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Bioavailability and metabolism of bioactive compounds from opuntia Ficus indica

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The *Opuntia ficus indica* (L.) (OFI) is used as nutritional and pharmaceutical agent in various dietary and value-added products. Their nutritional properties have recently been clarified by several scientific studies, as widely reported by different authors. OFI cladodes are a source of carbohydrates and fibres, particularly pectin, lignin, mucilage, cellulose and hemicellulose, recognized for their positive influence on glucose and lipids metabolism, obesity control and for the prebiotic function. They are also recognized for the presence of bioactive compounds, flavonoids and phenolic acids, and hydroxycinnamic acids (piscidic and eucomic acids), rarely encountered in nature and restricted to plants exhibiting crassulacean acid metabolism and succulence. Further, OFI cladodes present high values of nutrients like minerals and vitamins, which are able to regulate osteoporosis diseases.

The main objective is to valorise an ingredient obtained by mild technologies from OFI cladodes to use for the enrichment of widely consumed foods, such as bread, pasta and biscuits, for a possible functional food industrial application and health promoting food. To this purpose, chemical characterization of polyphenols, minerals and soluble dietary fibres was performed. Furthermore, the antioxidant activity (as ABTS and DPPH radical scavengers) in dehydrated OFI cladodes were assessed. Moreover, considering the influence of other plant's cellular components on polyphenols and their fate during human digestion, a simulated gastrointestinal digestion was also executed. This method allowed us to evaluate the cations' bioaccessibility, an important point for assessing the health impact for functional ingredient. In the simulated gastrointestinal conditions, the non-covalent bonds between polyphenols and dietary fibres were probably broken, with consequent bioactive compounds release in the upper and lower parts of digestive tract, increasing their availability for colonic microbiota action. Further studies will address the evaluation of the viability and metabolic activity of selected gut bacteria by an in vitro microbiota model.

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