The study of bioavailability of fortified milk with vitamin D_3

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Introduction

Vitamin D deficiency is one of the most common nutritional disorder. Various strategies have been developed to prevent micronutrient deficiency. The main approaches are daily supplementation with pharmacological doses of nutrients or food fortification.

Aim was to study the bioavailability of fortified milk with vitamin D_3 on the serum 25(OH)D concentration of selected participants during February, 2018 in Latvia.

Methods

The commercially produced fortified milks with different protein concentration were used for the study. Randomly selected participants (n=22, age 37.7±15.4) were divided into 3 groups. 1st group participants (n=8) daily consumed 250 ml milk (protein content 3 g 100 g^{-1}, vitamin D_3 concentration 0.75 µg 100 g^{-1} (20% of RDI per serving)), 2nd group (n=8) daily consumed 250 ml milk (protein content 5 g 100 g^{-1}, vitamin D_3 concentration 0.75 µg 100 g^{-1} (20% of RDI)), 3rd group (n=6) was control group. The blood samples were collected from 22 participants prior experiment and after one month of fortified milk consumption and clinically tested in E.Gulbis Laboratory Ltd. using electrochemical luminescence method for 25(OH)D determination.

Results

The mean serum 25(OH)D concentration was 19.30±1.95 ng ml^{-1} for 1st group, 12.90±1.30 ng ml^{-1} for 2nd group, 17.70±1.80 ng ml^{-1} for 3rd group participants. In all cases insufficiency and deficiency of vitamin D were established.
After fortified milk consumption, the mean serum 25(OH)D concentration over 4 weeks of study reached 20.6±2.08 ng ml^{-1} ($p=0.22$) for 1st group and 14.80±1.50 ng ml^{-1} ($p=0.006$) for 2nd group. In 3rd group, initial 25(OH)D concentration declined to 14.80±1.50 ng ml^{-1} ($p=0.14$).

Conclusions

The study revealed the significant differences of serum 25(OH)D concentration after fortified milk consumption for 2nd group, as well higher protein concentration in milk ensures higher vitamin D_3 bioavailability.

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