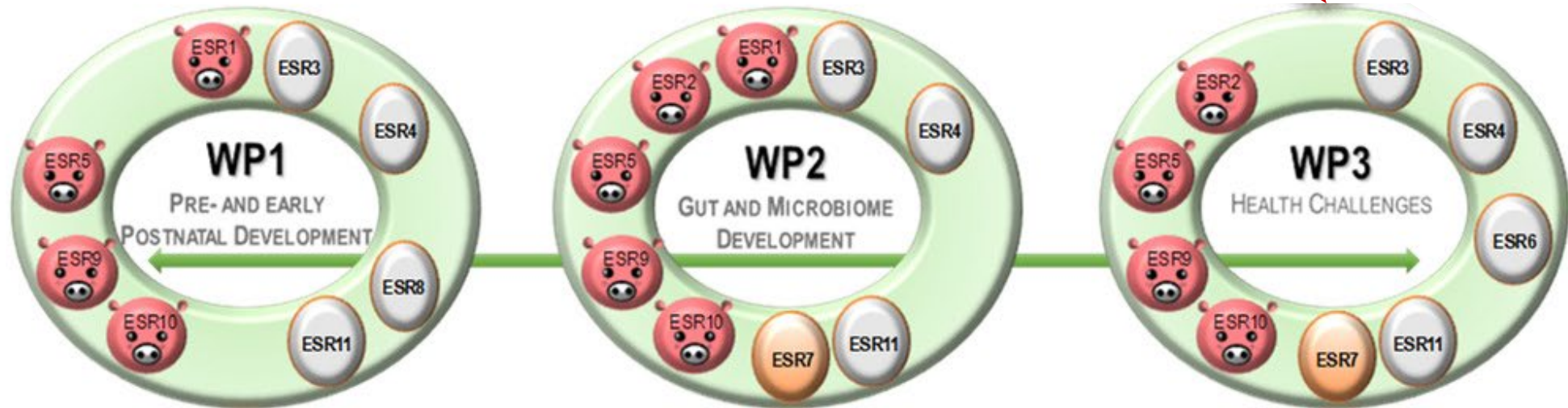


STRUCTURE OF THE PROJECT

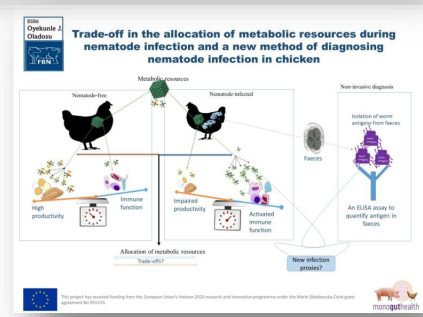
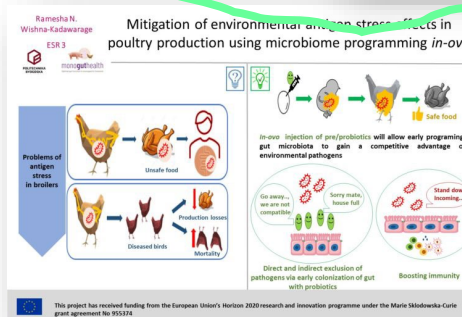
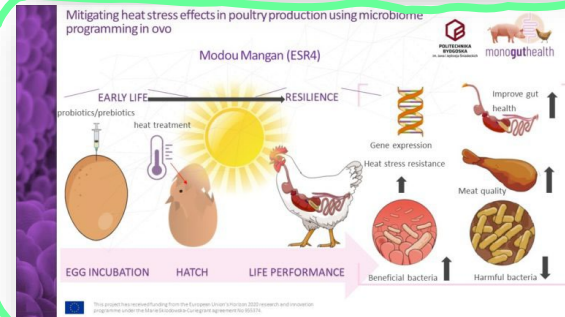
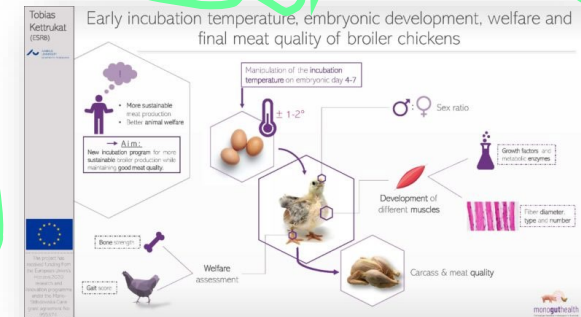
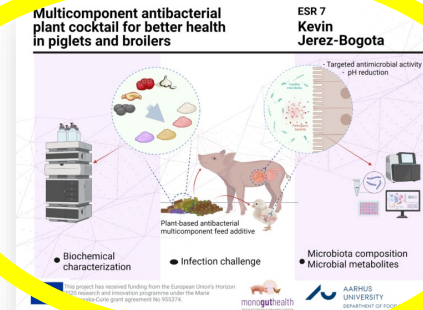
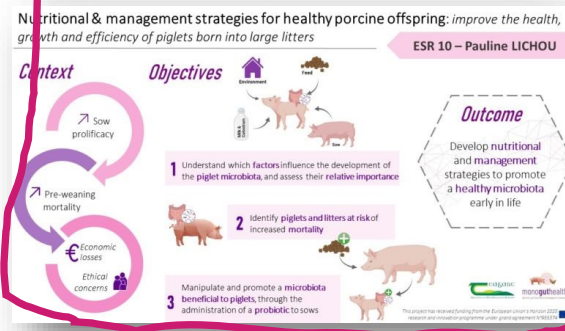
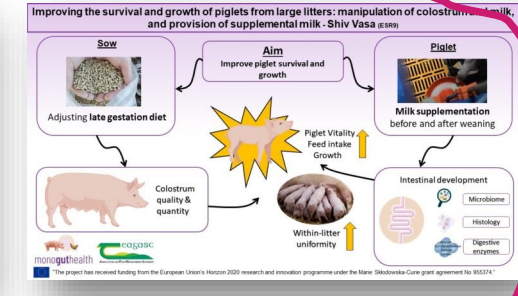
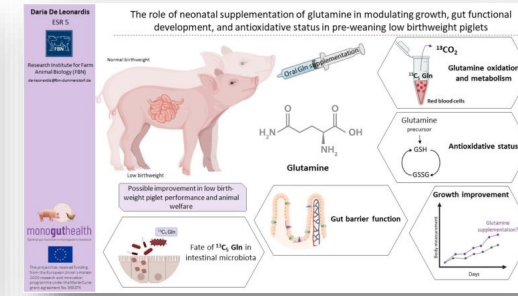
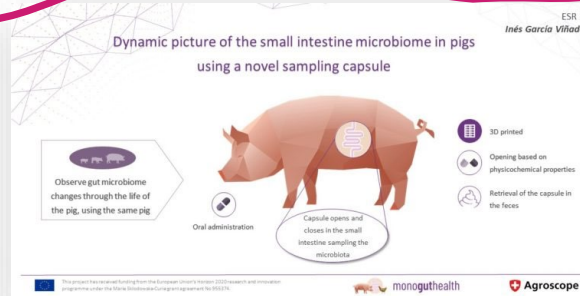
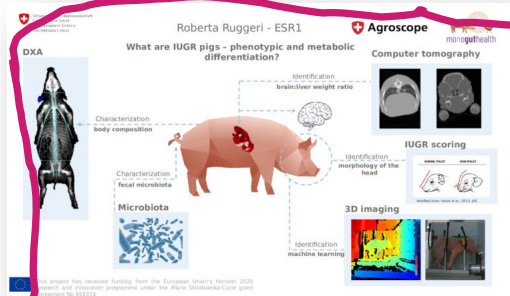
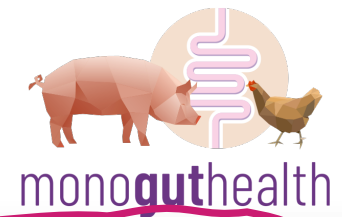
Generate new knowledge on the **phenotypic** and **metabolic background** of IUGR and low birth weight and identify **perinatal nutritional strategies** to improve pig and poultry survival, growth and development.

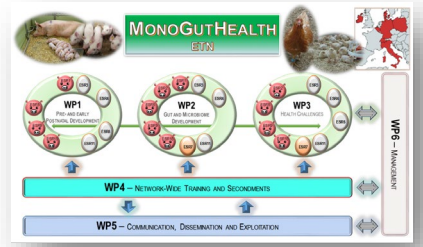
Characterise the **early-life development** of the GIT and its **microbiome** of IUGR/low birth weight piglets and underweight broilers and the potential **benefit of perinatal nutritional strategies**

Establish efficacy of the 'best' nutritional strategy determined in WP1 & 2 under **unfavourable conditions** by using established **infection or challenge models** in pigs and poultry



THE 11 PHD PROJECTS





TRAINING – RESEARCH SKILLS

WP4 – NETWORK-WIDE TRAINING AND SECONDMENTS

CORE RESEARCH SKILLS



ADVANCED RESEARCH SKILLS



MONOGASTRIC NUTRITION

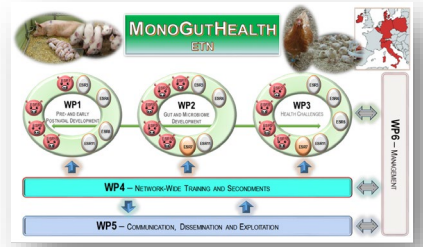
Objective: Pre- and early postnatal nutrition strategies in monogastric animals

GUT PHYSIOLOGY

Objective: Aspects of gut physiology in pigs and chicken

MICROBIOME AND IMMUNOLOGY

Objective: Introduction in GIT ecology (microbiology, immunology, and host–pathogen interaction) and its influence on health and disease in young animals



TRAINING – TRANSFERABLE SKILLS

WP4 – NETWORK-WIDE TRAINING AND SECONDMENTS

SOFT SKILLS

COMMUNICATION AND OUTREACH

Objective: Develop skills in communication and outreach

WRITING AND PUBLISHING

Objective: Deepening skills in academic writing, writing for general public

TRAINING FOR INDUSTRY

Objective: **1)** Understand the importance of innovation management and strategies. **2)** Gain insight into the technology transfer process and key stakeholders. **3)** Explore management and performance issues in knowledge and technology transfer. **4)** Understand Intellectual Property Rights (IPR), protection, and exploitation models.

INVOLVEMENT OF INDUSTRY

RESEARCH VALIDATION AND TESTING:

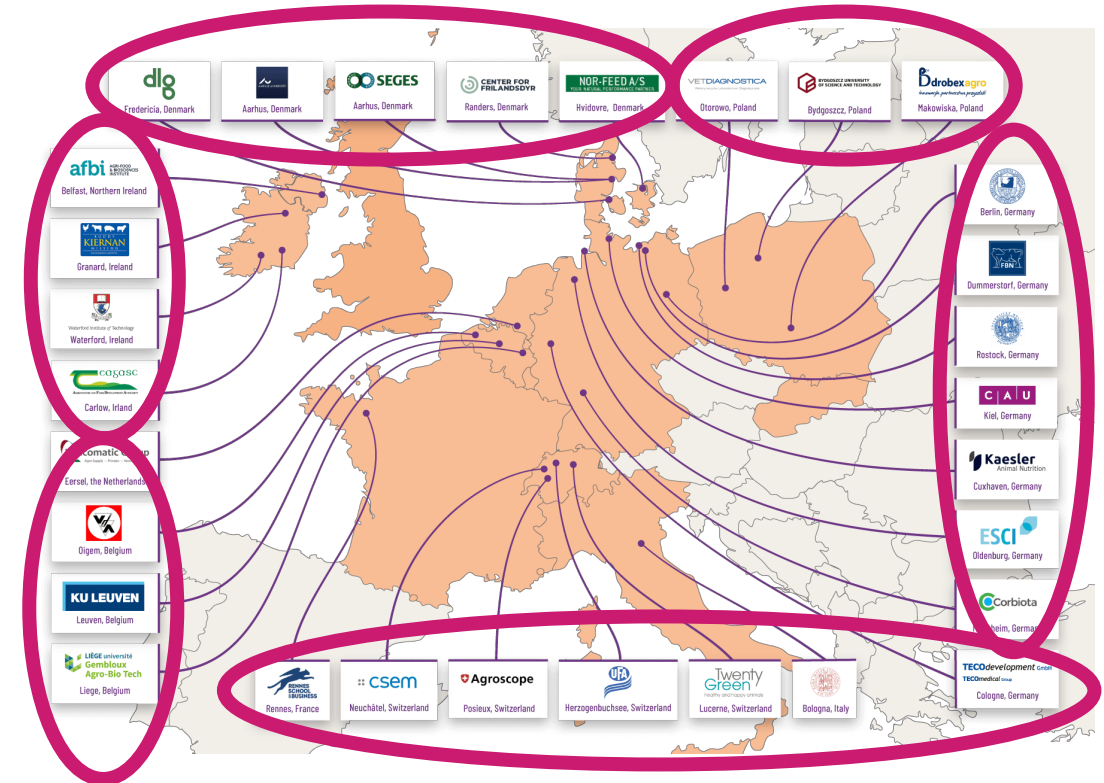
UFA provided facilities for validating a MACHINE LEARNING MODEL and tested it under commercial conditions. Drobex Agro facilitated in-hatch management and dosage tests at the commercial farm level.

TRAINING IN INDUSTRY PRACTICES:

TwentyGreen, Kaesler Nutrition, Chemovator, Vetdiagnostica, and Kiernan Milling offered specialized training in areas such as microbiological analysis, scientific marketing, feed formulation, and veterinary diagnostics. SEGES and Vencomatic provided training in animal welfare evaluation, housing systems, and equipment.

DEVELOPMENT AND TECHNICAL TRAINING:

TECOdevelopment and Vanden Avenue focused on technical aspects, including ELISA development and feed formulation for broiler rearing.

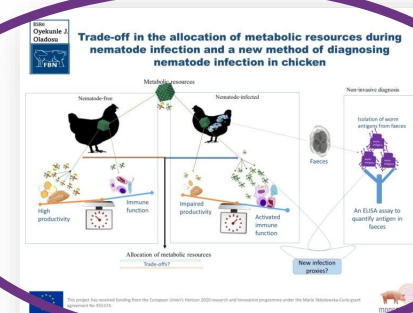
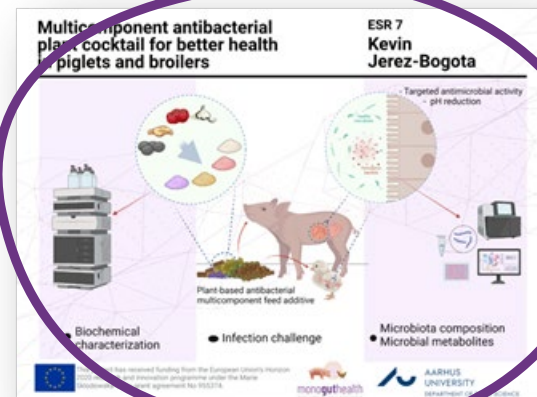
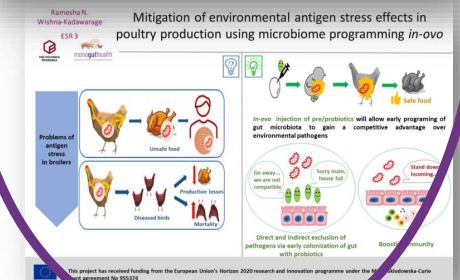
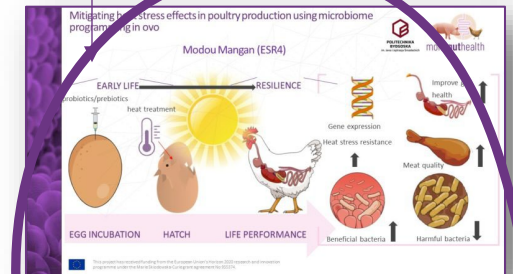
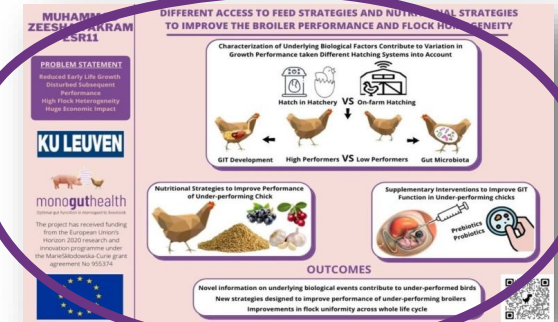
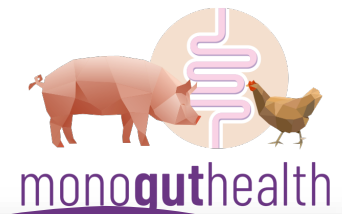


OUTCOME OF THE PROJECT

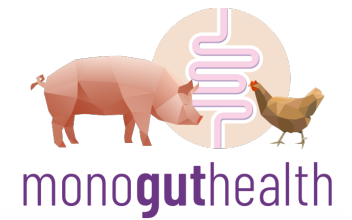
Theatre Session 50

Book of Abstracts page

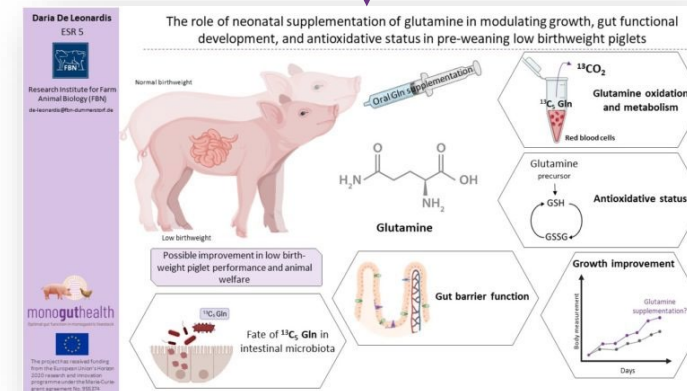
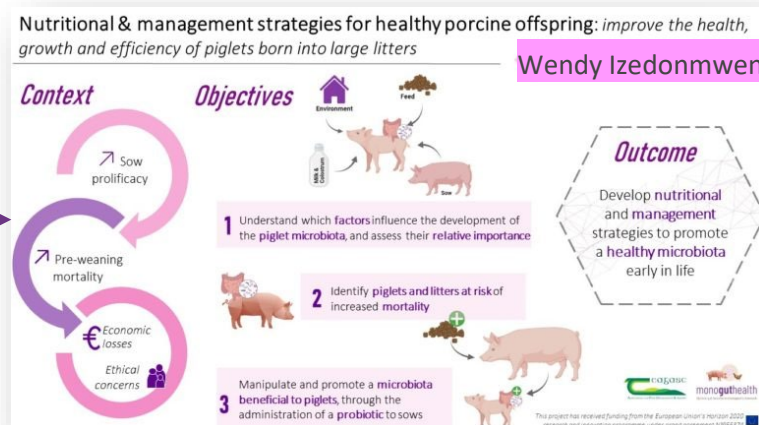
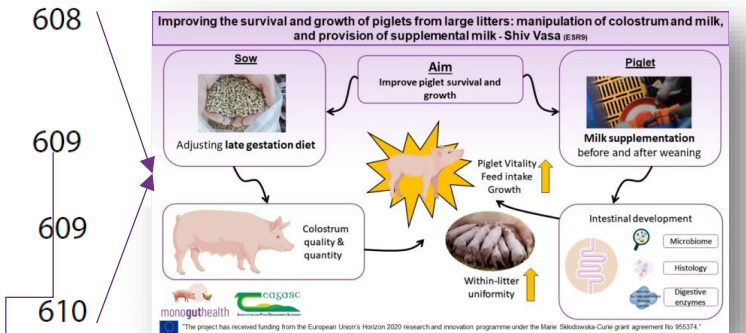
- 8:30 MonoGutHealth: An Interdisciplinary approach for enhancing livestock resilience through nutritional strategies
invited G. Bee, M. Siwek, C. Metges, P. Lawlor, M. Therkildsen, N. Everaert 606
- 8:45 Differences between low and high body weight broilers and strategies for catch up growth of low performing chickens
invited M. Z. Akram, A. Dunislawska, N. Everaert 606
- 9:15 Effects of in-ovo stimulation on gut health and production of broiler chickens
invited R. N. Wishna - Kadawarage, M. Mangan, A. Dunislawska, C. C. Metges, R. Hickey, M. Siwek 607
- 9:45 Transcriptional and metabolic responses in chickens infected with mixed parasite species
O. J. Oladosu, B. S. B. Correia, B. Grafl, D. Liebhart, H. Reyer, R. Weikard, H. C. Bertram, C. Kühn, C. C. Metges, G. Daş 607
- 10:00 Monoguthealth in Denmark: Early interventions in pigs and broilers to improve their health and welfare 608
invited N. Canibe, T. Ketrukut, K. Jerez Bogota, M. Jensen, O. Højberg, R. Engberg, M. Therkildsen



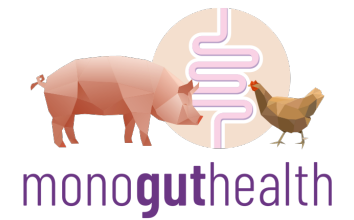
OUTCOME OF THE PROJECT



- 11:00 Pre- and post-weaning liquid feeding of pigs
invited P. Lawlor, S. Vasa, E. Arnaud, G. Gardiner
- 11:30 Glutamine supplementation during the suckling period and its influence on piglet growth and intestinal metabolism
invited Q. L. Sciascia, J. Buchallik-Schregel, J. Schulze Holthausen, Z. Li, D. De Leonardis, S. Goers, J. Zentek, C. C. Metges
- 12:00 Effect of creep feeding on pre-weaning growth of suckling pigs
W. O. Izedonmwen, R. Muns, C. Mulvenna, A. Jones, P. Cormican, G. Gardiner, P. Lawlor
- 12:15 Feeding a gestation diet to sows in early lactation and liquid creep feeding of suckling pigs
S. R. Vasa, M. Girard, G. E. Gardiner, K. O'driscoll, G. Bee, P. G. Lawlor



OUTREACH ACTIVITY



Discover the latest advancements from
MonoGutHealth project

Join us to explore Innovative solutions for reducing antibiotic use in livestock production and improving animal health through advanced nutritional strategies!



MonoGutHealth project aimed to transform swine and poultry production by harnessing targeted nutrition to enhance gut health, minimize antibiotic reliance, and boost overall animal welfare and productivity.

The project tackled the global issue of over-medication in livestock by optimizing conditions for healthy animal growth. By using perinatal nutrition, we aimed to influence gut microbiota composition and enhance metabolic and immune responses, focusing on essential growth stages such as gestation, early neonatal, and post-weaning in pigs, and pre- and post-hatch in chickens. Our goal was to develop specific dietary approaches to improve colostrum quality, support low birth weight piglets, and promote robust gut health.

(^@^*) **In swine production**, we addressed challenges as **low birth weight, high pre-weaning mortality, and post-weaning stress** through improved nutrition and gut health strategies.

(^v^*) **In poultry production**, we tackled growth **variability, antibiotic resistance, and health issues** in broilers with innovative *in ovo* and post-hatch nutritional interventions.



Register here: bit.ly/Register-MonoGutHealth-event

