

Article

Potential for Ammonia Generation and Emission in Broiler Production Facilities in Brazil

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Simple Summary: The aim of the present study was to develop predictive models for the potential generation and emission of ammonia from Brazilian broiler chicken production. For this study, samples of poultry litter (shavings and coffee husks) from thirty commercial poultry houses located in the Zona da Mata Mineira region were analyzed. The poultry litter samples were subjected to different air temperatures in climatic chambers. The models developed and validated showed high accuracy, indicating that they can be used to estimate the potential for generation and emission of ammonia in poultry production, enabling its quantification when its measurement is not possible.

Abstract: Air quality is one of the main factors that must be guaranteed in animal production. However, the measurement of pollutants is still a problem in several countries because the available methods are costly and do not always apply to the reality of the constructive typology adopted, as in countries with a hot climate, which adopt predominantly open facilities. Thus, the objective of the present study was to develop predictive models for the potential generation and emission of ammonia in the production of broiler chickens with different types of litter, different reuse cycles and under different climatic conditions. Samples of poultry litter from thirty commercial aviaries submitted to different air temperatures were analyzed. The experiment was conducted and analyzed in a completely randomized design, following a factorial scheme. Models were developed to predict the potential for generation and emission of ammonia, which can be applied in facilities with ambient conditions of air temperature between 25 and 40 °C and with wood shaving bed with up to four reuse cycles and coffee husks bed with up to six reuse cycles. The developed and validated models showed high accuracy indicating that they can be used to estimate the potential for ammonia generation and emission.

Keywords: air quality; animal buildings; environmental modelling; gas emissions; sustainability



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1. Introduction

Brazil is currently the world's largest exporter of chicken meat and the third-largest chicken meat producer in the world, with more than 14 million metric tons in 2021 [1]. For more than a decade, the country has maintained the position of the world's largest exporter of this type of meat, with shipments to more than 150 countries [2]. Brazilian broiler production employs more than 3.5 million workers, directly and indirectly, accounting for almost 1.5% of the Gross Domestic Product (GDP), representing social and economic relevance [3].