

Research Briefs: Chemical and Biological Enhancement of Broiler Poultry Litter

Thomas A. McCaskey, Auburn University

Research Purpose

Broiler poultry litter in Alabama is a resource that has become more valuable due to higher fertilizer, feed, and fuel costs and two consecutive years of draught. Typically litter has been used as a soil amendment and also as a nutrient resource for beef cattle. To further enhance the commercial value of litter, studies are underway to evaluate a two-step chemical process followed by a biological process.

Activities

Two-kg lots of broiler poultry litter were acidified with sulfuric acid to pH 1.5 then ammoniated to pH 5.0 with anhydrous ammonia. The treatment increased the crude protein (CP) content of the litter 34% from 27.4 to 36.6%, and decreased moisture 21% from 21.9 to 17.4%. The litter reached a temperature of 75C during the acid/ammonia treatment process. A second study was conducted with 450-kg lots of litter which also resulted in a 34% increase in CP. The temperature was higher (88C) for the larger lots of litter compared to the 2-kg lots (75C) due to less heat dissipation from the smaller surface area. Studies with litter inoculated with *E. coli* and *Salmonella* demonstrated the process is efficacious in eliminating these bacteria. An 8-log reduction was demonstrated with the 450-kg lot of litter.

What Has Been Learned?

The study has demonstrated that the CP content of litter can be increased 34% by treating the litter with sulfuric acid followed by anhydrous ammonia. More recent studies have demonstrated that the CP can be increased to 38% close to that of soybean meal. In addition to CP enhancement, the process substantially modifies the appearance

and olfactory properties of the litter. This modification is important to distance

the enhanced litter from raw, unprocessed litter, which is perceived to be a liability to the use of the litter as a nutrient resource for ruminant animals. An additional modification and enhancement of the litter is being pursued to further gain acceptance of litter as a protein by-product feed supplement. Yeasts that actively grow in litter and lactic acid bacteria isolated from fermented forage are being studied to determine if these microbes will further improve the value of litter.

Why is This Important?

In the past litter was used by some beef cattle producers as a feed supplement for overwintering brood cows. The practice of feeding litter has always been contentious, and has become even more contentious in recent years due to issues with BSE, and by a growing interest in natural and organic beef. However, during the past two consecutive years the Southeastern US has been under the worst draught on record. The lack of feed resources forced many beef producers to either market their animals or seek alternative feed sources. The need for alternative feed sources continues to intensify as feed, fertilizer and fuel costs escalate. Studies dating back to 1955, and many since, have demonstrated the feed value of broiler litter for beef cattle. Research reported here is attempting to explore ways to make broiler litter more valuable and amenable for use as a nutrient supplement for livestock production.

For More Information

Contact mccasta@auburn.edu or (334)844-1518