Bioavailability of Vitamin D from Bread made with Vitamin D Baker’s Yeast

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ABSTRACT

Vitaminised foods are a feasible way of preventing low vitamin D status. Bread could be a suitable vehicle for vitamins because it is a common part of diets worldwide. We studied the bioavailability of vitamin D2 (ergocalciferol) from bread made with vitamin D bakers yeast.

In a single-blind bioavailability study, 38 healthy women, 19-41 year old, with mean serum 25-hydroxyvitamin D concentration 58.7 nmol/L (range 55.9-60.2 nmol/L), were randomly assigned to 3 study groups. Each group consumed wheat bread baked with vitamin D2 bakers yeast or regular wheat bread and an ergocalciferol supplement or a placebo supplement daily for four weeks. The daily dose of vitamin D was 25µg (or 1000IU) in all groups except the control group. Bread baked with vitamin D2 containing yeast had an equal effect on S-25OHD concentration as a vitamin D2-containing supplement.

BACKGROUND

Low serum 25-hydroxyvitamin D concentrations, indicating vitamin D insufficiency are found at high latitudes all over the world in all age groups, especially during the winter months. Vitamin D is essential for skeletal health and mineralization. In addition, there is a growing evidence of association between vitamin D insufficiency and chronic diseases, such as cardiovascular diseases, multiple sclerosis, diabetes and cancer. When sunlight exposure is scarce, oral intake of vitamin D, either dietary or supplementary, becomes essential. However, natural dietary sources of vitamin D are limited.

There are still people e.g. vegetarians and persons with lactose intolerance who are not reached by natural dietary sources of the current fortification policy, and are thus in danger of poor vitamin D nutrition. Thus, we wanted to introduce a low-fat-food consumed widely in all population groups, namely bread naturally rich in vitamin D. We designed the experiment to study the bioavailability of ergocalciferol from bread made with vitamin D yeast.

OBJECTIVE

The objective of this study was to compare the bioavailability of vitamin D2 from bread baked with vitamin D2 containing bakers yeast with vitamin D2 supplements.

METHODS

Women volunteers between 19-41 year-old were recruited from the Helsinki University campus area. The subjects (n = 38) were screened for serum 25-hydroxyvitamin D (25-OHD) concentration. The subjects were randomly assigned to 3 study groups, with 12-13 subjects in each group. Characteristics of the subjects who completed the study are shown in the Table 1. The groups were given:

- Bread baked with vitamin D2 containing yeast + placebo supplement (= 25 µg vitamin D2 from the bread)
- Placebo bread + vitamin D supplement (= 25 µg vitamin D2 from the supplement)
- Placebo bread + placebo supplement (= 0 µg vitamin D2)

Wheat bread given to subjects were stored at -20°C. Subjects were given the frozen bread weekly and they were advised to consume it on a daily basis. The average daily portion of bread was 50 g (2 thin slices) for all 3 groups. A mean daily ergocalciferol intake of 25 µg (1000IU) from bread was targeted for the vitamin D2 yeast group. The same mean daily ergocalciferol intake (1000 IU) from vitamin D2 supplement was targeted for the supplement group. The study was conducted over 4 weeks in November-December 2009, when there is minimal sunlight exposure.

Vitamin D Status

Blood samples were taken at the beginning, 1 week, 2 weeks and 4 weeks. Serum 25-OHD concentration in the screening samples was analyzed by an enzymatic immunoassay (IDS, UK), which detects both 25-OHD2 and 25-OHD3.

Statistical Analysis

The effect of bread and supplementation on serum 25-OHD concentration was analyzed by repeated – measures ANOVA. Differences were considered significant at P<0.05.

RESULTS

The repeated measures ANOVA showed significant difference between groups. When comparing the serum 25-hydroxyvitamin D concentration of the baseline to level after 4 weeks, the results were:

- Significant difference between supplement and control
- Significant difference between yeast and control
- No difference between supplement and yeast bread

CONCLUSIONS

Bread baked with vitamin D2 containing yeast had an equal effect on 25-OHD concentration as a vitamin D2-containing supplement during a 4-week trial.

REFERENCES