

VITAMIN B₁₂ NUTRITION OF FOETAL AND NEWBORN LAMBS

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Cobalt deficiency in sheep is seen as an illthrift syndrome, particularly in the lamb flock, but in flocks affected with internal parasites or grazing poor quality pastures diagnosis of marginal deficiency has been difficult. Concentrations of serum vitamin B₁₂ have been used to assess the cobalt nutrition of Victorian flocks (Halpin 1979). Serum B₁₂ less than 1.00 µg/l indicates that dietary cobalt intake may be inadequate (Sutherland 1980) but low serum levels may not always reflect the liver stores (Millar and Penrose 1980). There is limited information on how B₁₂ levels change during growth in sheep. The aim of this experiment was to monitor plasma B₁₂ in foetal and newborn lambs and examine the normal changes in B₁₂ nutrition in a flock grazing pastures adequate in cobalt.

Experiments were done on seven housed pregnant ewes and their catheterized foetal lambs during 30 days before birth, and on 10 ewes and their 17 suckling lambs at pasture for up to 150 days after birth. Heparinized plasma, liver, colostrum and milk samples were collected at intervals and analysed for vitamin B₁₂ by a radioisotope dilution technique.

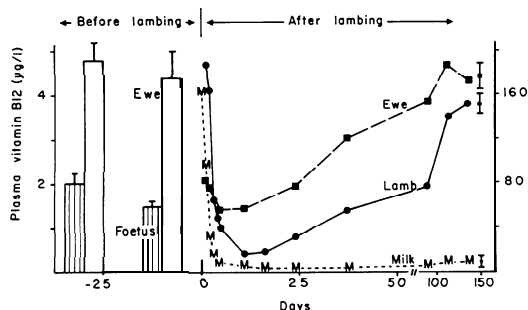


Fig.1. Changes in plasma vitamin B₁₂ concentrations in seven housed pregnant ewes (□) and their catheterized foetal lambs (▨), and in 10 ewes (■) and their 17 suckling lambs (●) up to 150 days after birth. Milk B₁₂ levels are shown (M - M) and values are means with bars representing SEM.

Plasma concentration of B₁₂ in foetal lambs was less than 50% of that in ewes (Fig.1). In newborn lambs plasma B₁₂ increased dramatically after they received colostrum. The high concentrations of B₁₂ in colostrum decreased within 48 hours and plasma concentrations in suckling lambs reflected this reduced intake: by day 11, lamb plasma B₁₂ had decreased to 0.40±0.05 µg/l. It took 37 days before lamb B₁₂ exceeded 1.00 µg/l, and 150 days before they had concentrations similar to the ewes.

Placental transfer of vitamin B₁₂ does occur in sheep, although some partitioning between mother and foetus is evident. Colostrum is a drain on plasma B₁₂ in the ewe, but provides an essential source of B₁₂ for the lamb. Milk provides little B₁₂ and plasma concentrations less than 1.00 µg/l in lambs within the preruminant period are normal in flocks with adequate cobalt nutrition. These results have important implications in the diagnosis of cobalt deficiency in illthrift lambs. Plasma vitamin B₁₂ concentrations are not a reliable index of cobalt nutrition of preruminant lambs.

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