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Abstract

Blood Phosphorus Concentration as an Indicator of Phosphorus Deficiency in Growing Cattle †

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Abstract: Inadequate intakes of phosphorus (P) by cattle can cause P deficiency and severely reduce productivity. Blood inorganic P concentration (Pi) is often used as an indicator of P deficiency. Results from two experiments (E1 and E2) with young cattle grazing tropical P-deficient rainy season pastures without or with additional P, or fed in pens on higher energy pelleted diets ranging in P concentration (E3), were used to examine the relationships between Pi and liveweight (LW) gain. When Pi was >2.0 mmol/L average LW gains were 0.71, 0.85 and 1.04 kg/day in E1, E2 and E3, respectively. These differences between experiments were most likely associated with diet limitations other than P. LW gain was related curvilinearly in E1 and E2, and linearly in E3, with Pi. The Pi ranged from ca. 1.0 mmol/L through to 2.5–3.0 mmol/L in each experiment. The reductions in LW gains from the maximum at Pi > 2.0 mmol/L for several lower Pi concentrations were calculated from these relationships. At Pi = 1.0 mmol/L the LW gains were 36–60% of the maximum, at Pi = 1.5 mmol/L LW gains were 59–84% of the maximum, and at Pi = 2.0 mmol/L the LW gains were 82–98% of the maximum. The reductions in LW gain at each Pi were substantially greater for E3 than for E1 and E2. It is concluded that the Pi threshold indicative of P deficiency varies with the diet quality and that the threshold values are substantially higher with higher diet quality.

Keywords: phosphorus deficiency; cattle; diagnosis; blood P concentration

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