

Abstract

# A Systematic Approach to Defining Nutritional Quality of Underutilised Crops <sup>†</sup>

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**Abstract:** Underutilised crops have potential to play an increasing role in the diet of many who may lack adequate nutrition. At present, there appears to be no comprehensive or systematic effort to collate and analyse nutritional composition data, although this is likely to make a significant contribution to global food and nutritional security. For example, determining intra- and inter-species variation for nutritional components would enable direct comparison with commodity crops. Using bambara groundnut (*Vigna subterranea*; BG) as a use-case, we present a systematic work-flow that facilitates comparison of nutritional composition and function for underutilised crops. This includes (i) critical literature review of available data sources for the target and comparator crops, to determine the extent of variation reported for a range of nutritional components; (ii) development of a Crop Dietary Nutritional Data Framework (CDN-DF) to assist in data curation; (iii) *de novo* analysis of seed nutritional components for a subset of BG accessions selected to represent the global genepool. The CDN-DF includes controlled vocabularies organised in a hierarchical structure that represent a simplified subset of relationships for nutritional composition and dietary function. This facilitates comparison of datasets between species and can help identify data gaps. This framework is currently guiding establishment of a formal nutritional ontology that more fully represents the complex relationships between nutritional components. Based on our analysis, it appears that BG seed protein, lipid and fibre concentrations cover a similar range in chickpea and mungbean. Variation in BG protein concentration indicates scope for developing high protein cultivars.

**Keywords:** underutilized crops; bambara groundnut; cultivar variation; genetic resources; nutritional security; food composition; nutrients; databases; knowledge representation



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