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► **To cite this version:**

Jp Fontenot, E Gallo Llorente, Jm Obamahinti, Vg Allen. Ammonia and urea treatment of wheat straw and corn stover. *Annales de zootechnie*, 1995, 44 (Suppl1), pp.73-73. hal-00889237

HAL Id: hal-00889237

<https://hal.science/hal-00889237v1>

Submitted on 11 May 2020

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Ammonia and urea treatment of wheat straw and corn stover

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Experiments were conducted to study the effect of treating two crop residues, wheat straw and corn stover, with ammonia and urea on nutritional value for ruminants. For each crop residue, square bales were allotted to three treatments : 1 - No treatment (control), 2 - Ammonia treatment, and 3 - Urea treatment. Jackbean meal was added to the ammonia-treated straw as a source of urease. Aqueous ammonia and urea were dissolved in water and the solutions were applied to both sides of the bales. The moisture of the treated forages was increased to 40 %. Ammonia was added at 3 % for both forages, and urea was added at 5.3 % for straw and 5.9 % for stover, dry matter basis. Treated forages were covered individually for each treatment with black polyethylene for 93 days for wheat straw and 129 days for corn stover. Dry matter, crude protein, fiber components, and *in vitro* and *in vivo* digestibilities were determined. For the *in vivo* digestibility, 24 lambs were allotted to four diets within each forage : 1 - Untreated forage, 2 - Urea-supplemented forage, 3 - Ammonia-treated forage, and 4 - Urea-treated forage. Approximately 10 % sugarcane molasses, dry matter basis, was included in each diet.

For both crop residues, ammonia and urea treatment resulted in similar increases ($P < 0.05$) in crude protein, averaging over eight percentage units. Neutral detergent fiber (NDF) concentration of wheat straw was decreased ($P < 0.05$) similarly for both ammonia and urea treatments. For corn stover, NDF was decreased ($P < 0.05$) more by ammonia than urea treatment. *In vitro* dry matter digestibility and *in vivo* digestibility of dry matter and NDF were increased ($P < 0.05$) by ammonia and urea treatments of both forages. However, the extent of improvement was greater for ammonia than urea treatment. Urea supplementation did not consistently affect *in vivo* fiber digestibility. Nitrogen retention was increased ($P < 0.05$) similarly for lambs fed the ammonia and urea treated forages. Values for the urea supplemented lambs were intermediate between those for lambs fed the untreated and treated forages.

In conclusion, nutritional value of crop residues can be enhanced by ammoniation directly or by urea treatment, but the improvement appears to be greater for ammonia than urea treatment.