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Czech Journal of Animal Science

Quantification of nitrogen balance components in a commercial broiler barn

von Bobrutzki K., Ammon S., Berg W., Fiedler M.:

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Characterizing the respective nitrogen (N) use efficiency requires understanding the N flow of inputs and outputs from a commercial broiler barn. In this study, an N mass balance was performed for one

entire growing cycle. The objectives were to quantify, sample, and analyze all N components entering and leaving the barn. The N from feed, chickens, and bedding material was considered as inputs, the outputs included the N accretion in mature broilers, the total N emissions (N_{TNE}), the N accumulation in litter, and the N of mortality. Of particular relevance was the determination of an appropriate method to mirror the heterogenic texture of the litter. Litter samples were collected weekly according to a defined procedure. The major N input was feed N, accounting for 99% of the total N input. After the 36-day growing cycle, the N outputs were portioned as follows: 59% (1741.3 kg N) in mature broilers, 37% (1121.3 kg N) accumulated in litter, and 4% in NTNE (114.3 kg N). The N accumulations in broiler tissue and litter agree well with other studies. The measured emissions were consistently lower compared to other references, due to the fact that these references were mainly based on studies where broilers were raised on built-up litter. In contrast to *in situ* quantified N emissions in this study, other published values were

between inputs and outputs. This study illustrates that extensive sampling of litter is a prerequisite for calculating litter masses. The accurate specification of the litter texture proved to be crucial within the mass balance approach. With this information, the feasible improvements within management practices can be identified.

Keywords:

ammonia; emissions; mass balance; litter sampling

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