

# Vitamin D content of Australian foods

Nutrient data provided by Curtin University

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| Funding |

In 2018 and 2019, Curtin University commissioned analyses of the vitamin D content of Australian foods, supported by the National Health and Medical Research Council (GNT1140611). FSANZ did not provide any funding for these analyses and was not involved with the collection of samples, quality assurance processes or data validation. FSANZ would like to thank Curtin University for making these data available.

## Background

Vitamin D food composition data were not incorporated into the main NUTTAB database, the predecessor to the Australian Food Composition Database. They were provided as a separate file due to the limited data available for these nutrients and concerns around the available analytical methods. While some up-to-date vitamin D data were included in the first release of the Australian Food Composition Database, a nationally representative and comprehensive vitamin D food composition dataset was still needed for Australian foods. In 2017, the National Measurement Institute (NMI) developed a liquid chromatography with triple-quadrupole mass spectrometry method (LC-QQQ)[[1]](#endnote-1) capable of measuring multiple D vitamers with the sensitivity required to quantitate the low concentrations of vitamin D found in food. This method was used to develop an analytical dataset for vitamin D3, 25-hydroxyvitamin D (25(OH)D3), vitamin D2 and 25(OH)D2 in Australian foods.

## Sampling and analysis

Food samples were selected based on their likelihood of containing vitamin D and being reported as commonly consumed by participants of the 2011-2013 Australian Health Survey. Primary samples of 98 different foods were purchased from supermarkets and independent shops in Sydney, Melbourne and Perth between August 2018 and June 2019. Centrally-produced foods were sampled in one city, while foods that are usually produced and distributed locally within regions were sampled in two or three cities. Samples were kept chilled and protected from heat and light during transport from the purchase location to NMI’s Port Melbourne laboratory.

Where necessary, foods were prepared and cooked as they would usually be consumed in the home. The groups of foods per city were homogenised into a composite sample for each food per city in which it was sampled. This resulted in 149 analytical samples of 98 commonly consumed foods.

Composite samples were analysed for moisture by NMI’s in-house method[[2]](#endnote-2), total fat by either Soxhlet[[3]](#endnote-3) or Mojonnier extraction[[4]](#endnote-4), and vitamin D3, 25(OH)D3, vitamin D2 and 25(OH)D2 by LC-QQQ (ISO17025:2017)[[5]](#endnote-5).

## Results

Analytical results for moisture, fat, vitamin D3, 25(OH)D3, vitamin D2 and 25(OH)D2, and calculated values for vitamin D3 equivalents are published in a separate Excel file available [here](https://www.foodstandards.gov.au/science/monitoringnutrients/afcd/Documents/Excel%20file%20to%20accompany%20Vitamin%20D%20in%20Australian%20foods%20report.xlsx). Vitamin D equivalents include a bioactivity factor of 5 for 25(OH)D3 and 25(OH)D2, concordant with data presented in the Australian Food Composition Database, and were calculated as: vitamin D3 + vitamin D2 + 5\*[(25(OH)D3 + 25(OH)D2)].

The greatest concentration of vitamin D3 was found in canned salmon, while chicken eggs contained the greatest concentration of 25(OH)D3. The greatest concentration of vitamin D2 was found in dark chocolate, and this vitamer was also quantitated in a number of animal products. There was sufficient 25(OH)D2 in lamb liver for quantitation and trace concentrations were found in several other foods, including animal products. Aggregated results have been published in *Food Chemistry.*2

## Uses of the data by FSANZ

The data will be incorporated into future releases of FSANZ’s food composition databases.

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**References**

1. Hughes LJ, Black LJ, Sherriff JL, Dunlop E, Strobel N, Lucas RM, et al. Vitamin D content of Australian native food plants and Australian-grown edible seaweed. Nutrients. 2018;10(7):Article E876. [↑](#endnote-ref-1)
2. NMI’s in-house method is based on AOAC International. (2005a). Dairy samples-determination of total solids and moisture. In W. Horwitz (Ed.), Official methods of analysis of AOAC International. AOAC International. Atlanta, GA, USA. [↑](#endnote-ref-2)
3. Food Science Australia. (1998). Crude fat determination - Soxhlet method. Retrieved from: https://meatupdate.csiro.au/infosheets/Crude%20Fat%20Determination%20-%20Soxhlet%20Method%20-%201998.pdf. Accessed April 20, 2020. [↑](#endnote-ref-3)
4. Mojonnier extraction (AOAC International. (2005b). Determination of fat-gravimetric method. In W. Horwitz (Ed.), Official methods of analysis of AOAC International. AOAC International. Atlanta, GA, USA.) [↑](#endnote-ref-4)
5. Further detail on the method of analysis for vitamin D is published in: Dunlop E, James AP, Cunningham J, Strobel N, Lucas RM, Kiely M, et al. Vitamin D composition of Australian foods. Food Chem. 2021;358:e129836. [↑](#endnote-ref-5)