While calcium has been identified as the primary nutrient attributed to bone health, it is clear that the benefit of calcium is strongly influenced by other macro and trace minerals. A balanced mineral profile is critical when assessing the impact of a supplement on bone formation and mineralization. TruCal contains the correct balance of minerals required for maximum bone growth and maintenance.

TruCal® and calcium carbonate were evaluated for bioavailability in a rat model. Young growing wistar rats (10 per group) consumed standardized diets fortified with calcium for one month. After completion, bone density and bone tensile strength were measured. TruCal was more effective at increasing bone tensile strength and bone density in young growing rats than calcium carbonate.

In a separate study, the impact of TruCal and calcium carbonate on bone biomarkers was determined in a six-week human clinical trial. Results showed that TruCal caused a significant positive shift in bone biomarkers (urine helical peptide and bone alkaline phosphatase) compared to calcium carbonate and baseline values. TruCal was more effective than calcium carbonate at decreasing bone loss and building strong bones.

Milk and low-fat dairy products have long been recognized as the premier source for calcium and minerals. Obtaining calcium from milk is advantageous, because the balanced profile of milk may enhance calcium absorption and mineral retention. The consumption of milk provides a meal effect due to its balanced profile, fostering the absorption of calcium and phosphorus, which is critical for bone deposition.

Young adolescents who do not consume milk or dairy products have lower total body mineral content and decreased bone density. Milk also arrests bone loss in post-menopausal women. The aforementioned advantages are associated with the balanced profile of milk, and can’t be provided by calcium alone.

TruCal was developed to provide milk minerals in a form that could be used in a wide variety of applications. TruCal is the mineral fraction of milk that has been concentrated and spray dried into a powder. It includes both macro-minerals (Ca, Mg, K, P), as well as trace minerals (Cu, Zn, Fe), which are critical for optimizing bone health. The following two studies were conducted to evaluate the balanced profile of TruCal in vivo.
Figure 2 illustrates the superior performance of TruCal versus calcium carbonate on tensile bone strength for each group at one month.

**FIGURE 2: TruCal group had the highest bone tensile strength (p<0.05)**

Human Clinical Study
Remodeling consists of two stages: resorption and formation. During resorption, osteoclasts excavate areas of weakened bone. In bone formation, cells called osteoblasts lay down deposits of new bone. As we age, bone resorption exceeds formation. This amounts to a loss in bone mineral density. A higher rate of bone remodeling will lead to a more rapid loss of bone mass and thus more fragile bones.

We evaluated TruCal’s impact on remodeling. UHP and BAP are sensitive biomarkers for bone resorption and bone turnover, respectively. Lower values for both biomarkers are critical, as this indicates a lower rate of bone remodeling. This results in a decreased loss of bone mass and thus stronger bones. Baseline values are shown in comparison to values after six weeks of supplementation with TruCal and calcium carbonate.

Figure 3 contains the measurements for urine helical peptide (UHP). Consumption of TruCal resulted in a significantly lower UHP value when compared to baseline and calcium carbonate, which is indicative of less bone mass loss. Calcium carbonate exhibited very little impact on UHP.

**FIGURE 3: TruCal significantly decreased urine helical peptide (p<0.05)**

CONCLUSIONS
TruCal provides a bioavailable source of milk minerals that are absorbed and physiologically available for bone formation and mineralization.

TruCal was more effective at increasing bone tensile strength and bone density in young growing rats than calcium carbonate.

TruCal was more effective than calcium carbonate at decreasing bone loss and building strong bones during a six-week human clinical study.

TruCal delivers an excellent balance of calcium and other essential minerals critical for optimizing bone health.

TruCal is unique ingredient suitable for use in a wide variety of applications developed to help individuals optimize and maintain strong, healthy bones.

References


**Figure 4 illustrates the results for bone alkaline phosphatase (BAP). TruCal showed a significant decrease in bone alkaline phosphatase activity when compared to baseline and calcium carbonate, which represents less bone turnover. Calcium carbonate had no impact on this biomarker.**

**FIGURE 4: TruCal significantly decreased bone alkaline phosphatase (p<0.05)**

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