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HARMFUL GASES CONCENTRATION AND EMISSIONS FROM HALLS FOR BROILER CHICKENS FED BY DIFFERENT RATIONS

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OBJECTIVES

Ammonia (NH3), Carbon dioxide (CO2), and Nitrous oxide (N2O) production, air temperature and relative humidity and litter temperature were measured during the winter period in two halls for broiler chicken fed by different rations (experiment hall and control hall). In the experiment hall Alltech feed ingredient "Deodorase" was added to the regular feed ration.

MATERIAL AND METHODS

Chickens in both halls were housed on deep litter. The housing area can be heated with two suspension gas units for direct heating with natural gas burning. Combined tunnel and transverse two-sided automatically regulated ventilation is used in both halls. In each of them six ceiling axial-flow fans are installed in the ridge of the roof and four fans are installed on the front wall of the building. Only four ceiling fans were run during the observed winter period. Ventilation flaps were placed on longitudinal walls of each hall. The photoacoustic field gas system, consisting of INNOVA devices, was used for quantitative analysis of gases. Air samples were taken from air stream at two ceiling fans and at the level of birds. Air temperature and relative humidity were examined by apparatus COMET-S 3121. Three thermo-cell thermometers were placed in litter. Air flow in fans was measured by equipment Testo 400 with 8 canals.

RESULTS

Air temperature in both halls declined similarly ***(Fig.1). Air humidity*** inside of both halls grew similarly towards the end of fattening periods, however, it was influenced also by changes of air humidity outside ***(Fig. 2.) Litter temperature*** has grown as it was expected ***(Fig. 3)***. The decline at the beginning of third quarter of fattening period in the control hall cannot be explained. Only four ventilators in both halls were run during the observed period. ***Ventilation capacity*** has grown up to 23rd day of fattening ***(Fig. 4)***. Then the mentioned ventilators were fully opened and therefore ventilation capacity since 23rd day to the end of fattening period was almost stable in both halls. Data of the real ventilation capacity were used for calculation of gases emission.

Concentration of NH_3 was generally lower in the experimental hall than in control hall. The larger differences were in the last half of fattening period ***(Fig. 5).*** High concentrations of all gases at the beginning of fattening period were probably caused by very intensive heating during low outside temperature. There were almost none differences of ***N_2O and CO_2 concentration*** between the halls ***(Fig 6 and 7).***

Emission of all gases was evaluated only at the second half of fattening period. ***Emission of NH_3*** was lower in the experimental hall than in control hall. The larger differences were in the last half of fattening period ***(Fig. 8)***. There were almost none differences of ***N_2O and CO_2 emission*** between the halls ***(Fig 9 and 10)***

Fig. 1 Air Temperature

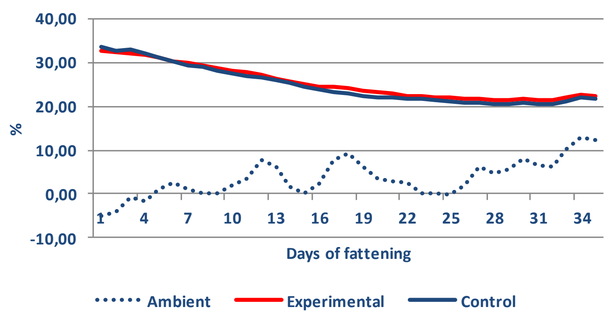


Fig. 3 Litter Temperature

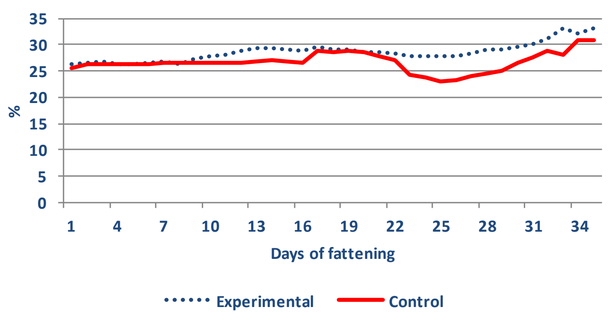


Fig. 2 Air Humidity

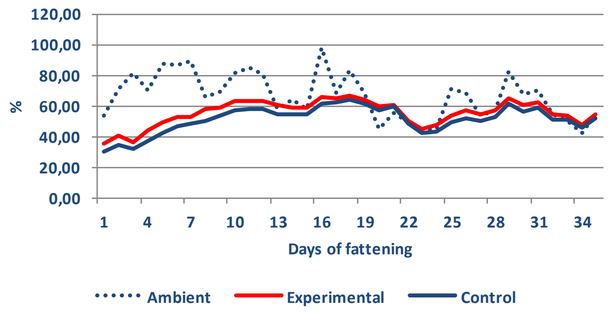


Fig. 4 Ventilation Capacity

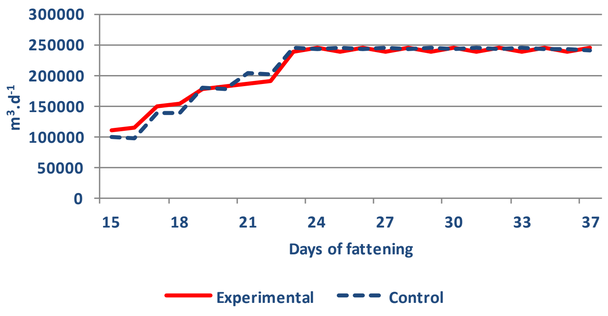


Fig. 5 Concentration of NH_3

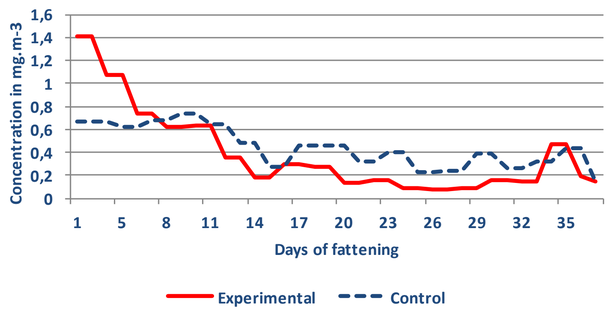


Fig. 6 Concentration of N_2O

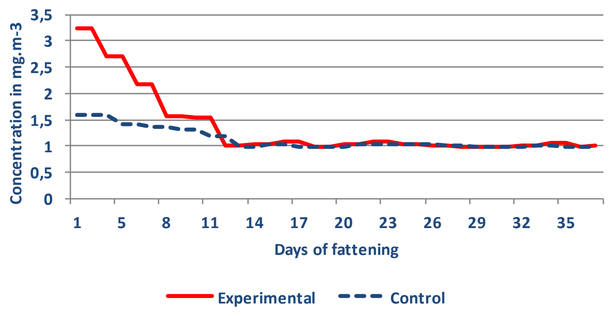


Fig. 7 Concentration of CO_2

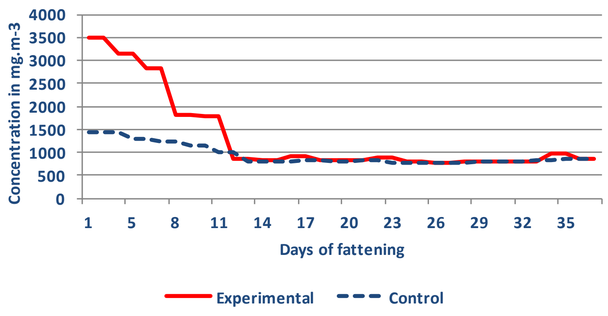


Fig. 8 Emission of NH_3

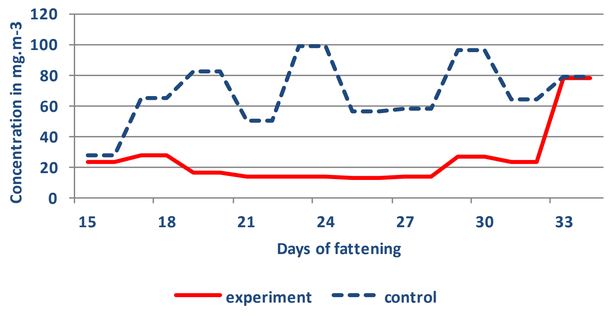


Fig. 9 Emission of N_2O

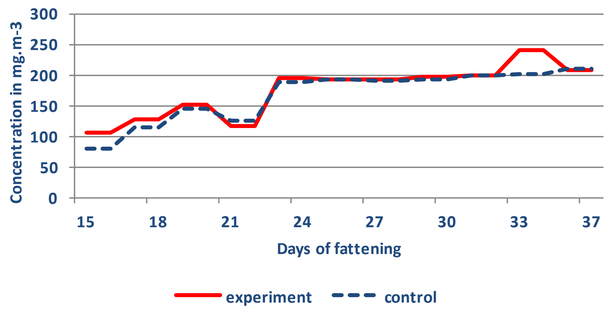
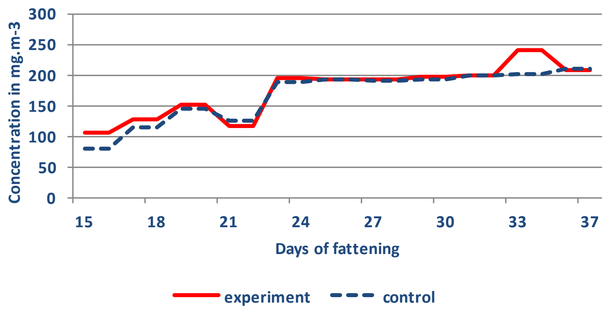


Fig. 10 Emission of CO_2



CONCLUSIONS

Addition of Alltech feed ingredient "Deodorase" to the regular feed ration of chicken broilers caused decreasing of NH_3 emission.

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