

# **Nutrition and claw health**

The health and function of the bovine claw is dependent upon sound nutrition and feeding practices. In this context, the avoidance of rumen acidosis, which is considered to be the predominant predisposing cause of laminitis, is believed to be of paramount importance. Acidosis in its acute form is a life-threatening disease. In its subclinical form, acidosis contributes to decreased performance, poor body condition, and lameness most often due to laminitis and related claw disorders. In addition to being the single largest component of the dairy cow's diet, the one most often incriminated in rumen acidosis and laminitis is carbohydrate. The rapid fermentation rates of certain nonstructural carbohydrates place desirable rumen microbes in jeopardy. Therefore, rations must be carefully formulated and fed to avoid potential problems. Rumen pH is a balance between the acid produced by carbohydrate fermentation and rumen buffering from saliva. Heat stress contributes to rumen acidosis by altering feeding behavior (encouraging slug feeding) and reducing salivary buffering. Research into the role of vitamins, particularly biotin, suggests significant benefits to claw health. Similar information exists on the role of minerals and trace minerals in dairy cattle diets. A claw healthy diet should include appropriate supplementation of both vitamins and minerals to support the proper growth and development of claw horn. Laminitis results from disrupted blood flow in the corium that leads to damage of the dermal–epidermal junction and the underlying connective tissue matrix of the corium. Inflammation predisposes to the activation of matrix metalloproteinases (MMPs) that breakdown the strong collagen fiber bundles of the suspensory apparatus of P<sub>3</sub>. This permits sinking and rotation of P<sub>3</sub> and predisposes to the ulcers of the toe, sole, and heel. The management of feeding and nutrition is the primary area of interest when attempting to reduce lameness problems. This may or may not be the correct approach, depending upon the specific types of lameness experienced. For example, it would be hard to influence the incidence of infectious foot diseases (foot rot, inter-digital dermatitis, or digital dermatitis) by manipulation of the diet alone. Laminitis and claw disorders share a closer relationship to metabolic

disease disorders that are often linked to nutrition and/or feeding issues. Cow comfort considerations are also critical factors in sorting out lameness problems and must be thus evaluated in herd problem situations as well.