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## Vitamin D<sub>2</sub> fortification of bread with 3 varieties of sunlight exposed mushrooms

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Vitamin D is a pro-hormone essential for bone health and calcium homeostasis<sup>(1)</sup>. Low levels of vitamin D impair calcium and phosphorus absorption, leading to poor mineralization of the skeleton. Vitamin D deficiency has become a major public health concern in the UK<sup>(2,3)</sup>. Since not many food sources of vitamin D exist, it has been suggested that one strategy to improve vitamin D status is through the fortification of foods<sup>(4)</sup>. Mushrooms produce vitamin D<sub>2</sub> when exposed to sunlight, and therefore may be an easy and inexpensive approach to fortifying food products<sup>(5)</sup>, particularly for vegetarians. The aims of this study were to 1) develop a bread rich in vitamin D<sub>2</sub> using sunlight exposed mushrooms, 2) to evaluate the effect of the duration of sunlight exposure on vitamin D<sub>2</sub> content in 3 types of bread and 3) to analyse the acceptance of the product by the public.

Three varieties of two species of mushroom were used (*Lentinula edodes* and *Agaricus bisporus*). They were irradiated for 3 durations of exposure (30 minutes, 60 minutes and 90 minutes) and used to produce wholemeal breads with the same recipe (100 g mushrooms in each bread). Loaves of bread without mushrooms and with non-irradiated mushrooms were used as controls. Samples of 200 g of each type of bread were freeze-dried and sent to Campden BRI laboratories for vitamin D<sub>2</sub> analysis. The sensory analysis was done in 51 participants and statistically analysed by SPSS.

Bread made with unirradiated mushrooms contained levels of vitamin D<sub>2</sub> that were below the level of quantification (0–13 µg/100 g bread). Each type of mushroom showed an increased content of vitamin D<sub>2</sub> which related to the duration of solar irradiation. Chestnut and Shitake mushrooms showed similar levels of increase of vitamin D<sub>2</sub> levels with maximum levels at 90 mins (2.67 and 2.83 µg/100 g bread respectively). Highest levels of vitamin D were apparent in bread containing button mushrooms irradiated for 90 mins (5.19 µg/100 g bread).

The sensory analysis revealed that the breads made with chestnut and shitake mushrooms were preferred. In conclusion bread with mushrooms that have been irradiated with natural sunlight may offer a useful way to increase vitamin D<sub>2</sub> in the diet.

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