

TRACE MINERAL NUTRITION OF DRY DAIRY COWS AND PROGENY GROWTH

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Trace mineral supplementation during the dry period is important for both the pregnant cow and the unborn calf. Trace mineral status can impact the incidence of clinical or subclinical metabolic disease post-calving resulting in reduced lactation or reproductive performance. In addition, as the dam is the only source of trace minerals for the fetus, adequate trace mineral status is needed during gestation to provide the fetus with sufficient trace minerals for proper development and tissue accretion (Hidioglou and Knipfel, 1981). The importance of trace mineral status for proper immune function has been established primarily using beef cattle or beef calves under stressed conditions. Recent research has included the effect of dry dairy cow trace mineral status on the health and performance of her calf. The time period of particular interest is during the transition period which is approximately three weeks pre-partum to three weeks post-partum. During this period, a cow undergoes considerable stress which can reduce an animals' ability to retain trace minerals (Nockels et al., 1993). If trace mineral levels are sub-optimal in a transition cow, the dam may not exhibit signs of clinical deficiency, but the transfer of these minerals to the calf may be affected. As the trace mineral status in the calf declines, immunity and enzyme functions are compromised first. Ensuring an optimum trace mineral status of the dam during the dry period will increase the trace mineral content in fetal tissues and potentially enhance immunity in the calf. Kincaid and Socha (2004) supplemented dairy cows with inorganic or a combination of inorganic and organic trace minerals beginning at 21 d prepartum through 150 days in milk. They reported an increase in colostrum IgG concentration and a tendency for increased serum IgM concentration for cows supplemented with organic trace minerals. Newborn calves depend not only on mineral reserves acquired from the dam but also those acquired from colostrum. Colostrum is the main source of minerals for the calf and mineral content of colostrum is largely affected by mineral supplementation to the cow during the prepartum transition period. Published research on bovine colostrum composition is limited (Foley and Otterby, 1978; Kehoe et al., 2007). There is a dearth of information defining the relationship between level of trace mineral supplementation during the dry period and its effects on the nutrient content of colostrum, calf health and calf performance. Our research has recently investigated this relationship between trace mineral supplementation prepartum and the effects on colostrum nutrient profile and the health and performance of the calves. The specific objectives were to investigate the effects of dietary trace mineral source and amount during the dry period on: 1) cow health and performance of the dam during subsequent lactation; and 2) function of the immune system, health, and growth performance of calves during the first 56 days of life. Results are currently being finalized.