

BIOTIN : IMPROVING HOOF GROWTH AND STRENGTH

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In the exercising horse, tearing forces, tendon pull and rotational forces due to concussion, turning and acceleration, combine to load the weight-bearing limb with **5000kg during galloping**. In addition, frequent shoeing, damp stable floors and high grain diets place the hoof wall under enormous stress.

High energy training diets commonly cause high caecal acid levels - *reducing fibre fermentation* and *B-vitamin* synthesis. **Caecal acidosis** is thought to be the major pre-disposing factor for sub-clinical *laminitis* and reduced hoof strength. This is seen clinically as:

1. **prominent growth rings**
2. **dished out front walls**
3. **long, flared out toes with compacted heels**
4. **soft horn, broken edges and seedy toe**
5. **soft, flaky soles**
6. **wide or crumbly, soft white lines**

What can be fed to improve hoof strength and resilience? Many dietary nutrients are involved in the production of optimum hoof quality, including sulphur, phosphorus, zinc, selenium, copper, calcium, amino acids and the B-group vitamin commonly known as **biotin**. If single nutrient deficiency has caused the problem then single nutrient supplementation should improve the problem - but this can be difficult to diagnose and requires detailed diet and feed analysis. Given the damp stables, caecal acidosis and stresses of hard exercise and frequent shoeing, a balanced approach must be adopted.

There is enormous variability in the biotin availability from natural sources. Although available from grass and clover, the biotin in oats, wheat and barley is almost completely indigestible to the horse, so changing to a high-energy training diet reduces the dietary biotin. Because the horse is only able to synthesize small amounts of biotin - compared to exercise-related needs at medium to high levels of exercise - **biotin supplementation becomes necessary (Frape, 1988)**.

Recent veterinary research has found benefit from feeding biotin to horses with poor hoof quality. Dramatic improvement in hoof wall strength and resolution of hoof wall cracks and thin walls have been consistently demonstrated. Hooves that crumble at the edges respond to biotin supplementation for 9 - 12 months and 5 - 15 mg per day has been shown to improve strength and conformation. Subsequent maintenance on 3 mg per day will maintain the improvement.

A balanced complete concentrate diet will *avoid many of the dietary risk factors and provide all the nutritional requirements* for strong hooves. Balancing the ration is less expensive and meets the horses nutrients better than attempting to redress individual nutrient imbalances with various supplements. It is also essential that hooves are properly shaped and trimmed, as long toes exert excess pressure on the heels which restricts blood flow and prevents adequate nutrition - leading to poor quality hoof, crumbly walls, sole and frog.

Biotin Chromium and Energy: Like chromium, biotin is an essential nutrient and is closely linked to exercise performance

(1) **Biotin is an essential co-enzyme** for the utilization of protein and energy. Biotin supplementation is advantageous in performance horses for efficient energy use and levels found to maintain hoof quality are also adequate for efficient energy use (Kerrigan, 1994).

(2) **Chromium is also involved in energy and protein metabolism and supplementation has been shown to be beneficial when diets are deficient** (Pagan et al, 1996).

***Mitavite* feeds have high levels of added biotin and are supplemented with both chromium and yeast - to meet the needs of high performance horses.**

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