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Quantification of vitamin D3 and 25(OH)D3 in commercial pork products by LC- MS/M

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Vitamin D deficiency is a growing concern in the UK with many failing to consume the recommended nutrient intake of 10–20 µg/day[(1)]. Meat and meat products are one of the largest contributors to vitamin D intakes in the UK, of which, pork and pork products are among the top three most commonly consumed[(2)]. Therefore, it is important to understand the total vitamin D content of such products currently available to consumers. The aim of this study was to quantify vitamin D3 and 25(OH)D3 concentrations in commercial pork products; bacon, sausages, and gammon, in comparison to McCance and Widdowson composition of foods integrated dataset (CoFID)[(3)].

Branded pork products: unsmoked streaky bacon, unsmoked back bacon, thick sausages, and unsmoked prime gammon joint (3 packs of each), were provided by a local producer (Karro Food Group, Cookstown, UK). All products were oven roasted (180°C) until an internal temperature of >75°C was reached. Cooked samples were homogenised thoroughly by product type and stored at -80°C prior to analysis. Cooked samples (n = 3; 1 sample per pack) were analysed in duplicate by Liquid Chromatography-Tandem Mass Spectrometry (LC-MS/MS)[(1)] for vitamin D3 and 25(OH)D3 concentrations (µg/100g). Vitamin D activity was calculated: vitamin D3 + 25(OH)D3 x 5[(4)].

The mean ± SD vitamin D3 and 25(OH)D3 concentrations of each product (per 100g) were quantified as follows: back bacon (0.25 ± 0.06 and 0.11 ± 0.01 µg); streaky bacon (0.32 ± 0.04 and 0.15 ± 0.03 µg); sausages (0.66 ± 0.01 and 0.13 ± 0.01 µg), and gammon (0.60 ± 0.02 and 0.15 ± 0.01 µg), respectively. One Sample T-Test revealed a higher vitamin D activity in sausages and gammon (per 100g), in comparison to comparable data published in CoFID[(3)]: sausages (1.32 ± 0.03 vs 1.1 µg, P = 0.007) and gammon (1.34 ± 0.08 vs 0.8 µg, P = 0.007). In bacon, vitamin D activity was not significantly different compared to CoFID[(3)] values: back bacon (0.81 ± 0.11 vs 0.6 µg, P = 0.079); streaky bacon (1.05 ± 0.17 vs 0.7 µg, P = 0.064).

Vitamin D concentrations may vary between pork products owing to differences in animal husbandry practices (e.g., indoor vs outdoor housing/feed composition), processing techniques (e.g., fat trimming) and/or analytical factors (e.g., range of samples analysed/method of quantification)[(5)]. Data within the current analysis may inform future new product development (e.g., products targeted for biofortification or another reformulation). Continued monitoring of food composition data including a larger range of samples is warranted to ensure food composition data are reflective of current nutrient supply within the food supply chain.

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References

1. Neill HR, Gill CIR, McDonald EJ *et al.* (2021) *Frontiers in Nutrition*, 8.
2. Public Health England (2020) *NDNS: results from years 9 to 11* [Available at: https://www.gov.uk/government/statistics/ndns-results-from-years-9-to-11-2016-to-2017-and-2018-to-2019].
3. Public Health England (2015) *Composition of foods integrated dataset (CoFID)* [Available at: https://www.gov.uk/government/publications/composition-of-foods-integrated-dataset-cofid].
4. Cashman K (2012) *Food Nutr Res* **56**, 1–810.
5. Neill HR, Gill CIR, McDonald EJ *et al.* (2023) *Meat Science* **199**, 109–115.