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Applicability of Turmeric (*Curcuma longa*) for Minimizing Ammonia Emission Rates from Poultry Litter by Altering Some Physiochemical Properties

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Abstract

Turmeric(TM) is a natural antiseptic which shows antimicrobial activity against bacteria, fungi, viruses, yeast, and round worms. Objective of the study was to investigate the applicability of TM to diminish ammonia emission rates from poultry litters by wiping out the conditions favourable for microbes. Three months old paddy husk based layer litter was the subject for the study. A litter sample (2 kg) was taken using a spade and mixed by hand in a sealed black poly bag. From the mixed litter, samples were taken for the determination of pH and moisture. Litter was mixed with TM powder in 5 different levels; 0%, 1%, 3%, 5% and 8% (w/w). After mixing with TM, 4 replicated samples (150 g each) were placed in containers for all levels of mixed litter. Then samples were incubated for 5h, and the emitted NH_3 was trapped with boric acid and then titrated with HCl to determine the NH_3 emissions. The emission rate was calculated as milligrams of NH_3 emitted/ /kilogram of fresh litter/hour. The pH was significantly ($p < 0.05$) reduced with the increment of TM level showing the highest (9.34) and the lowest (9.07) which is a considerable drop with control (0%) and 8% application level respectively. Moisture (%) was also significantly increased in 1% (44.53%) and 8% (45.18%) applications. There was a trend in reducing ammonia emission with all applications but not significantly different among treatments. Application of TM (>3%) was effective in reducing pH (towards acidic) and the NH_3 emission of poultry litter. It was concluded that by mixing TM powder with poultry litter, there is a possibility to reduce ammonia emission by altering favourable conditions for microbes in the litter such as pH and moisture.

Keywords: Ammonia, Emission, Litter, Poultry, Turmeric