DIETARY MANIPULATION TO REDUCE PHOSPHORUS EXCRETION BY LACTATING DAIRY COWS

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REDUCING PHOSPHORUS EXCRETION

The most effective way to reduce manure P excretion is to feed less P. Until recently, almost all dairy rations have been formulated with P levels higher than recommended by feeding standards. Several surveys conducted a few years ago in the Mid-South States (Sansinena et al., 1999), Texas (Goodall et al., 2000), and Wisconsin (Powell et al., 1999) indicated that P was fed at about 30-40% above the NRC (1989) guidelines at the time. Typically, dairy nutritionists recommend that P be fed, on average, at 0.48% of the diet on a dry matter basis (Satter and Wu, 1999). This amount was about 25% higher than the NRC (1989) recommendations.

Reducing dietary P without affecting animal performance has been proven a reality. Several studies (Brintrup et al., 1993; Valk and Ebek, 1999; Wu and Satter, 2000b; Wu et al., 2000, 2001) showed that P fed to lactating dairy cows can be safely lowered compared to the amounts producers had been feeding for many years. These were long-term studies, ranging from one to three years. Figure 6 is the lactation curve of cows fed 0.38% or 0.48% dietary P for two years in one (Wu and Satter, 2000b) of the studies, showing no difference in milk production between the two P groups in either year.

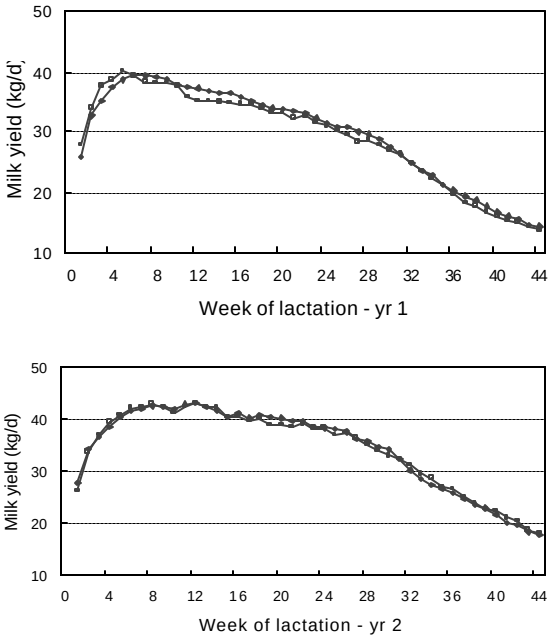

Figure 6. Lactation curve of cows fed diets containing 0.38% (◆) or 0.48% (■) P for two years.

The economics of excessive feeding of P also needs to be questioned. Using the milk production data from Wu et al. (2000), who fed diets containing 0.31%, 0.40%, or 0.49% P, and current milk prices it is possible to determine the economic impact of feeding P. The low P diet (0.31%) yielded an income over feed cost of $11.01/cow/d over 308-d lactation. Income over feed costs was $11.52/cow/d for the middle level of P (0.40%) and $11.45/cow/d for the high level of P (0.49%). The difference between the 0.40% and 0.49% P diets was due to a slight reduction in milk yield and a higher ration cost for the higher P diet. On a whole farm basis feeding 0.49%

P reduced income over feed costs by $0.07/cow/d or $21/cow/yr. Not included in this value is the cost of removing the extra P from the farm system or acquiring the land to spread the extra manure P. Cows on the highest P ration excreted 10 lb more P than did cows on the medium P diet. The dairy producer needs to account for the excess P excreted as well as the loss in income caused by feeding relatively high levels of P.