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61. Mitigating ammonia emissions from pig farms implementing source-oriented measures

Levrault, C.M.[a*], Seefedpari, P.[a], de Mol, R.M.[a], Hol, J.M.G.[a], Aarnink A.J.A.[a] & van der Fels, J.B.[a]

Wageningen Livestock Research, Wageningen University & Research, The Netherlands [a]; [*]Corresponding author, email: cecile.levrault@wur.nl

Introduction

In the past decades, the European pig sector has intensified to answer the growing food demand. For the animals, this intensification translates in an increase of chronic environmental stressors that have adverse effects on their health, welfare, and productivity (O'Connor et al., 2010). One of the consequences of the higher animal densities that are observed in these intensive production systems (Maes et al., 2020) is the emission of pollutants such as ammonia (NH_3) (Zhang et al., 2024). This has repercussions on both indoor and outdoor air quality, with armful impacts on pigs and workers health as well as on the environment (Donham, 2000; Webb et al., 2014; Philippe and Nicks, 2015). Mitigating its emission is therefore essential.

Methodology

The NH_3 emissions of four commercial pig barns in the Netherlands were monitored over a period of two years. These emissions were monitored using a combination of real-time measurements taken by commercial sensors and a reference method (wet-chemical analysis (Mosquera et al., 2019)). Source-oriented reduction strategies such as daily manure removal, reduction of emitting area and manure dilution were implemented in a number of rooms of the target pig farms. Their effect on the aforementioned emissions was compared to the levels observed in the conventional pen designs.

Results and discussion

This study highlighted once again the challenges of monitoring emissions under practical settings. Sampling location, the number of samples taken, the time interval between two observations, and technology used are some of the difficulties encountered in practice. Yet, preliminary results showed the positive effect of these reduction strategies on NH_3 emissions, leading to significantly lower emission factors. Simultaneously, the better indoor air quality observed in these low-emission pens seemed to have positive effects on pigs health (decrease in occurrence of respiratory diseases) as well as on productivity (shorter fattening phase).

Conclusion

Preliminary analysis show the potential of mitigation strategies on both emissions and animal health. Furthermore, real-time emission monitoring would help farmers track their emissions and enable immediate decision-making for better management. Further analysis will allow for more precise conclusions to be drawn.

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