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Sustainable food processing for recovering bioactive compounds from food materials

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Fruits and vegetables are rich in bioactive phytochemicals. However, proper bioprocessing methods (upstream and downstream) are necessary for extracting, standardizing and improving stability of those bioactive phytochemicals, which otherwise, have limited shelf-life. In addition, processing of byproducts from fruits and vegetables could increase the utilization of those by-products and generate value-added products useful as food and nutritional supplements. Minimal processing methods such as, non-thermal extraction techniques including high pressure processing, ultrasound, dense phase carbon dioxide and accelerated fluid extraction, show promise for extracting polyphenols. Fermentation has shown promising results in maintaining the bioactivity of certain phytochemicals. Additional external forces, by different mechanisms of these thermal and non-thermal methods could further break down the cell and enhance extractability. Besides, bioprocessing conditions such as temperature, other factors, such as particle size, contact time and flow regime are important for processing and extracting most of the polyphenols from a by-product. It is very relevant considering the recent increase in the utilization of bioactive compounds as nutraceuticals and development of encapsulation technologies for accurate delivery of these compounds. In this presentation, I will discuss different bioprocessing operations and enhanced extraction technologies for producing various value-added with bioactivity in the final products.

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