

Nitrogen excretion in dairy cows: is one percent crude protein in the diet important?

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To comply with the new water quality regulation some dairy producers in California will have to control manure production and minimize nitrogen intake and excretion in lactation animals. Crude protein intake and nitrogen excretion are highly and positively correlated. For example, nitrogen imported as feed (grains, protein supplements, byproducts, etc.) may have 70% digestibility, this means that 30% of feed nitrogen is part of manure or storage nitrogen. In other words, manure represents an indigestible part of on-farm forages production (e.g. corn silage) and imported feed.

This newsletter and the Table 1 below were prepared to discuss the impact of reducing crude protein one percent in the diets on two variables: (1) feed imports as protein supplements and (2) how much one percent represents in terms of nitrogen excretion. The example (Table 1) is based on a dairy farm producing 70 lbs of milk/cow/day and 17.5% crude protein in the diet. In this case, and according to the National Research Council (Nutrient Requirements of Dairy Cattle, 2001), crude protein in the diet can be reduced at least one percent without any effect on cows' performance.

Table 1. Impact of reducing dietary crude protein (**CP**) one percent in lactating dairy cows on CP intake and nitrogen (**N**) excretion

		% CP in the diet		Difference (lb/cow/day)	Difference for 1,000 cows (Tons/year)
		17.5	16.5		
Milk yield	lb/cow/day	70.4	70.4	0	0
Dry matter intake	lb/cow/day	48.4	48.4	0	0
CP intake	lb/cow/day	8.47	7.99	-0.48	-80.3
N intake	lb/cow/day	1.36	1.28	-0.077	-12.85
N excretion	lb/cow/day	1.13	1.06	-0.070	-11.56
N excretion	Urea equivalent				-25.14

The last two columns represent the numerical changes in our example. For 1,000 lactating cows 80 metric tons of crude protein can be reduced in a year, representing about 220 tons of canola meal or 160 tons of soybean meal (48% crude protein). To understand the impact on nitrogen excretion, reducing crude protein 1% in the diet represents about 25 tons of urea equivalents per year in a dairy farm milking 1,000 cows per day. Clearly, a nutritionist should be responsible for any dietary change. Dairy farmers must discuss with their private consultants the impact of

possible changes in the diets on feed imports, nitrogen excretion, and the relationship between feed cost and manure management.

Compared to other management practices, to control nitrogen balances without changing the number of animals or manure land application areas (e.g. triple cropping, exporting more manure, increasing nitrogen in milk, etc.), for most dairy producers reducing dietary nitrogen intake is probably one of the higher- impact management practices to reduce manure N.