

Extraction of Polysaccharides by Autohydrolysis of Spent Coffee Grounds and Characterization of their Antioxidant Properties

Lina Ballesteros, Mónica Ramírez, José Teixeira, Solange Mussatto

University of Minho, Gualtar, Portugal

Spent coffee grounds (SCG) are the major wastes obtained during the process for soluble coffee preparation, being generated in large amounts around the world. Despite SCG show an interesting composition for food industry, there are few studies focused on their use and profitable applications for the production of value added compounds.

The purpose of this work was to extract polysaccharides from SCG by using the autohydrolysis technique. Experimental assays were performed under different conditions of temperature (160°C to 200°C), solid/liquid ratio (1/5 to 1/15 g SCG/ml water) and extraction time (10 to 50 min), which were combined according to a 23 central composite design. The polysaccharides extracted in each assay were precipitated with ethanol and lyophilized for further analyses. The polysaccharide's yield was calculated for each experimental condition. The antioxidant potential of the recovered polysaccharides was estimated by the FRAP, DPPH, ABTS and total antioxidant activity (TAA) methods. Moreover, the effect of the variables on the extraction yield and antioxidant activity of the recovered polysaccharides was determined, and the conditions that maximize the results were established. The highest polysaccharide's yield (8.95% w/w) was obtained when the autohydrolysis process was performed at 180°C, during 30 min, using a solid/liquid ratio of 1/15 g/ml. The polysaccharide recovered under these conditions presented also the highest antioxidant activity by the FRAP (0.046 mM Fe(II)/g polysaccharide), ABTS (108.05 µM trolox/g polysaccharide) and TAA (18.17 mg α-tocopherol/g polysaccharide) methods.

These findings are of great relevance since they demonstrate the possibility of obtaining polysaccharides with high antioxidant potential from SCG, which could be used to produce functional food.