

ABSTRACT

PRODUCTION OF COMPOSTED ANIMAL FEED

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Three laboratory-scale aerobic composters designated systems I, II and III were used to compost mixtures containing molasses, bagasse, wet brewers grain, dry brewers grain and poultry litter to produce a ruminant animal feed. Initial C:N ratios of mixtures composted from systems I, II and III ranged from 18.7:1 to 53.3:1, moisture content from 40.6 to 61.8%, pH from 4.8 to 6.2 and crude protein from 6.3 to 15.8%. Initial values of %ADF for systems I and II ranged from 37.0 to 66.5% and %CDOMD values for system III ranged from 21.6 to 52.8%. Aeration rates ranged from 0.78 to 1.08 L/min/kg-VM for system I, while for systems II and III aeration rates were 0.28 and 0.50 L/min/kg-VM respectively, in addition to rotation at 23 rpm.

After composting, wet weight losses varied from 32.7 to 58.8%, while dry weight losses varied from 29.0 to 54.1% for the three systems investigated. The C:N ratio of the compost was also reduced to a range of 13.7 to 27.5, while the pH and crude protein increased to 6.3 - 7.5 and 11.42 - 21.2% respectively. %ADF ranges for

compost produced from systems I and II varied from 41.4 to 55.9% and %CDOMD values for compost produced from system III all decreased to a range of 15.3 to 33.2%. The mineral concentrations of the composts were significantly higher ($p < 0.005$) than those of the initial mixtures.

Multiple regression analysis of chemical data indicated that only the % ash, % C and C:N_{dt} ratio in final composts could be predicted from initial compost composition. Two diets, namely compost/concentrate and compost produced from system I were fed to two groups of sheep in a 7 day feed intake observation. The dry matter intake as a percentage liveweight was higher for animals fed compost than those on compost/concentrate diet, confirming the acceptability of the compost to sheep.

Likewise two diets, namely a control consisting of freshly chopped sugar cane, concentrate and molasses, and a compost produced from system III were fed to sheep during a 15 day voluntary feed intake (VFI) trial. Statistical analysis indicated that the dry matter intake as a percentage liveweight for animals fed compost was significantly lower ($p < 0.005$) than animals on the control diet.