The development of a method to estimate amino acid profiles across food composition datasets

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BACKGROUND

- Food consumption data relating to the habitual intake of amino acids for the Irish and UK population is limited.
- In the UK, the last amino acid dataset was published in 1980[1].
- Since then periodic revision of food composition have been published and combined to form the current Composition of Food Integrated dataset, 2015 (CoFID)[2]
- As it stands, 2,898 (100%) CoFID foods do not have published amino acid profiles.

AIM

- To develop a method to estimate the amino acid content of foods to supplement the McCance and Widdowson's Composition of Foods Integrated Database (CoFID)[2].

METHODS

- Published sources of amino acid composition data were identified[1,3,4].
- Nutritics database comparison tool, DB Map[5], facilitated the comparison of foods based on name, scientific description and protein content in a hierarchical fashion. Foods were subsequently characterised as identical, similar and biologically similar:

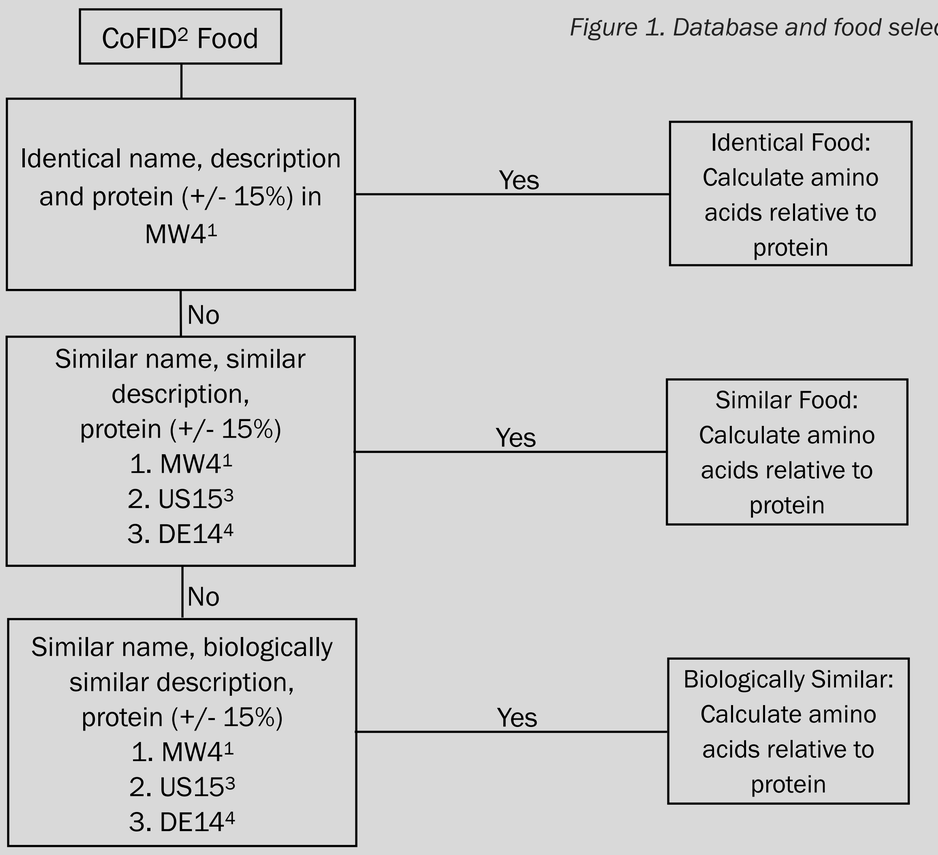

Figure 1. Database and food selection criteria.

1. Paul A, Southgate D, Russell J. First supplement to McCance and Widdowson's The Composition of Foods Amino Acid composition (per 100g foods), Fatty Acid composition (per 100g foods). The Composition of Foods. London: HMSO; 1980.
2. McCance & Widdowson. Composition of foods integrated dataset (CoFID) 2015 [Available from: https://www.gov.uk/government/publications/composition-of-foods-integrated-dataset-cofid]
3. US Department of Agriculture, Agricultural Research Service, Nutrient Data Laboratory. USDA National Reference, Release 28. Version Current: May 2016. Internet: http://www.ars.usda.gov/ba/bhnrc/ndl
4. BLS. German Federal Food Code. 2017 [Available from: https://www.blsdb.de/bls?background.

- Protein tolerance was set as +/- 15% relative to the CoFID food.
- CoFID amino acid values were recalculated relative to total protein using the formula:

$$\frac{\text{Amino Acid}}{\text{Protein from source}} \times \text{Protein from CoFID}$$

RESULTS

Table 1. Number of foods matched from each dataset

Name of Dataset and no. of foods with published amino acid data (*n*)	Identical	Similar	Biologically Similar	Total
McCance and Widdowson's Composition of Food 4th Edition (MW4)[1] (*n*=670)	597	184	0	781
United States Department of Agriculture Food Composition Database (US15)[3] (*n*=4,719)	0	802	172	974
German Food Composition and Nutrition Tables (DE14)[4] (*n*=14,564)	0	813	33	846
Total	597	1,799	205	2,601

1. Paul A, Southgate D, Russell J. First supplement to McCance and Widdowson's The Composition of Foods Amino Acid composition (per 100g foods), Fatty Acid composition (per 100g foods). The Composition of Foods. London: HMSO; 1980.
3. US Department of Agriculture, Agricultural Research Service, Nutrient Data Laboratory. USDA National Reference, Release 28. Version Current: May 2016. Internet: http://www.ars.usda.gov/ba/bhnrc/ndl
4. BLS. German Federal Food Code. 2017 [Available from: https://www.blsdb.de/bls?background.

- 297 foods did not fit the criteria outlined in the methods and therefore, were unable to be estimated.

DISCUSSION & CONCLUSION

- This study produced a dataset that may be used for the assessment of amino acid intake in the UK and Irish populations.
- Knowing the amino acid composition of foods is important in nutritional epidemiology and in investigations into associations between amino acid intake and health and disease. This has potential for both applied and population based research.
- Opportunities for further research with this study include comparison and validation to assess accuracy of estimated data.

References:

1. Paul A, Southgate D, Russell J. First supplement to McCance and Widdowson's The Composition of Foods Amino Acid composition (per 100g foods), Fatty Acid composition (per 100g foods). The Composition of Foods. London: HMSO; 1980.
2. McCance & Widdowson. Composition of foods integrated dataset (CoFID) 2015 [Available from: https://www.gov.uk/government/publications/composition-of-foods-integrated-dataset-cofid]
3. US Department of Agriculture, Agricultural Research Service, Nutrient Data Laboratory. USDA National Nutrient Database for Standard Reference, Release 28. Version Current: May 2016. Internet: http://www.ars.usda.gov/ba/bhnrc/ndl
4. BLS. German Federal Food Code. 2017 [Available from: https://www.blsdb.de/bls?background.
5. DB Maps - A digital database management tool developed by Nutritics to assist with the comparison of food parameters across food databases.