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Review

Food Composition Databases: Does It Matter to Human Health?

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Abstract: Food provides humans with more than just energy and nutrients, addressing both vital needs and pleasure. Food habits are determined by a wide range of factors, from sensorial stimuli to beliefs and, once commanded by local and seasonal availability, are nowadays driven by marketing campaigns promoting unhealthy and non-sustainable foodstuffs. Top-down and bottom-up changes are transforming food systems, driven by policies on SDGs and by consumer's concerns about environmental and health impacts. Food quality, in terms of taste, safety, and nutritional value, is determined by its composition, described in food composition databases (FDBs). FDBs are then useful resources to agronomists, food and mechanical engineers, nutritionists, marketers, and others in their efforts to address at maximum human nutrient needs. In this work, we analyse some relevant food composition databases (viz., purpose, type of data, ease of access, regularity of updates), inspecting information on the health and environmental nexus, such as food origin, production mode as well as nutritional quality. The usefulness and limitations of food databases are discussed regarding what concerns sustainable diets, the food 'matrix effect', missing compounds, safe processing, and in guiding innovation in foods, as well as in shaping consumers' perceptions and food choices.

Keywords: food data; natural substances; health promotion; sustainable foods; national food composition databases; one health

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1. Introduction

Food databases (FDB), or more correctly food composition databases, contain detailed information on the nutritional composition of foods and on other relevant compounds (e.g., polyphenols, phytic acid). Food components primarily determine nutritional features and, in some cases, quality aspects. For example, polyphenols, which are abundant in plants, are often associated to bitter taste and astringency sensation of foods [1], while acting in favour of food safety by inhibiting foodborne pathogens and spoilage microbes. Polyphenols can be intentionally added to foods for their bioactive properties [2–4] or they can be key natural components, as happens in table olive fermentation [5,6]. During the spontaneous fermentation process, olive's polyphenols help to select the suitable microbial populations, resulting in taster and safer foodstuffs.

The applications of FDBs have been greatly evolving and, consequently, the awareness on some of their limitations. Firstly, FDBs consisted of printed tables listing the nutritional composition of selected foods, usually from a certain country and only available to a few specialists. Today, the most popular FDBs are open access online comprehensive