Sustainable diets and novel food technologies

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Abstract

To meet a sustainable food demand for the next decades boosting the production output in primary production of food materials is just one of the steps necessary (Augustin et al., 2016). Hence, it is paramount to consider some more exquisitely practical issues, among which the role of food technologies is central. For instance, optimizing food processing systems in the post-harvest end of the food production chain in accordance to energy consumption, nutritional quality, yield of final products, and application of waste of food processing in other sectors (e.g. biofuel production, textile industry, chemical industry) or in development of value-added products, can be influential in moving towards sustainable diets and consequently address issues such as energy crisis, malnutrition and waste management in post-harvest sectors (Augustin et al., 2016; Beddington, 2010; Godfray et al., 2010). In a wide way, food processing can be referred to any change made to raw food material before its consumption (Floros et al., 2010). Such changes can impose negative effects to food products by reducing the nutritional value because of the destruction of nutritional compounds. However, the benefits of food processing should not be neglected (Weaver et al., 2014). Food processing, in fact, is essential to make the food consumable, increase the shelf life, enhance the bioavailability of critical nutrients in food, and destroy the toxic ingredient of food material (Van Boekel et al., 2010). Specifically, some of the so called global 'megatrends' (Augustin et al., 2016, 2016; Hajkowicz, 2015). such as 'more from less', 'planetary pushback', the 'silk highway', 'forever young', 'digital immersion', 'porous boundaries' and 'great expectations' which address waste, energy, healthy food, environmental impact, market issues and the technical issues of production, will have a foremost impact on the design of new foods product and the technologies used to produce them. Research (Augustin et al., 2016; Pereira & Vicente, 2010; Van Boekel et al., 2010; Van der Goot et al., 2016; Weaver et al., 2014) is currently devoted to develop new techniques that enhance the food production chain by using sustainable energy while having less impact on environment and initial nutritional characteristics of raw food materials. These technologies may be used for different food processing such as pasteurization, sterilization, drying, peeling, cooking or extraction, and for a wide range of food products while production lines in different food industries have been profiting from their advantages. For instance,

various novel non-thermal food processing technologies including pulsed electric fields (PEF), supercritical CO_2, high pressure processing (HPP), radiation, and ozone processing as well as novel thermal processing technologies such as microwave, ohmic heating (OH) and radio frequency (RF) heating have been regarded as alternative to conventional heat treatments in recent years. Beside production of safe food and reduction of losses in nutritional factors of the product comparing to conventional food processes, such novel technologies are empowered by green and sustainable energy (Jermann et al., 2015; Pereira & Vicente, 2010; Sims at al., 2003), and, in the case of novel thermal and non-thermal food processing technologies, can also help in saving energy and while reducing the emission of food processing (Masanet et al., 2008). In this paper, we aim at addressing some of these novel food processing technologies and assess them in the context of sustainable diets. The interdisciplinary cooperation between pre-harvest and post-harvest sides of food production systems by taking advantage of novel technologies has been introduced as an effective way to make available to the population a diet that provides them with sufficient energy and nutrition besides satisfying the environmental and ethical values (Augustin et al., 2016; Karunasagar & Karunasagar, 2016). The use of novel food technologies might improve the stability of local food production, while imposing less environmental impact and less energy consumption to extend the shelf life of locally produced food products. But of course these technologies will unlikely be evenly adopted globally (costs and specific knowledge being still an entry barrier for adoption) and might become a site of contestation as food produced using them might be perceived as non-natural or with dubious qualities.

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