

## PRESS RELEASE

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### **Under embargo until 21 May 2022 12:00 CEST**

*Press release – European Congress of Endocrinology 2022 Abstract RC8.3: What is the most efficient way to fortify food items with vitamin D? A randomised, multiple crossover study.*

### **Milk and water most efficient vehicles for absorbing vitamin D, study finds**

According to a new study that will be presented today (Saturday 21 May at 12:00 noon CEST) at the 24th [European Congress of Endocrinology](#) in Milan, Italy on vitamin D food fortification working better with water and milk than in juice. By measuring the maximum concentration over time, the researchers found bioavailability of vitamin D to be higher in milk and water.

### **Vitamin D insufficiency is a global health problem**

Vitamin D insufficiency has been linked with multiple health issues, including the immune response to COVID-19<sup>1</sup>. Estimates show that as much as 40% of the European population could be suffering from vitamin D deficiencies, with 13% potentially suffering from severe vitamin D deficiency<sup>2</sup>. Vitamin D supplements are therefore vital – and knowing whether they will be absorbed and how best to aid absorption is crucial.

To answer this question, **Dr. Rasmus Espersen of Aarhus University in Denmark** and his colleagues conducted a randomised trial on 30 postmenopausal women aged 60-80 with vitamin D deficiency. The study aimed to measure immediate changes in blood concentrations in response to the consumption of various food items containing 200 g D<sub>3</sub>. In a random order, 500 mL of water, milk, juice, juice with vitamin D bound to whey protein isolate as well as 500 mL of water without vitamin D (placebo) were presented to the study participants. Blood samples were collected at 0h, 2h, 4h, 6h, 8h, 10h, 12h, and 24h on each study day.

“One aspect that surprised me was the fact that the results seen in the water and milk groups were equal. This was quite unexpected given the fact that milk contains more fat than water.” stated Dr. Espersen.

The study revealed that whey protein isolate in apple juice did not enhance maximum concentration of D<sub>3</sub> compared to juice without WPI. However, compared to juice, D<sub>3</sub> concentrations were significantly higher in response to intake of milk and water. No difference was observed between milk and water. Therefore, the conclusion from this study is that vitamin D fortification works better in water or milk than in juice.

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<sup>1</sup> Bilezikian et al., (2020), *MECHANISMS IN ENDOCRINOLOGY: Vitamin D and COVID-19*, European Journal of Endocrinology, Volume 183:5, <https://doi.org/10.1530/EJE-20-0665>

<sup>2</sup> Amrein et al., (2020), Vitamin D deficiency 2.0: an update on the current status worldwide, European Journal of Clinical Nutrition, Volume 74, pp 1498-1513, <https://www.nature.com/articles/s41430-020-0558-y#Sec23>

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### Notes for Editors

1. The presentation “**What is the most efficient way to fortify food items with vitamin D? A randomised, multiple crossover study**” will be presented on Saturday 21 May, 2022 at 12:00 CEST at ECE 2022, which will be held in Milan on 21-24 May 2022. You can access more information about the event [here](#).
2. The [European Society of Endocrinology](#) was created to promote research, education, and clinical practice in endocrinology by the organisation of conferences, training courses and publications, by raising public awareness, liaison with national and international legislators and by any other appropriate means.

### About the European Society of Endocrinology

The European Society of Endocrinology (ESE) provides a platform to develop and share leading research and best knowledge in endocrine science and medicine. By uniting and representing every part of the endocrine community, we are best placed to improve the lives of patients. Through the 54 National Societies involved with the ESE Council of Affiliated Societies (ECAS) ESE represents a community of over 20,000 European endocrinologists. We inform policy makers on health decisions at the highest level through advocacy efforts across Europe.

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## Abstracts

### RC8.3

#### What is the most efficient way to fortify food items with vitamin D? A randomised, multiple crossover study.

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#### Introduction:

Vitamin D insufficiency (25-hydroxy vitamin D <50 nmol/l) is a global health problem. Vitamin D food fortification might be the solution, but knowledge is sparse on whether fortification of various food items affects the bioavailability differently. It is generally assumed that ingesting vitamin D with a fatty meal improves the bioavailability of vitamin D. Furthermore, complex formation with whey protein isolate (WPI) may enhance the stability of vitamin D and thereby improve bioavailability. We studied the efficiency of fortifying different food items with vitamin D<sub>3</sub>.

#### Materials and methods:

In a randomised, multiple (5-periods), crossover trial, we enrolled 30 postmenopausal women with vitamin D insufficiency aged 60-80 years. We measured immediate changes in plasma concentrations of cholecalciferol (D<sub>3</sub>) in response to intake of different food matrices with 200 µg D<sub>3</sub> added i.e., 1) 500 mL of water, 2) 500 mL of milk, 3) 500 mL of juice, 4) 500 mL of juice with D<sub>3</sub> complex-bound to WPI, and 5) 500 mL of water without D<sub>3</sub> (placebo). The different food matrices were provided in a randomised order with at least ten days washout period in-between study days. On each study day, blood samples were collected at 0h, 2h, 4h, 6h, 8h, 10h, 12h and 24h.

#### Results:

Complexation D<sub>3</sub>-WPI in apple juice did not enhance maximum concentration (C<sub>max</sub>) of serum D<sub>3</sub> compared to juice without WPI (25 nmol/l vs. 24 nmol/l; p=0.61), nor the area under the time-D<sub>3</sub> curve (AUC) (370 nmol/l\*24h vs. 357 nmol/l\*24h; p=0.93). However, compared to juice, C<sub>max</sub> and AUC of serum D<sub>3</sub> were significantly higher in response to intake of milk (30 nmol/l and 452 nmol/l\*24h) and water with D<sub>3</sub>

added (32 nmol/l and 479 nmol/l\*24h) ( $p < 0.05$ , all). No difference in serum  $D_3$  was observed between milk and water ( $p = 0.29$ ,  $C_{max}$ ;  $p = 0.33$ , AUC).

Conclusion:

The bioavailability of  $D_3$  assessed by  $C_{max}$  and AUC was superior in water and milk compared to juice, independent of whether complexation  $D_3$ -WPI was added to juice.