

Addressing limitations with food composition data - The development and automation of a method to estimate amino acid profiles across datasets

N.L Lynch^{1,2}, J Kearney², M Stack², D O'Kelly¹, F.E Douglas¹,

1.Nutritics, Nutrition Analysis Software, Town Plaza, Swords, Co. Dublin

2.School of Biological Sciences, Dublin Institute of Technology, Kevin St, Dublin 8

Background

Food consumption data relating to the habitual consumption of amino acids for the Irish and UK population is limited. This is due to a lack of reliable data relating to amino acid composition of commonly consumed foods.

In the UK, the last amino acid data was published in 1980¹. Since then periodic revision of food composition have been published and combined to form the current Composition of Food Integrated dataset, 2015 (CoFID)² however, chemical analysis of protein for amino acid composition is very expensive and not easily affordable within public analytical budgets. As it stands, 2,898 CoFID foods do not have published amino acid profile

Aim

The aim of this study is 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 of foods were identified^{1,3,4}. DB Maps⁵ was used to compare source foods with CoFID foods. Foods were categorised as identical, similar and biologically similar.

- Foods were considered 'identical' if the scientific name and description were identical and the protein composition was similar.
- Foods were considered 'similar' if they had a similar scientific name and protein composition.
- Foods were considered 'biologically similar' if the food had a similar scientific name and comparable protein composition but was in a different form, i/e. raw / cooked.

DB Maps was used to estimate the amino acid profile of source foods to CoFID foods relative to total protein.

Results

2,715 CoFID foods were supplemented with amino acid profiles while 183 were not.

910 amino acid profiles were estimated using UK data¹; 597 identical, 268 similar, 45 biologically similar.

1,028 amino acid profiles were estimated using US data³; 837 similar foods, 191 biologically similar.

777 amino acid profiles were estimated using German data⁴; 737 similar foods, 40 biologically similar.

Discussion and Conclusion

This study produced a dataset that may be used for the assessment of amino acid intake in UK and Irish populations. This has potential for both applied and population based research. 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.

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 (Slightly revised). 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.