

Very poor bioavailability of vitamin D₂ from bread made with UV-irradiated yeast has implications for its ability to improve vitamin D status: new data from an ODIN RCT.

There is a considerable mismatch between current intakes of vitamin D by many European populations and recommended target intakes for the vitamin [1]. While traditional fortification of milk and other dairy products remains important in tackling inadequate intake, additional strategic approaches to fortification, including biofortification, of a wider range of foods, have the potential to increase vitamin D intakes in the population [2]. The potential to fortify bread with synthetic vitamin D₃ has been known for some time, and fortified bread has been shown to increase vitamin D status as effectively as vitamin D supplements in adult women [3]. The process of treating baker's yeast with UV light enriches it in vitamin D₂ and thus opens up major potential for vitamin D₂-enhanced bread and other appropriate baked products. This vitamin D₂-enriched UV-treated baker's yeast was assessed by the EFSA Dietetic Products, Nutrition and Allergies (NDA) Panel in 2014 and was considered safe for use in yeast-leavened bread, rolls, fine pastry and food supplements [4]. Bread using this vitamin D-enriched UV-treated baker's yeast has already made its way onto the market in some countries [5]. Data demonstrating that the vitamin D₂ in bread made from this UV-treated baker's yeast can increase vitamin D status has only come from a study in rats [6] thus far. One of the aims of the ODIN project was to investigate the bioavailability of vitamin D₂ from UV-irradiated yeast present in bread in an 8-week randomized controlled trial in healthy young adult women during winter.

In an 8-week randomized controlled trial (called *BreaD*) by Itkonen and colleagues [7] at the University of Helsinki, Finland under the direction of Professor Christel Lamberg-Allardt, thirty-three healthy young adult women (aged 20–37 years) during winter (February–April) 2014 were divided into four study groups. The groups were given different study products, either:

- A placebo pill and regular bread (providing 0 µg vitamin D₂ or D₃ per day);
- A vitamin D₂ supplement and regular bread (providing 25 µg vitamin D₂ per day);
- A vitamin D₃ supplement and regular bread (providing 25 µg vitamin D₃/d);
- Or a placebo pill and vitamin D₂-fortified bread (made with UV yeast) (providing 25 µg D₂/d)

Serum 25-hydroxyvitamin D concentration (the indicator of vitamin D status) was measured at baseline, midpoint (week 4) and endpoint (week 8) using a CDC-certified liquid chromatography tandem mass spectrometry method at the *Cork Centre of Vitamin D and Nutrition Research* at University College Cork. The mean baseline serum 25-hydroxyvitamin D concentration of the group of women was 65.1 nmol/L.

The study showed that consumption of the UV yeast-vitamin D₂-fortified bread did not affect serum 25-hydroxyvitamin D concentration (See **Figure 1**). This was despite the fact that the bread, even following the baking process, was analysed and shown to actually contain the 25 µg vitamin D₂. The group receiving no additional vitamin D (placebo) likewise had no change in serum 25-hydroxyvitamin D concentration; whereas both the vitamin D₂ and, even more so, the vitamin D₃ supplement groups had significant increases in serum 25-hydroxyvitamin D concentration (by 9.6



and 17.0 nmol/L, respectively) [7]. Thus, this new data suggests that vitamin D₂ from UV-irradiated yeast in bread, despite being present post baking, was not bioavailable in humans.

Click here to for the link to the full paper describing the full study and other interesting findings:

<http://journals.cambridge.org/action/displayAbstract?fromPage=online&aid=10186300&fileId=S0007114516000192>

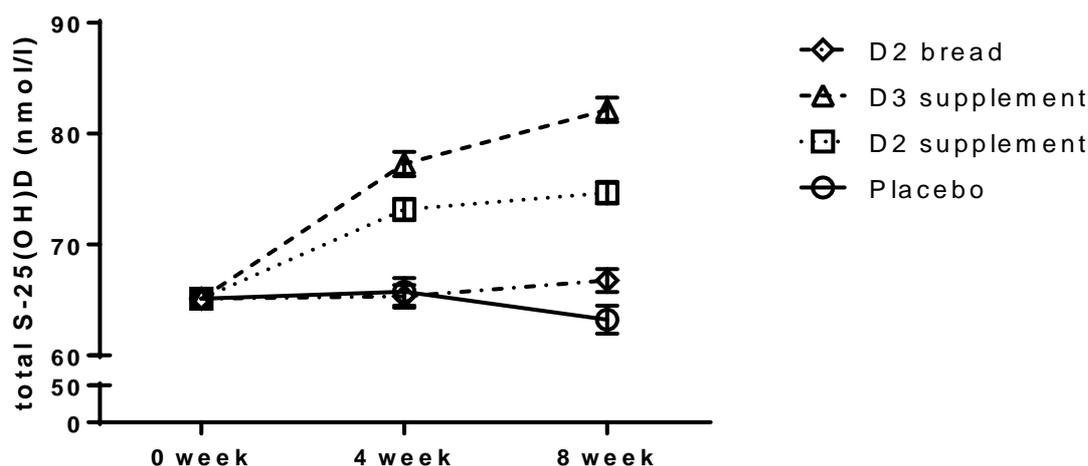


Figure 1. Response of serum 25-hydroxyvitamin D concentration to 25 µg vitamin D per day in the form of UV yeast-D₂-bread or vitamin D₂ or D₃ supplements over the eight-week study period. Time-points are at 4-week intervals, representing mean values at each time-point, error bars represent standard errors [7].

References

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