

VITAMIN D VITAMERS AFFECT VITAMIN D STATUS DIFFERENTLY IN YOUNG HEALTHY MALES. [J Jakobsen¹](#), [EAW Andersen¹](#), [T Christensen¹](#), [R Andersen¹](#), [S Bügel²](#). ¹National Food Institute, Technical University of Denmark; ²Department of Nutrition, Exercise and Sports, University of Copenhagen.

Dietary intake of vitamin D includes vitamin D3 (vitD3), 25-hydroxyvitamin D3 (25OH-D3), and vitamin D2 (vitD2). However, the bioactivity of the different species has not been scientifically established. The hypothesis in this study was that vitD3, 25OH-D3, and vitD2 have an equal effect on 25-hydroxyvitamin D in serum (vitamin D status). To test our hypothesis, we performed a randomized, crossover study. Twelve young males consumed 10 µg/day vitD3 during a four-week run-in period, followed by 3 × 6 weeks of 10 µg/day vitD3, 10 µg/day 25OH-D3, and 10 µg/day vitD2. The content of vitD3, vitD2, 25OH-D3, and 25-hydroxyvitamin D2 (25OH-D2) in serum was quantified by liquid chromatography-tandem mass spectrometry (LC-MS/MS). The hypothesis that the three sources of vitamin D affect vitamin D status equally was rejected. Based on the assumption that 1 µg vitD3/day will show an increase in vitamin D status of 1.96 nmol/L, the results showed that 23 µg vitD2 and 6.8 µg 25OH-D3 was similar to 10 µg vitD3 ie. the potencies of vitD2 and 25OH-D3 are 0.44 and 1.5 compared to vitD3. Furthermore, the results showed that the content of vitD3 in serum was significantly lower when administrating vitD2 and 25OH-D3 compared to vitD3 (1.8 nmol vitD3/L), while the content of vitD2 in serum was significantly higher when administrating vitD2 (0.22 nmol vitD2/L). This is the first study which used a crossover design to efficiently overcome the personal dependence on the individual differences, which also include the dependency on BMI and genetic differences. For the vitamin D status at the end of supplementation period with vitD3, we observed no dependency on start level of the given supplementation period. VitD3 is generally the primary form in food. However, vitD2 is the primary vitamin D form in wild mushrooms and vitD2 enriched button mushrooms approved for marketing in the EU, and 25OH-D3 is the main vitamin D metabolite in beef and liver. Our results demonstrate that further investigations are necessary to determine how to quantify the total vitamin D activity based on chemical quantification of the individual vitamin D metabolites to replace the total vitamin D activity assessed in biological rat models.