The Importance of Food Composition Data for Estimating Micronutrient Intake: What Do We Know Now and into the Future?

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Reducing all forms of malnutrition represents a great challenge in many countries and recognizing population intake deficiencies is the first step to solve this problem. In this context, food composition tables or databases (FCT/FCDB) are an essential tool for dietary assessments as they provide the information required to convert food consumption data into energy and nutrient intakes [1–3].

FCT/FCDB centralize data on the nutrient content of foods of a certain country or region that are the basis for many activities involving nutrition and health, food security, and agriculture [2, 3]. The main factors that affect the quality of FCT/FCDB are coverage of foods and components, details included in the food description, component identification (including denominators, units, and definitions), appropriateness of the analytical procedures, and how well the foods analyzed represent the food supply (sampling). In addition, they also need to be regularly updated to reflect changes in the food supply and nutrition science [1].

FCT/FCDB should be elaborated at country level since the composition of foods differs from country to country due to geographical location, fortification programs, and dietary habits (types of foods and processing methods applied) [1]. Therefore, adapting an FCT/FCDB from another country can be a challenging and time-consuming work due to these differences in the food items.

Around three-quarters of all countries already have published at least one FCT/FCDB [4], even though many are outdated and vary considerably in terms of data quality, documentation, food and nutrient coverage, analytical methods used, and accessibility [1]. Moreover, a great number of those FCT/FCDB contain very few up-to-date analytical data obtained for food composition purposes, resulting in many data being estimated or copied from other publicly available FCT/FCDB [5].
Low-quality FCT/FCDB may introduce errors in the intake assessment resulting in under- or overestimated intake for a certain micronutrient. For example, total vitamin A may be calculated either as Retinol Equivalents (RE) or as Retinol Activity Equivalent (RAE), and they result in different values for the same vitamin A content in plant foods. Thus, using RE or RAE in estimating nutrient-deficient population would generate 2 significantly different figures. Similar problems may occur for other components, for example, niacin, folate, carbohydrate, or dietary fiber.

Furthermore, many other natural factors that can affect the composition of foods are often not reflected in FCT/FCDB including biodiversity, maturation degree, soil, and harvest season. The variation in the nutrient content for distinct varieties or cultivars of the same species can represent the difference between nutrient deficiency and nutrient adequacy in populations and individuals. For instance, vitamin A content of sweet potato may vary from trace amounts to 3,637 µg of RE per 100 g of edible
portion, which corresponds to 6 times the recommended daily intake for this nutrient. Flesh color gives evidence of the vitamin A content since yellow- and orange-fleshed sweet potatoes contain higher amounts of vitamin A. Hence, these foods should be reported individually in FCT/FCDB with their unique nutrient profile instead of a singular food entry with an average value. Table 1 summarizes limitations and considerations for using FCT/FCDB.

In this context, FAO/International Network of Food Data Systems (INFOODS) coordinate food composition activities aiming to improve data quality and availability globally. INFOODS’ activities include capacity development and publication of both guidelines and regional and international FCT/FCDB that are available on their website free of charge [4].

In spite of food composition receiving more attention in recent years, many countries still need to generate and disseminate up-to-date and high-quality FCT/FCDB. Poor food composition data may lead to wrong conclusions resulting in the development of misleading policy and programs in nutrition to improve nutritional status, especially for micronutrients, of individuals and population [5].

References