

Iodine

The primary physiological requirement for iodine is the synthesis of hormones by the thyroid gland that regulate energy metabolism. Since iodine functions as a part of the hormone thyroxine and thyroxine is produced by the thyroid gland, a deficiency of iodine causes an enlargement of the gland. Birth of goitrous calves which are sometimes weak or dead and may be hairless is a sign of borderline or definite dietary iodine deficiency even though the cows may appear normal. Milk iodine levels reflect the cow's iodine status. Goiter may develop in nursing calves as a result of an iodine deficiency in the cows' diet.

A relationship between thyroid activity and reproductive performance has been suggested. Tennessee workers have reported an improvement in conception rate of repeat-breeder cows by treating with organic iodine 8 to 12 days before the onset of estrus. Also, in one field study the number of retained placentas and irregular breeding intervals was reduced when iodine was added to the ration. Similar results have been reported in Maryland.

The requirement for iodine as recommended by the NRC is 0.6 ppm of the ration dry matter. Iodized salt should contain about .005 to 0.1% iodine. Complete feeds (with CSH, etc.) containing 1% salt that contains .01% iodine in the trace salt will contain 1 ppm in the finished feed. Therefore, salt containing .005% to .01% iodine added to complete feeds at the rate of 1% (20 lb/ton) will meet the nutritional requirements of dairy cows for iodine.

Iodine toxicity can be a problem where herds are fed too much iodine to prevent diseases such as footrot and lumpy jaw. Symptoms observed and reported are tearing eyes, nasal discharge, bulging eyes, nervousness, rough hair coat including loss of hair, sluggish movement, reduced appetite, tracheal congestion that causes coughing, and lowered milk production. Recovery from iodine toxicity is rapid after the excess iodine is eliminated from the diet.

Excessive levels of dietary iodine result in high blood iodine, excretion of large amounts of iodine in urine and feces, and increased secretion into milk. The Food and Drug Administration (FDA) is concerned with high levels of iodine consistently in milk.

Selenium

The importance of selenium in cattle feeding is continuously being evaluated and has been considered an essential element for cattle since 1957. The current recommendation listed by the NRC is 0.3 ppm. However, in 1993 the FDA lowered the maximum selenium allowance from 0.3 to 0.1 ppm, citing concerns over environmental impact of selenium excreted by animals.

The classic deficiency symptoms reported in the literature for livestock are white muscle disease in calves, stiff lamb disease, and muscle degeneration in pigs, and is related to reproductive problems in cattle such as retained placenta. Selenium plays a key role in the immune system, protecting white blood cells from the toxic by-products – known as oxidants – resulting from the destruction of pathogens. Both selenium and vitamin E are necessary to prevent white muscle disease and for normal immune response in cattle.

Work at Ohio State University showed that retained placenta may be controlled in herds with a high incidence of this problem by either an intramuscular injection of 50 mg of selenium as selenite and 680 IU of vitamin E given approximately 21 days prepartum; or by feeding a total intake of 1.0 mg of selenium per day as selenite during the last 60 days of the dry period. Since protein feeds are natural sources of selenium, dry cow rations low in protein may lead to increased incidence of retained placenta.

There are many factors which are related to retained placenta. Disease, stress, and nutrition are considered the primary factors related to a high incidence of this problem. In many herds where the incidence is high, the cause or causes need to be determined and eliminated. Diseases should be eliminated by developing a good herd health program with the cooperation of your veterinarian.

Nutritional deficiencies of vitamin A, iodine, selenium, phosphorus and calcium increase the incidence of retained placenta. Nutritional imbalances which have been reported to increase the incidence include an imbalance of calcium and phosphorus and to some degree their ratio. Generally, the ration is of less importance so long as each is adequate. We recommend a ratio range of 1.5:1 to 2:1 of calcium to phosphorus in the final ration.