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“Development on the margin”

## Rumen Degradability and Kinetic Properties of Deep Stack Broiler Litter

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### Abstract

Fresh broiler litter was collected from a commercial broiler house that uses wood shavings as bedding material in Khartoum state, Sudan. Chemical composition, rumen degradation and kinetic properties of broiler litter (BL) and three deep stack broiler litters (DSBL) was investigated. Deep stacking was done in underground silo pits  $1.5 \times 1.5 \times 1.5$  m (DBSL 1),  $1.75 \times 1.75 \times 1.75$  m (DBSL 2) and  $2 \times 2 \times 2$  m (DBSL 3) to guarantee a use as ruminant feed. Deep stacking lasted for one month after that representative samples were taken for chemical analysis and rumen degradation trials.

Deep stacking had no significant effect on the chemical composition of BL. Crude protein contents and cell wall components did not change significantly within the three silo pits of deep stacked litter. There were significant ( $p < 0.05$ ) differences in the readily degradable fraction among BL and DSBL, but for other kinetic fractions there were no significant ( $p < 0.05$ ) differences found. Degradability of crude protein increased for the deep stacking treatments ( $p < 0.05$ ) during incubation in the rumen of fistulated buffalos from 35.8% at 3 h of incubation to 81.6% after 96 h, from 40.7 to 82.3%, from 32.5 to 79.3% and from 35.4 to 81.3% for BL, DBSL 1, DBSL 2 and DBSL 3, respectively. Degradability of neutral detergent fibre increased ( $p < 0.05$ ) for the deep stacking treatments during incubation from 17 to 71.1%, 17.3 to 64.8%, 18.16 to 65.3% and 16.6 to 63.9% for BL, DBSL 1, DBSL 2 and DBSL 3, respectively. The rate of degradable fraction for neutral detergent fibre showed no significant difference ( $p > 0.05$ ) among broiler litter and deep stack litters, whereas, the readily degradable fraction, slow degradable fraction, potential degradability and the effective degradability in different rate of outflow showed a significant difference ( $p > 0.05$ ) among all broiler litter and deep stack litter.

The results of this study indicate the possibility of incorporating DSBL into their animal feeding system in order to reduce costs and it will enable the farmers to explore a feasible method of waste management and also to develop their own complementary system of animal production.

**Keywords:** Broiler litter, composition, deep stacking, degradability