A LONGITUDINAL STUDY TO ESTIMATE NH_3-N LOSSES ASSOCIATED WITH TEMPORARY HOUSING OF DAIRY COWS AND MANURE MANAGEMENT

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Duration controlled grazing systems for dairy cows to reduce N loss to water involves temporary housing (naturally ventilated barns) to reduce urinary load on paddocks. However this temporary housing system results in N loss as NH_3 during housing and at subsequent stages of manure management (housing, storage and land application). Methods appropriate for estimating these losses from each stage have been developed and used to undertake a longitudinal study to quantify NH_3 losses associated with partial grazing/housing and manure management system. This comprises measurement of ;N loss during the deposition of cow waste (urine and dung) on the floor (0-2 hr from deposition); transfer of cow waste to the collection channel (0-2.25 hr); total N loss from the channel (16-32 hr); total N loss from the storage pond (7- 120 days storage); and finally, N loss during the reapplication of the manure to the land.

The results show that NH_3 gas emission from a naturally ventilated barn system is highly dependent on of the fate of urea N contained in the urine and dung (slurry). In the first few hours (2, 4 and 8 h) between excreta deposition and lane scraping NH_3-N emission accounted for 0.05%, 0.34 % and 0.78% of total slurry N. For the 16-32 h of slurry retention in the channel the loss is approximately 0.62% of the slurry N before gravitational flow delivers the slurry to the pond. During storage in the pond, loss of N continues and over 120 days storage this represents up to 24% of total initial N lost. During re-application of slurry to the paddock by tanker using spray or trailing shoe injection NH_3 emissions made up only 2.35% and 1.57% of the total slurry N. Overall NH_3 loss accounted for 27.13% of the urine and dung N deposited in the barn, storage pond and land application. This work clearly identifies that pond storage needs to be minimised or ponds covered if NH_3 losses occurring in manure management are to be reduced.

Editor's Note: An extended manuscript has not been submitted for this presentation.