

**TITLE**

**HEALTHY CLIMATE: AMMONIA, CO<sub>2</sub>, RELATIVE HUMIDITY AND ENDOTOXINS IN DUTCH PIGFARMS**

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**CONTENT**

Background and objectives

Pig vets are twice as likely to develop chronic cough as other vets. Lung diseases in pigs account for substantial antibiotic use. Our aim is to measure the indoor climate in pig barns.

Materials and methods

The temperature, relative humidity (RH), ammonia- and CO<sub>2</sub> concentrations were measured on 21 pig barns, on days with an outdoor temperature below 15 °C. We've collected 43 results. It was measured for at least 5 minutes per unit, on chest height, not at feeding time. On 18 of these farms, we have also collected dust, with air pumps. The farms have not been selected in any way.

Results

CO<sub>2</sub> concentrations were too high (>1200 ppm) for normal working conditions in 95% of our results. Ammonia concentrations are unhealthy from > 7 ppm, which was the case for 80% of our results. Relative humidity was too high in 54% of the results (norm humans 40-60%). For pigs, the norm for ammonia is 25 ppm which was exceeded in 20% of our results.

The endotoxin units per mg dust compared with CO<sub>2</sub> concentrations show extreme differences when CO<sub>2</sub> is >2400 ppm: the maximal endotoxin units are then up to three times as high.

Notable findings are that high ammonia (>25 ppm) and endotoxin concentrations seem to be linked to high CO<sub>2</sub> (>1800 ppm) and bad RH (>60% or <40%).

Conclusions

Recommended concentrations for CO<sub>2</sub> (2000-3000 ppm) and relative humidity (RH 50-80%) in pig barns are not healthy. CO<sub>2</sub> concentrations >1200 ppm cause ill working conditions. Moreover, there seems to be a link between high ammonia, endotoxins, CO<sub>2</sub> and RH.

We recommend CO<sub>2</sub> concentration <1800 ppm. To realise a healthier climate for ourselves and our pigs, we need at least CO<sub>2</sub> sensors next to temperature sensors connected to ventilation systems in each pig barn-unit.