Emission of ammonia and hydrogen sulfide from fattening pig houses with natural ventilation in South-East Spain

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INTRODUCTION AND OBJECTIVE

The emission of polluting gases from pig farms is nowadays considered an important factor that should be controlled. For estimating gas emissions, it is necessary to know the ventilation flow and concentration of pollutant gas. The aim of this work was to monitor the emission of NH_3 and H_2S for a period of 46 days in a pig fattening farm in the South-East of Spain.

METHODS

This experiment was developed under natural ventilation and intensive rearing conditions during the growing phase (30-60 kg BW). Pigs were raised on partly slatted floor, with a pit that was emptied regularly. The animal density was 1 pig/m^2, with maximum indoor temperature that ranged from 20 to 30ºC.

Figure 1. Pig fattening farm

Figure 2. Multigas detector

The ventilation flow was indirectly determined by the tracer gas method (CO_2). The production of CO_2 was estimated considering different factors (liveweight, energy intake and temperature) and adjusted for animal activity. Indoor and outdoor CO_2 concentrations were measured. Gas concentrations (CO_2, NH_3 and H_2S) were continuously monitored by X-am 7000 Dragër multigas detectors.

RESULTS

The average ventilation rate was above 30 m^3/animal/hour. The average indoor concentration of CO_2 was 1281 ppm; a maximum limit of 3000 ppm is suggested for pig houses. The concentration of NH_3 reached a high average value (19.30 ppm) compared to the threshold value recommended by the International Commission of Agricultural Engineering. By contrast, the H_2S did not exceed a problematic concentration (average value of 0.23 ppm). The high NH_3 concentration joined to ventilation flow led to high values of NH_3 emissions.

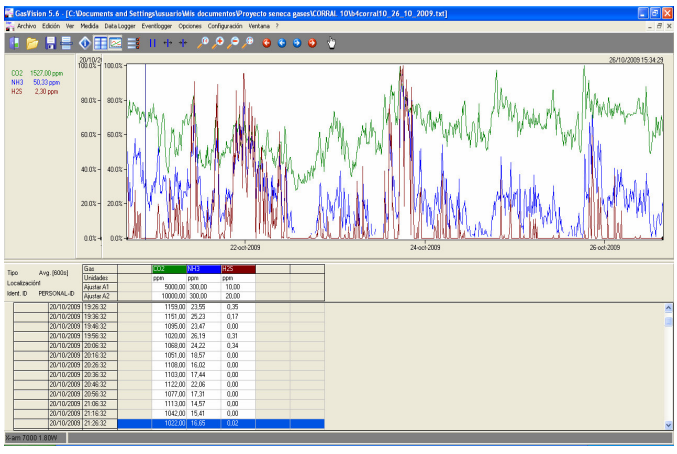

Figure 3. Software for record storage of gas concentrations

CONCLUSIONS

The results of our study could be explained by some factors (livestock building design, manure handling and indoor environmental factors) with significant influence on emission of polluting gases.

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