

Lack of effect of cobalt supplementation on serum vitamin B₁₂ concentrations in lactating dairy cows

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During lactation, cows producing 20 L milk/d lose about 55 nmoles vitamin B₁₂ (VB12) a day. Maximum liver stores in cows in Australia are between 3500-5000 nmoles (based on data of Mitsioulis et al. (1)). Following calving, serum VB12 has been reported both to increase (2) and decrease (3) relative to prepartum concentrations. We therefore wished to determine the direction of change in VB12 concentrations in dairy cows in Victoria and whether supplementation with cobalt (precursor for microbial synthesis of VB12) could influence the post partum concentrations.

Twenty cows from six farms in Gippsland, Victoria were given slow release intra-ruminal cobalt pellets (30% cobalt oxide) plus grinder and 13 controls from the same properties were given only the grinder. Blood samples were collected on the day treatments were administered and at least 24 days later. Blood samples were analysed for VB12 using a radioassay (Ciba Corning Magnetic Immunochemistries, Germany). Data were analysed with a paired t-test.

Post partum concentrations of VB12 were significantly lower ($P < 0.05$) than prepartum levels in both treated (188 ± 28 vs 274 ± 27 pmol/L) and untreated cows (185 ± 33 vs 280 ± 24). Before calving 21% of the cows were apparently marginally deficient (serum VB12 concentrations between 50 and 200 pmol/L) and, irrespective of treatment, 75% after calving (Figure).

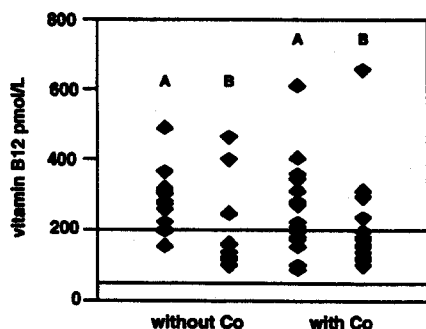


Figure. Pre- (A) and post partum (B) serum vitamin B₁₂ concentrations in cobalt supplemented and unsupplemented cows. Values between 50 and 200 pmol/L indicate marginal deficiency.

The lack of effect of cobalt supplementation on serum VB12 concentrations may have been due to a rapid rate of extraction of VB12 into milk and may not reflect tissue stores. The results confirm those of Mykkanen and Korpela (3) that VB12 concentrations decrease post partum.

1. Mitsioulis A, Bansemer PC, Koh T-S. Relationship between vitamin B₁₂ and cobalt concentrations in bovine liver. *Aust Vet J* 1995;72:70.
2. Walker CK, Elliot JM. Lactational trends in vitamin B₁₂ status on conventional and restricted-roughage rations. *J Dairy Sci* 1979;55:474-9.
3. Mykkanen HM, Korpela H. Serum vitamin B₁₂ levels in dairy cows before and after parturition. *Zbl Vet Med A* 1981;28:526-8.