

Optimization of a green method for the recovery of polyphenols from onion solid wastes

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The valorization of Onion (*Allium cepa*) wastes, a 450,000 tonnes/year waste in Europe, by a non-conventional method is presented. The outer dry layers of the onion bulb, which constitute the main waste of onion, is a source of valuable polyphenols such as flavonoids and anthocyanins. Valuable polyphenols of onion leaves were extracted using eco-friendly solvents, such as water and glycerol. 2-hydroxypropyl- β -cyclodextrin was also used as a co-solvent for the promotion of the extraction, as cyclodextrins (CD's) are known to enhance the extraction of polyphenols in water by forming water soluble inclusion complexes. The process was optimized by implementing a central composite (Box-Behnken) experimental design and response surface methodology (RSM), taking into consideration the following independent variables: glycerol concentration (C_{gl}), CD concentration (C_{CD}) and temperature (T). The assessment of the extraction model was based on two responses: the total pigment yield (Y_{TPm}) and the antiradical activity (A_{AR}). LC-MS analysis was also applied in order to identify biophenols and colourants of the obtained extracts. The main biophenols found were quercetin and quercetin derivatives and the main colorant was cyanidin 3-O-glucoside.