Rumen degradability and kinetic properties of deep stack broiler litter

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Introduction:
Byproduct feedstuffs are very important in ruminant production systems throughout the world, and will continue to be so in the future. Broiler litter is a byproduct of poultry production, is high in crude protein rapidly degraded in the rumen and variable but generally low to moderate in available energy concentration (Saleh et al 2003). Poultry litter has a potential use as a ruminant feed in addition to its traditional use as fertilizer and more valuable as a feed ingredient than as a fertilizer. The use of poultry litter as a dietary supplement in ruminant ration could have a considerable effect on reducing costs, insufficiency of protein in diet and on solving disposal problems. The treatment of broiler litter by deep stacking was effective in the destruction of pathogens as stated by (Eleman et al 2010).

The productivity of livestock in terms of milk yield or the annual red meat off-take from an animal unit in Africa including Sudan is considerably low, when compared to other developed countries. Poor nutrition, both in quantity and quality and poor reproductive performance are recognized as major factors limiting animal production.

Objectives:

✓ To assess whether poultry litter was a viable and renewable protein supplement for small ruminants in Sudan.

✓ To determine the effect of deep stacking treatment on chemical composition and degradability of broiler litter.

Results:

✓ The chemical composition results of raw broiler litter and deep stacked broiler litter was shown in table 1. However, according to these compositions there are no greater differences between broiler litter and deep stacked litter as shown in Figure (1). The soluble fraction (a) as shown in Table (2) increased significantly for DSBL1 compared to other, but degradable in the rumen constant (b), rate (c) of degradability, potential degradability (PD) and the effective degradability in different rate of outflow showed no significant difference among all broiler litter and deep stack litter.

✓ Broiler litter showed a relatively superior NDF degradability in the rumen at 48, 72 and 96 hours (2). The rate of degradation (fraction) for NDF showed no significant differences (P>0.05) among all broiler litter and deep stack litter, whereas, the soluble fraction (a), slow degradable fraction (b), potential degradability (PD) and the effective degradability in different rate of outflow showed a significant difference (P<0.05) among all broiler litter and deep stack litter. Table 3.

Table 1: Chemical composition (%) of broiler litter and deep stacked broiler litter.

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Table 2: CP degradability kinetics of broiler litter and deep stack broiler litter.

Table 3: NDF degradability kinetics of broiler litter and deep stack broiler litter.

Material and methods:
Deep stacking was prepared in underground silo pits (1.5x1.5x1.5 m, 1.75x1.75x1.75 m and 2x2x2 m). The collected litter was spread on a plastic sheet and water was added to bring its moisture contents to about 30% using garden sprayer. Then, the sprayed litter was stacked in the underground silo pit surrounded with plastic sheet and pressed manually. The pressed litter was covered using plastic sheet. A thin layer of soil (3 – 5 cm) was placed over the covered plastic sheet. The preparation of the underground silo pit was made in two days and was opened after a period of at least one month.

Representative samples of broiler litter and deep stacked litter were taken and proximate analysis was made on dried ground samples as outlined by (AOAC 1990).

Degraddability study of broiler litter and deep-stacked broiler litter was carried out in a fistulated buffalo according to the nylon bag technique described by Ørskov et al, (1980). The buffalo was fed at maintenance level on a balanced roughage concentrate diet with free access to water and mineral blocks. Nylon bag (80 × 140 mm; pore, size 45µ) weighing 1-2.5 g each were used for incubation of experimental sample. The bags were incubated for different period of time 4, 8, 16, 24, 48 and 72hrs.

The data were treated with the analysis of variance with the general linear model procedure of (SAS 1994).

Conclusion:
The study explored the practical possibility of incorporating deep stack broiler litter into animal feeds hence reducing the cost of production of feed and consequently reducing the unit cost of animal products.

References

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