



BIOTIN IN QLF LIQUID SUPPLEMENTS

Larry Carver, Ph.D.

Why Should Dairymen Consider Feed Additives?

Because they can improve either production or animal health, contributing to improved profitability. A better question may be . . .

Which additives provide best R.O.I? This article cannot evaluate the broad additive question but specifically reviews Biotin because of its current excellent profit return and because it contributes positively to both milk production and hoof health.

Biotin is an essential factor in carbohydrate, fat and protein metabolism. Specifically, biotin is involved in the maintenance of normal blood glucose levels and is a required cofactor in the ruminal synthesis of propionic acid.

It is one of several b-complex vitamins believed, until recently, to be synthesized in adequate amounts in ruminants. But cows receiving typical modern dairy rations may have a marginal biotin status. Why:

- 1) Unfortified rations provide uncertain sources. Many feedstuffs contain biotin, but the amount actually available to the cow is unknown.
- 2) Diet type affects the level of rumen biotin synthesis. Biotin synthesis was reduced 50% when the forage-to-grain ratio decreased from 83:17 to 50:50. Adequate levels may be provided when need is low, but may not during stress periods, such as peak lactation. By enhancing rumen function, QLF liquid supplements provide more propionic acid to the liver and combined with supplemental biotin could increase glucose status of the animal.

Effect on Milk Production - Most dairy biotin research has concentrated on hoof health, where its importance has long been recognized. Lameness cost is estimated at \$346 per case with an average herd prevalence of 20-30%. Feeding biotin consistently reduces hoof disorders; but must be fed long term (minimum 6 months) for effects to be seen. This, coupled with cost has limited biotin feeding. However, additional work shows significant increases in milk & milk component yields in biotin-supplemented cows. This response is almost immediate and makes the hoof benefit free. These studies suggest that un-supplemented dairy cows may have marginal biotin deficiencies, especially when animals are fed today's high concentrate diets. Ohio State University researchers (see Table 1) assessed biotin fortification and milk production using typical diets for high-producing cows.

Table 1. Biotin Increases Milk Production

	Supplemental Biotin	
	(mg/hd/day)	
	0	20
DMI, Lbs./d	42.7	43.8
Milk Yield, lbs./d	81.2	87.3
Fat, %	3.63	3.45
4% FCM, lbs./d	76.7	80.1
Protein, %	3.03	3.01

Biotin treatments were included in rations that were 70% forage during the late dry period and 50% forage during lactation. Milk production increased with biotin supplementation although dry matter intake did not differ by treatment. Cows receiving 20 mg of supplemental biotin produced 6 lbs. more milk (87.3 vs. 81.2) than unsupplemented cows. Milk protein yield also increased. The researchers noted that because of the immediate increase in milk production with biotin supplementation, the response was almost certainly due to metabolic changes rather than improved hoof health.

A more recent trial conducted at the University of Wisconsin – Madison showed a 3.8-lb/day milk production (81.8 vs. 85.6 lbs./d) response and a DMI (55.0 vs. 56.5 lbs./d) response to 20 mg of supplemental biotin.

Feeding Recommendations		
	<u>Lactation</u>	<u>Dry Period</u>
Cows	20 mg/day	10 mg/day
Replacement Heifers	10 mg/day (beg. @ 15 mos.)	

Consider the 20 mg/hd/day recommended rate. A kernel of corn weighs approximately 300 mg. Think about distributing 100 kernels of corn in 5-tons of TMR and expecting each cow to receive 1 kernel of corn.

Providing biotin in a minimum of 2 lbs/hd/day of a QLF liquid supplement helps ensure uniform TMR distribution while preventing separation and sorting. It is the ideal way to ensure each cow consumes the desired amount.

Current cost of 20 mg. Biotin is approximately 7.5¢. With milk @ \$10/CWT & a research proven response of 3 lbs milk/day, ROI is 4. Biotin supplementation makes sense for dairymen now.