

Use of fecal grab samples to determine dietary changes on phosphorus excretion: the effect of added forage and time of sampling.

E. M. O'Rourke¹, J. J. Michal¹, R. L. Kincaid¹, J. H. Harrison², and C. T. Gaskins¹

Sixteen multiparous Holstein cows were assigned to a study to determine if added dietary forage affected diurnal variation in the concentration of phosphorus (P) and nitrogen (N) in feces. At the start of the experiment, the cows averaged 262 DIM, 757 kg BW, and 37 kg daily milk yield. Dietary treatments were a control TMR consisting of 25% alfalfa haylage, 23% alfalfa hay, 10.3% whole cottonseeds, 7.3% wheat millrun, and 34.4% concentrate, and a treatment diet where cows were fed 2.27 kg alfalfa hay as a top-dress supplement to the control ration. The TMR contained 19% CP, 36 % NDF, 27% ADF, and 0.42 % P. The treatment diet contained 19.2 % CP, 36.3 % NDF, 27.3 % ADF, and 0.42 % P. All cows were fed the TMR at 1400 h daily and the alfalfa hay offered as a top-dress at 0700 h. Cows had ad libitum access to feed except between 0800 to 1000 h, and 1100 to 1400 h. On d 21, fecal grab samples (200 g) were collected approximately every 4 h for 48 h in such a manner as to represent every 2 h in a diurnal period. The dry matter intake (DMI) averaged 26 kg/d and was not affected by treatment. Similarly, average milk yield was 38 kg/d and not affected by treatment. Milk and serum inorganic P were not affected by supplemental forage (33.7 ± 2.37 and 5.07 ± 0.17 mg P/dl respectively). Likewise, additional forage did not affect P digestibility (30.6 ± 1.51). Supplemental forage and time of sampling affected ($P < 0.02$) fecal NDF concentration (59.6 ± 0.5 and 57.8 ± 0.5 for control and supplemented cows, respectively). Fecal ADF concentrations were similarly affected ($P < 0.01$) by sampling time (39.6 ± 0.4). The concentration of P in dry feces (0.70 ± 0.105) was not affected ($P > 0.1$) by either supplemental forage or time of sampling. Although the concentration of N in the feces was affected ($P < 0.05$) by both the supplemental forage and time of sampling, the ratio of P to N was not significantly changed by either supplemental forage or time of sampling (mean = 0.285). In conclusion, there was no diurnal change in the % P in feces nor did a forage top-dress affect the % P in feces for dairy cows fed a TMR containing 0.42 % P. Fecal grab sampling appears to be a reasonable method by which the effects of dietary changes on P excretion can be determined. Due to variability in fecal P concentrations, the time of fecal sampling appears to be less important than the number of cows sampled.