



Review

Ultra-processed foods: A new holistic paradigm?

Anthony Fardet*, Edmond Rock

Université Clermont Auvergne, INRA, UNH, Unité de Nutrition Humaine, CRNH Auvergne, F-63000, Clermont-Ferrand, France



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ABSTRACT

Background: The concept of ultra-processed foods (UPFs) is new, and it was proposed for the first time in 2009 as group 4 of the NOVA classification to address the degree of food processing. UPFs include not only “junk foods” but also foods marketed as healthy, such as light, vegan, organic, or gluten-free products. UPFs are characterized by the presence of highly-processed/purified “cosmetic” ingredients and/or additives to restore and/or exacerbate organoleptic properties, *i.e.*, taste, aroma, color and texture. Substantial industrial processing techniques, *e.g.*, puffing, extrusion cooking, and/or extreme fractioning/refining that greatly breakdown the food matrix, may also be markers of ultra-processing. The UPF concept has been consistently criticized for being an overly heterogeneous concept, and the NOVA classification has been criticized for being qualitative only and too imprecise.

Scope and approach: This review is intended to discuss the UPF concept from a holistic perspective and to analyze the scientific soundness of criticisms about UPFs and NOVA. The UPF concept is first defined; then, its primary nutritional characteristics are described, followed by their association with health based on human studies.

Key findings and conclusions: UPF criticisms differ between holistic and reductionist perspectives. In a holistic concept, reductionist researchers view the proposed definition of UPF as an imprecise, vague and heterogeneous technological group. However, from a holistic perspective, the UPF concept has serious advantages, such as broad and common deleterious health attributes (*i.e.*, the loss of “matrix” effect, empty calories, poorly satiating, hyperglycemic and containing artificial compounds foreign to the human body).

1. Introduction

The act of ranking foods is not harmless, notably in relation to epidemiological studies and the subsequent national dietary guidelines that are derived from them, and the potential impact on public health area (Fardet et al., 2015). Generally, to date, foods have been ranked according to their nutrient content, *e.g.*, foods rich in protein such as fish, meat, dairy and legumes and foods rich in sugars, salt and fat (as in many dietary pyramids worldwide), or their botanical and animal origins, *e.g.*, white and red meats, fruits, vegetables, cereals, legumes, nuts, fish, dairy and eggs (Fardet et al., 2015), or other classifications (ANSES, 2017). In 2014, Brazil was the first country in the world to release dietary guidelines for populations based on the degree of food processing (Ministry of Health of Brazil, 2014). They distinguished un/minimally processed foods, culinary ingredients, processed foods and ultra-processed foods (UPF) in what they call the “NOVA” (*i.e.*, “new” in Portuguese) classification (Monteiro et al., 2018).

Before NOVA, the degree of food processing was rarely taken into

account during binary comparisons such as whole *versus* refined grains (Aune, Norat, Romundstad, & Vatten, 2013), red *versus* processed meat (Farvid et al., 2018), low fat *versus* whole dairy products (Benatar, Karishma, & Stewart, 2013), or fruit *versus* fruit juices *versus* sweetened fruit juices (Imamura et al., 2016). In epidemiological studies, the different relative risks of some chronic diseases were calculated according to these first binary comparisons, with a generally higher risk when foods were more processed, as shown in particular for fruit-based products (Fardet, Richonnet, & Mazur, 2019). However, the degree of processing was not previously considered within national dietary recommendations. Currently, it is clear that despite fifty years of preventive nutrition and national dietary guidelines, the prevalence of chronic diseases continues to increase worldwide, and several experts and researchers have recently emphasized that unbalanced nutrition and its associated risk factors or deregulated metabolisms are the leading cause of deaths and chronic noncommunicable diseases worldwide (Development Initiatives, 2018; GBD 2013 Mortality and Causes of Death Collaborators, 2015; GBD 2015 Risk Factors

Abbreviations: UPF, Ultra-processed food

* Corresponding author.

E-mail address: anthony.fardet@inra.fr (A. Fardet).

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