Indoor concentrations of CO$_2$ and NH$_3$ in a fattening pig barn in Beijing, China

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1. Introduction
This study quantified the indoor gas concentrations of carbon dioxide (CO$_2$) and ammonia (NH$_3$) in a fattening pig barn from a commercial pig farm situated in the Shunyi District, Beijing. The pig farm is characterized by the “Gan Qing Fen” system or “Dry Manure Cleaning” and its capacity was of 5000 LU.

2. Materials and Methods
A BABUC instrument (LSI Lastem s.r.l., Italy) with sensors for CO$_2$, NH$_3$, Temperature (T) and Relative Humidity (RH) were adopted. Operative ranges of the CO$_2$ probe was 0-3000 ppm and of the NH$_3$ probe was 0-50 ppm. CO$_2$ and NH$_3$ were recorded every 1 min and 3.5 min, respectively on 16-17 April, 2010. The device was placed at 2 m height in the center of the pig barn as shown in the figures below.

3. Results
Fig. 3. Indoor CO$_2$ concentrations (ppm), T (°C) and RH (%)
Fig. 4. Indoor NH$_3$ concentrations (ppm), T (°C) and RH (%)

4. Conclusions
CO$_2$ and NH$_3$ fluctuations were mainly influenced by pig activity, manure accumulation and cleaning. In order to draw more certain conclusions, it is required to perform long term gas concentrations measurements, to consider the outside conditions such as incoming air / air exchange and the influence of pig respiration, manure decomposition, animal characteristics as well as to replicate the measurements in full and empty barns.

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