Title Interdisciplinary team-work for providing global citizens with a safe, adequate and healthy diet

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Abstract

The global population is projected to increase from the current 7 billion to 9 billion before 2050. Our ability to provide the present and future inhabitants of the earth with a safe and nutritionally adequate diet requires increased production and distribution of nutritionally dense foods, decreased post-harvest decay, and improved processing and cooking styles. It has been estimated that the human diet contains approximately 20,000 compounds, although only 42 of these are essential for life. There is much interest within the biomedical community in the health-promoting activities of many of the non-essential compounds in plant foods. Attention is increasingly directed towards enriching the concentrations of nutrients and such bioactive compounds in diverse plant foods using genetic and post-harvest methods as a means to deliver nutritionally dense, healthy foods to the plate. Greater insights are also needed to ensure the delivery of ingested compounds and their bioactive metabolites to target tissues for the prevention, attenuation and treatment of acute and chronic diseases. Once ingested, compounds may be directly absorbed across the gut epithelium or transformed by the gut microbiota with subsequent absorption of bioactive metabolites. Cost- effective and predictive in vitro models are being increasingly used to evaluate the impact of plant variety, post -harvest processing, and style of preparation on the bioaccessibility and bioavailability of nutrients and health-promoting compounds in foods. These include oral, gastric and small intestinal digestion, cecal/colonic fermentation, highly differentiated human intestinal cell lines, and co-culture systems. Several examples of the application of such models for investigating the bioavailability and efficacy of compounds in fruits and vegetables will be presented. Greater integration of efforts among breeders, horticulturists, food scientists, nutritionists and biomedical researchers will be encouraged to facilitate advances for providing foods that promote health and wellness throughout the lifecycle.