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INFOODS contributions to fulfilling needs and meeting challenges concerning food composition databases

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Abstract

Food composition data play a key role in most nutrition related activities. The International Network of Food Data Systems (INFOODS) has contributed to improving the availability and quality of food composition data worldwide. INFOODS activities include publication of regional and international food composition tables and databases (e.g., Food Composition Database for Biodiversity) and guidelines. Capacity development is an on-going activity through postgraduate classroom courses and distance-learning modules. Training and awareness-raising through these efforts has led many sectors (e.g., agriculture, health, environment, food regulatory) to appreciate the importance of quality food composition data as the basis for policies and decision-making.

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1. Global nutrition, food and agriculture situation

Despite global agricultural production that is theoretically sufficient to feed the world's population, about one billion people are hungry [1] and two billion suffer from micronutrient deficiencies [2]. In contrast, excessive consumption of energy-dense, nutrient poor food in combination with a decrease in physical activity has led to 1.4 billion adults and school children who are overweight and half a billion who suffer from obesity [3]. In the past, it was assumed that when individuals reached energy adequacy, their requirement for all other macro- and micronutrients would be covered automatically. However, this assumption is almost always incorrect. Agricultural programs and policies often aim to increase the production of staple crops as they are essential to alleviate hunger and energy deficiency; however they are typically insufficient to combat all micronutrient deficiencies. Therefore, additional efforts are needed

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to address all forms of malnutrition (i.e. undernourishment, micronutrient deficiency and overnutrition) by increasing the availability and affordability through production or import of a wide range of diverse foods that are needed for a healthy diet. Such foods include fruits, vegetables and some animal source foods.

Nomenclature:

FB – food-based

FC – food composition

FCT – food composition table(s)

FCDBMS: food composition database management system

Another aspect to be considered is food biodiversity, which can be a useful tool in the fight against malnutrition, giving consumers access to wider dietary diversity. The potential of indigenous, neglected or underutilized food crops and gathered foods to improve dietary diversity remains largely unknown and underexploited. Information on the contribution of such foods to people's diets and nutrient intakes is also scarce as such foods are often not included in food consumption surveys and in the FAO Food Balance Sheets [4]. Recent studies have shown that nutrient values may vary up to 1000 times among different varieties of the same food, especially for micronutrients. This means that the nutrient content can vary as much among varieties of the same food as among different foods. Intake of one variety rather than another can mean the difference between micronutrient deficiency and adequacy [5–7]. Therefore, the production and consumption of those varieties with high nutritional value should be favored, especially those rich in nutrients that the population may be deficient in. Furthermore, it is important that the nutrient content is one of the criteria agriculture policy makers and practitioners use to ensure better and more nutritious crop varieties are available for consumption [8].

Many countries and international agencies attempt to combat malnutrition with short-term health and nutrition interventions such as supplementation or fortification. In recent years, increasing doubts have been articulated on the sustainability of supplements [9,10]. Furthermore, food not only contains nutrients but also many bioactive compounds that have not yet been fully explored. Additionally, it is thought that nutrients interact differently when consumed in their original form through foods and thus, are able to provide important benefits that supplements and fortificants cannot deliver [11]. FAO and its partners, on the other hand, concentrate their efforts in decreasing malnutrition through foods, i.e. by increasingly linking agriculture, biodiversity and nutrition to achieve sustainable solutions, e.g. sustainable diets [12].

Increasingly, the literature supports the success of food-based (FB) approaches, which include dietary diversification and modification, fortification and biofortification [13]. The success of homestead or community gardens as a cost-effective means of combating micronutrient deficiency, especially vitamin A deficiency, has been demonstrated by studies coordinated by Helen Keller International in Bangladesh, Nepal, Cambodia and the Philippines, where an integrated approach including animal husbandry and nutrition education were used [14]. Another well-known example of a successful FB-approach is that of orange-fleshed sweet potato, where high carotenoid varieties were identified and promoted to agricultural extension to reduce vitamin A deficiency [15]. A recent systematic review that looks at household food production strategies on the health and nutrition outcomes of women and young children concludes that the existing evidence base supports the hypothesis that agricultural strategies improve intakes of micronutrient-rich foods by women and young children when nutrition education, gender and nutrition objectives are explicitly stated [16].

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