

## **Expert opinion on biosecurity measures for controlling Salmonella and hepatitis E virus in pig farming – findings of the OHEJP BIOPIGEE project**

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### **INTRODUCTION**

Salmonella (SAL) and hepatitis E virus (HEV) are considered zoonotic pathogens. In humans, SAL can cause gastrointestinal diseases. About 10-20 % of the human cases of salmonellosis in the EU have been attributed to pigs as the source of infection. HEV can cause asymptomatic, acute self-limiting or chronic diseases in humans. Human HEV infections are considered to be an emerging problem in the EU. The most common transmission route is assumed to be food-borne, from pigs. Usually, neither pathogen causes clinical disease in pigs. Effective measures which reduce the introduction of these pathogens into and within pig herds will contribute to the prevention of human infections.

The 'Biosecurity practices for pig farming across Europe' (BIOPIGEE) project under the One Health European Joint Programme (<https://onehealthejp.eu/>) aims to establish a protocol of biosecurity measures relevant for reducing the occurrence of SAL and HEV in the pig production chain, harmonised across EU countries. The protocol will be based on the combination of results from literature reviews, expert opinion and bespoke studies. Here, the experts' evaluation of farm biosecurity measures to counteract SAL and HEV are compared.

### **METHODOLOGY**

In 2021, experts identified by the BIOPIGEE project team were invited to evaluate a list of 57 biosecurity measures for indoor pig farming and 54 for outdoor pig farming previously identified from a literature review in terms of their importance for controlling SAL and HEV. Professionals from 12 European countries were recruited. The panel mainly consisted of veterinarians active as researchers, consultants, government officials, and practitioners. The panel was invited to complete an online survey with four sections (HEV indoor/outdoor, SAL indoor/outdoor). Depending on their area of expertise, the experts answered either one section or up to all four sections.

Within each section, the experts rated eight biosecurity categories (other animals, cleaning & disinfection, equipment, feed/water/bedding, humans, mixing, purchase, transport)

according to each category's relative importance. Afterwards, they rated 4 to 10 measures within each category on a numeric scale from 1 to 5.

## RESULTS

Answers from 46 questionnaires were eligible for analysis. The sections for HEV indoor/outdoor and SAL indoor/outdoor were answered 23/10 and 39/20 times, respectively.

For the indoor situation, the experts ranked the relevance of categories similar for both pathogens. The category 'cleaning & disinfection' was considered to be the most important and pig 'mixing' the second most important. The responses varied most for the pig 'purchase' category, in connection with SAL control.

For outdoor keeping, the experts placed great emphasis on limiting the 'mixing' and 'purchase' of pigs to control both pathogens. The category 'feed/water/bedding' was also rated high for SAL, as was 'cleaning & disinfection' for HEV reduction. The experts' answers were more varied for HEV while their answers for SAL were more consistent.

Measures in connection with the 'mixing' category were generally rated high, with a wide variation in the assessment of 'cross-fostering' outdoors. 'Feed/water/bedding' was ranked relatively highly, too. The measures 'water free from microbial contamination' and 'protected storage of feed/bedding' were considered relevant for HEV, and 'contamination, structure and pH of the feed' was as well, for SAL reduction.

## DISCUSSION

The most important biosecurity categories and measures per husbandry system and pathogen according to the evaluation could be used as a starting point by farms in order to control SAL and HEV. According to the experts' assessment, 'mixing' is important in all four situations, probably due to the fact that pathogen transmission may occur when pigs come into contact with one another, independent of husbandry system.

Most measures were assessed to be relevant to a similar degree for both pathogens and husbandry systems. However, asking experts to answer for more than one pathogen/husbandry system can produce bias that leads to similar results, but could also lead to differences being sought. Nevertheless, a wide variation in the answers for some of the measures indicates a need for further studies, especially regarding the effectiveness of measures for HEV control. In the BIOPIGEE project, we will subsequently compare the expert opinion results with evidence of the effectiveness of specific biosecurity measures based on previous literature and current research studies.

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