



## Biotin Improves Hoof Health and Milk Production

Biotin is a water-soluble B-vitamin. Rumen microbes synthesize the B-vitamins, and in the past it was considered to be unnecessary to supplement these vitamins. Recent research, however, supports supplementing biotin to improve hoof health and milk production. This is particularly true for higher producing dairy cows and cows fed higher grain diets. Studies by de Costa Gomez et al. (1998) with artificial rumens showed that microbial synthesis of biotin decreased 50% when the forage to concentrate ratio decreased from 80:20 to 50:50.

### Biotin And Hoof Horn Quality

Biotin is involved in the health and integrity of skin, hair, hooves, and fingernails. In cattle it plays two key roles in hoof horn production.

- It is required for production of **keratin proteins** that make up the hoof horn tissue.
- It is required for developing the **intracellular cementing substance** between the hoof horn cells.

Since hoof horn tissue growth is a continual process, biotin supplementation also must be continual to provide strong hooves.

The following trial results have been documented in regards to hoof health when lactating dairy cows were supplemented with 20 mg/day of biotin:

- **Reduced incidences of sole ulcers and heel horn erosion** (Hagemeister and Steinberg, 1996; Voight et al., 2000).
- **Reduced incidences of white line separation** (Medla et al., 1998; Hedges et al., 2000).
- **Reduced incidences of hairy heel warts** (Distl and Schmid, 1994; Hochstetter, 1998).

### Biotin And Milk Production

Biotin is a required cofactor for several microbial and mammalian carboxylase enzymes. It is necessary for:

- Propionate metabolism
- Gluconeogenesis
- Fatty acid synthesis
- Leucine metabolism

A shortage of biotin could limit metabolic activities and therefore limit milk production. A typical response to biotin supplementation is shown in the following study from Ohio State University.

Supplementing Holstein cows in early lactation with biotin (10 and 20 mg/day) linearly increased milk yield but did not affect DMI. Percent fat and protein and fat yield were not different across treatments, but protein yield increased linearly with biotin supplementation. The milk yield response to biotin was immediate and was sustained throughout the experiment.

**TABLE 1. Effect Of Supplemental Biotin On Performance Of Lactating Holstein Cows**

	Suppl. Biotin, mg/cow/day		
	0	10	20
Dry matter intake, lb/day	42.7	43.6	43.8
Milk <sup>a</sup> , lb/day	81.2	83.2	87.3
Milk fat, %	3.63	3.50	3.45
Milk fat yield, lb/day	2.88	2.77	2.90
Milk protein, %	3.03	3.05	3.01
Milk protein yield <sup>a</sup> , lb/day	2.44	2.49	2.60

<sup>a</sup>Linear effect (P<0.05) of Biotin Ohio State University, Special Circular 182-01, 2001