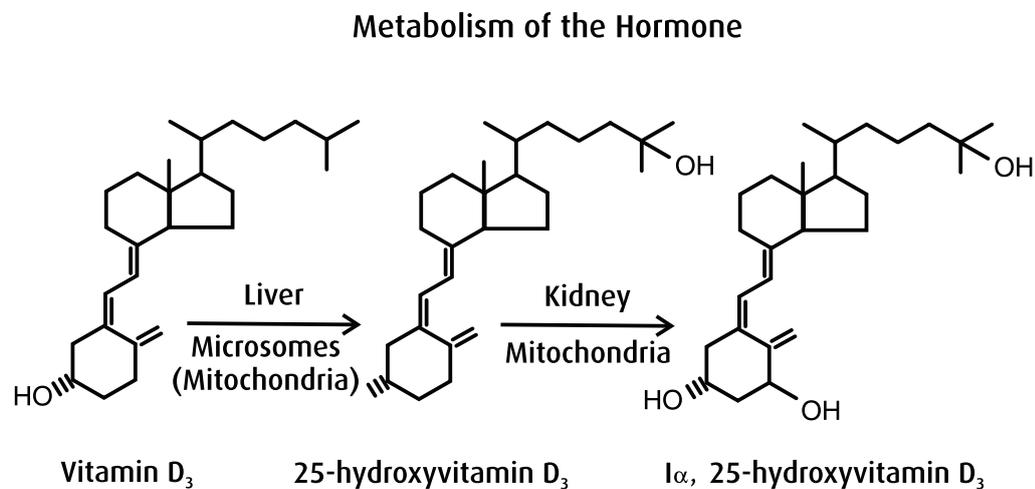


Bio D[®]: The Natural Choice

-A Fermented 25-Hydroxyvitamin D₃ Supplement-

Cholecalciferol (Vitamin D₃) from the diet or dermal synthesis is biologically inactive and requires enzymatic conversion to its active metabolites in order to illicit function in the tissues. Vitamin D₃ is first converted to 25-hydroxyvitamin D₃ (25-OH D₃), and then to 1,25-dihydroxyvitamin D₃, the active form of Vitamin D, by enzymes in the liver and kidney (Figure 1). 1,25-dihydroxyvitamin D₃ (1,25-[OH]₂ D₃) is important in maintaining bone mineralization, calcium homeostasis, and immune function. In commercial poultry, the supplemental use of 25-OH D₃ in poultry diets has long been associated with improved bone health, egg shell strength, and has recently been linked to increased breast meat yield in broilers.

Figure 1. Metabolic conversion of Vitamin D₃ to its biologically active form, 1,25-(OH)₂ Vitamin D₃. The intermediate metabolite, 25-hydroxyvitamin D₃ is in the center.

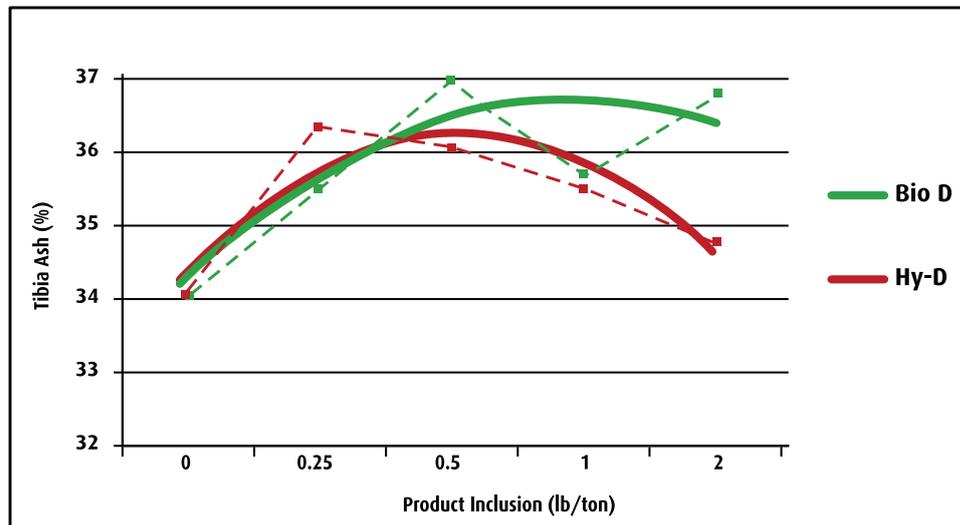


Bio D is a source of 25-OH D₃ that is produced via bacterial fermentation from all-natural ingredients and provides enhanced bioavailability over the synthetic form of 25-OH D₃ currently available on the market.

In a recent study, chicks consuming a diet containing low levels of Vitamin D₃ were administered graded levels of **Bio D** or Hy-D[®] over a three-week period. As determined by bone mineralization rates, chicks consuming **Bio D** had increased levels of tibia ash compared to those consuming Hy-D (Figure 2). These results indicate that **Bio D** has greater bioavailability than Hy-D, and is therefore a more efficacious source of 25-OH D₃.

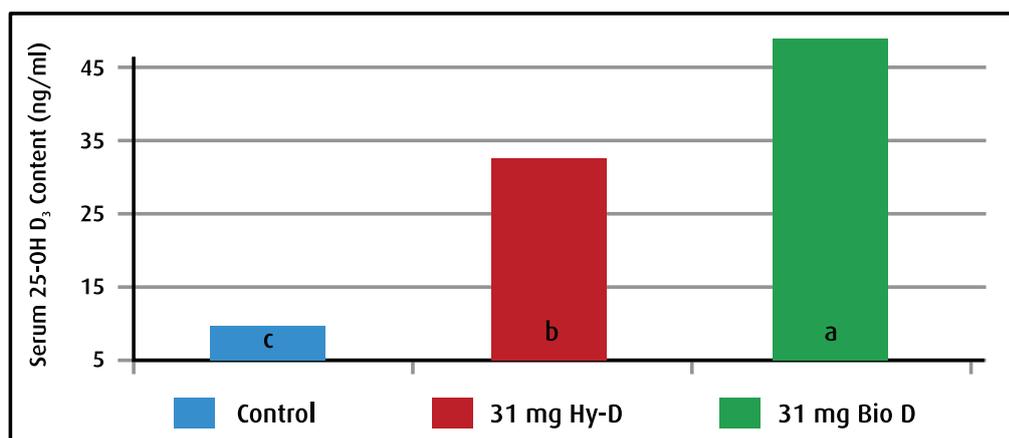


Figure 2. Increased bone mineralization in chicks fed **Bio D**.



A second trial was conducted to more closely examine the possibility of improved **Bio D** bioavailability. In this study, serum 25-OH D₃ was used as an indicator of bioavailability in broilers consuming diets containing either **Bio D** or Hy-D. Figure 3 illustrates the difference in serum 25-OH D₃ content of 36 day-old broilers consuming both products added at equal rates of active ingredient. It is our belief that this difference in bioavailability, as determined by serum 25-OH D₃ content, explains our observations for increased bone mineralization rates in previous trials.

Figure 3. Increased serum 25-OH Vitamin D₃ content in broilers fed **Bio D**.



Further, **Bio D** is extremely stable under high temperatures and retains greater than 95% potency after exposure to 250° F for sixty minutes. **Bio D** has a 2-year shelf life compared to the 6-month shelf life of the competitive product. **Bio D** is also stable through the pelleting process. In a recent pellet stability survey consisting of 5 feed mills in different regions across the country, **Bio D** retained an average of 96% of its 25-OH D₃ content when pelleted up to 190° F with up to 20 seconds of steam conditioning time.

In summary, **Bio D** offers a natural, more efficacious, and more stable alternative to the 25-OH D₃ supplement currently available on the market.