

PEGaSus

PHOSPHORUS EFFICIENCY in *Gallus gallus* and *Sus scrofa*

Bridging the gaps in the phosphorus value chain via combining ideas, experience and expertise on monogastric feeding, economic-environmental balance and governance



Basic Data

Funding:

ERA-NET Cofunds Sustainable Animal Production (€ 2 million)

Duration:

2017 –2020 (36 months)

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Phosphorus (P) is an irreplaceable component of life yet it is not efficiently used/reused in agriculture, leading to grave concerns for soil and water ecosystems. PEGaSus, a project within the European Research Area NETwork on Sustainable Animal Production (ERA-NET SusAn), aims at providing solutions to balance the P cycle in pig and poultry farming, hence contributing to P-resilient livestock production that is resource-efficient and economically competitive.

Background

The competitiveness of European agri-food production relies on the efficient and sustainable use of resources. The essential element phosphorus (P) is a finite resource but is not used efficiently in agriculture yet global food demand is increasing rapidly along with population growth. The EU imports 90% of its mineral P which creates vulnerability to shocks in the global mineral P supply chain and this could jeopardize EU food security. Reaching sustainability and resilience in the P cycle will require addressing multiple aspects including changes in P-use efficiency in animals and plants, P losses from manure management and the role of micro-organisms in influencing P availability and storage in soils, all with a multidisciplinary approach. PEGaSus has been developed to tackle these issues and to strive for improving sustainability and efficiency regarding P use with an emphasis on monogastrics since pigs and chicken contribute to global food security but are major P excretors and sources of P losses.

Project aims

The strategic objective of PEGaSus is to contribute to resource-efficient and economically competitive animal production systems by; identifying strategies for increasing the bioavailability, digestibility and efficiency of plant-derived P by monogastrics so as to reduce P supplements; reducing P losses and emissions from pig and chicken husbandry targeting benefits for animal health, welfare, and the environment; developing technical, policy and governance strategies to minimize P discharges from farms, P in runoff from soil and subsequent enrichment in aquatic ecosystems.

Activities

PEGaSus involves the following key activities:

- The development of a bio-economic model to evaluate the impact of alternative P management strategies and policy measures on farm economics and the ecological footprint
- Animal experiments to assess various feeding strategies and alternative P sources for pigs and poultry
- Lab experiments to characterize the animal-intrinsic genetic, physiological and molecular factors influencing efficient P utilization in pigs and poultry using state-of-the-art genomic, bio-mathematical and analytical methods
- Quantification of the P reuse potential from manure, bone and slurry including economic replacement values
- Modelling P deficient/surplus areas within selected EU zones sensitive to eutrophication
- Generating policy measures for controlling P use and runoff from farms and for provision of P reuse products.

Expected outcomes and impact

Some of the major social challenges faced by the European community are the need to reduce environmental burdens from agriculture while at the same time providing food security. Areas where PEGaSus will have the most impact include the reduction of the environmental burden due to P losses, strengthening the resilience and competitiveness of European animal production and making it more independent from P imports, while considering public demands for more animal- and environmental-friendly safe and secure food production. By addressing the relationships between feeding, digestibility, endogenous utilization, excretion of P, and environmental releases, PEGaSus will develop feeding, breeding and management/reuse tools and strategies as well as science-based policy measures to improve the efficiency of P use in pig and chicken production.

Partner Institutions

Leibniz Institute for Farm Animal Biology (FBN), Germany
Agri-Food and Biosciences Institute (AFBI), United Kingdom
Aarhus University (AU), Denmark
Stockholm Environment Institute (SEI), Sweden
Università Cattolica del Sacro Cuore Piacenza (UCSC), Italy

Funding

Federal Ministry for Food and Agriculture (BMEL), Germany
Department for Environment, Food & Rural Affairs Services (Defra), United Kingdom
Danish AgriFish Agency, Ministry of Environment and Food (DAFA), Denmark
Swedish Research Council (Formas), Sweden
Ministry of Agricultural, Food and Forestry Policies (MIPAAF), Italy



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