

OC33 Chromatographic approaches to study pine nut skin: exploitation of its composition and bioactivities

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Pine nut skin (PNS) is an unexploited and uncharacterized by-product recovered during pine nut processing. The exploitation of by-products as sources of valuable compounds agrees with the current demand for the reduction of waste, and a transition to more sustainable production and consumption¹. Therefore, PNS characterization and bioactive potentialities were assessed.

The utilization of several chromatographic techniques allowed the characterization of PNS phenolic compounds (HPLC-DAD-UV and HPLC-DAD-ESI-MSⁿ), and the carbohydrates quantification and structural characterization, after specific derivatization (GC-FID and GC-MS). PNS subcritical water extraction using microwave was optimized and the obtained extracts, separated into low-molecular-weight (rich in phenolic compounds) and high-molecular-weight (rich in carbohydrates), were evaluated regarding their digestibility and prebiotic activity. The prebiotic potential was assessed by quantifying the short-chain fatty acids (HPLC-UV) produced after the *in vitro* faecal fermentation.

HPLC-DAD-ESI-MSⁿ allowed to identify PNS phenolic compounds, namely protocatechuic, *p*-coumaric, and caffeic acids, while HPLC-DAD-UV enabled the monomers identification of proanthocyanidins ((epi)catechins) and hydrolysable tannins (protocatechuic acid), after acid methanolysis. GC techniques allowed to disclose the polysaccharides structures (xyloglucans and pectic polysaccharides) and their degradation by microbiota. The fermentation of both extracts rich in phenolic compounds and rich in polysaccharides resulted in an increased production of acetic, propionic, and butyric acids when compared to the commercial prebiotic inulin, proposing these PNS extracts as prebiotic agents.

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