

Reducing CARBON FOOTPRINT with MEPRON

Nitrogen excretion from dairy and beef cattle is a precursor of nitrous oxide and ammonia.

Nitrous oxide plays a major role in greenhouse gas emissions.

Nitrous oxide has global warming potential that is **298** times as powerful as carbon dioxide (methane has global warming potential of **28** times as powerful as carbon dioxide).

Reduction of nitrogen output from beef and dairy farms has the potential to reduce nitrous oxide from entering the atmosphere (Johnson et al., 2016).

Johnson, A. C. B., K. F. Reed, and E. Kebreab. 2016. Evaluation of nitrogen excretion equations from cattle. J. Dairy Sci. 99:7669-7678.

Beef and dairy operations contribute 41 and 20% of total livestock nitrous oxide emissions, respectively (Gerber et al., 2013).

Gerber, P. J., H. Steinfeld, B. Henderson, A. Mottet, C. Opio, J. Dijkman, A. Falcucci, and G. Tempio. 2013. Tackling climate change through livestock – A global assessment of emissions and mitigation opportunities. Food and Agriculture Organization of the United Nations, Rome, Italy.

Human health problems can arise from these nitrogen compounds being released into the environment, including lung disease, chronic bronchitis, and premature mortality (McCubbin et al., 2002; Fowler et al., 2013).

McCubbin, D. R., B. J. Apelberg, S. Roe, and F. Divita. 2002. Livestock ammonia management and particulate-related health benefits. Environ. Sci. Technol. 36:1141- 1146.

In addition to improved absorption in the mammary gland, methionine supplementation increased gastrointestinal tract absorption and consequently improves nitrogen efficiency.

Feeding rumen protected methionine (MEPRON) has been demonstrated to reduce urine/ faecal nitrogen excretion and the potential to improve efficiency of protein utilization for milk production by 20%. (Broderick et al., 2008)

Table 1

Item	CP %	18.6	17.3	16.1	14.8		
	Mepron [®] , g/d	0	8	17	25	SEM	P > F
MUN (mg/dL)		14.5 ^a	11.8 ^b	9.5 ^c	7.9 ^d	0.4	< 0.01
Milk-N/NI, %		26.2 ^c	29.9 ^b	31.7 ^b	34.0 ^a	0.9	< 0.01
Excretion, g/d							
Urinary Urea-N		205 ^a	148 ^b	115 ^c	80 ^d	6	< 0.01
Total urinary N		260 ^a	207 ^b	188 ^c	150 ^d	8	< 0.01
Fecal N		250	246	259	237	9	0.20
Total manure N		510 ^a	453 ^b	447 ^b	387 ^c	13	< 0.01
Estimated N balance		28	25	14	-7	9	0.01

Change in N utilization by replacing SBM with HM corn and Mepron[®]

Broderick GA, Stevenson MJ, Patton RA, Lobos NE, Olmos Colmenero JJ (2008): Effect of supplementing rumen-protected methionine on production and nitrogen excretion in lactating dairy cows. J Dairy Sci 91: 1092-1102

Amino acid balancing of dairy rations represents a viable approach to meet the challenges of environmental sustainability and production economics. The highest N efficiency, with no loss in performance, was observed in the Mepron[®]-supplemented diet containing 16.1% protein.