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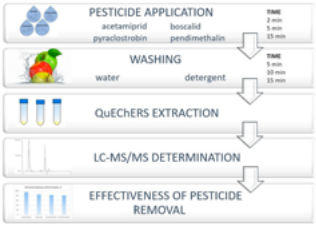
Section Separation Processes

Selected Papers

DOI:10.3390/pr10040793

A New LC-MS Method for Evaluating the Efficacy of Pesticide Residue Removal from Fruit Surfaces by Washing Agents

Authors: Magdalena Zarębska, Zofia Hordyjewicz-Baran, Tomasz Wasilewski, Ewa Zajszły-Turko and Natalia Stanek



Abstract: Modern agriculture uses pesticides to improve the quality and quantity of crops. However, pesticide residues can remain on agricultural products, posing very serious risks to human health and life. It is recommended to wash fruits and vegetables before consumption. To assess the removal efficacy of pesticide residue, a sensitive and reliable method based on ultrahigh-performance liquid chromatography-tandem mass spectrometry (UHPLC-MS/MS) was developed and optimized for the simultaneous determination of four pesticide residues (acetamiprid, boscalid, pyraclostrobin, and pendimethalin). Isotope-labeled standards were used to validate the method in terms of recovery, linearity, matrix effects, precision, and sensitivity. The mean recovery values for both low-quality control (LQC) and high-quality control (HQC) transitions were in the range of 89–105%, and the intra-day precision was less than 13.7%. The limits of detection (LOD) and quantification (LOQ) were 0.003 mg/kg and 0.01 mg/kg, respectively. The proposed method is suitable for evaluating the quality of detergents for removing pesticide residues from fruit surfaces.

DOI:10.3390/pr10050983

Processing of Carob Kernels to Syrup by Ultrasound-Assisted Extraction

Authors: Maria Lisa Clodoveo, Pasquale Crupi, Marilena Muraglia and Filomena Corbo

Abstract: Carob syrup is one of the most important carob products, which can have applications in pastry and confectionery, as a fruit preservative, but also in the pharmaceutical field because of the antimicrobial activity due to its polyphenol content. Carob syrup is traditionally made through a very time-consuming process, involving solid–liquid extraction in boiling water and concentration at a high temperature (>100 °C), which potentially causes the degradation of the active compounds (i.e., procyanidins or flavonol glycosides). Therefore, in this work, an alternative and less drastic method based on ultrasound technology was proposed to produce carob syrup. Processing conditions (i.e., time, temperature, and liquid–solid ratio) influencing the extraction of total soluble solids (TSS) and total phenolic compounds (TPC) were optimized using a central composite design coupled to response surface methodology. Reliable mathematical models allowed us to predict the highest TSS (24 ± 2 °Brix) and TPC (1.7 ± 0.5 mg/mL) values that could be obtained at 15 min, 35 °C, and 2 mL/g. Finally, a different HPLC-DAD phenolic pattern was determined between syrups produced by traditional and ultrasound methods; epicatechin, 4-hydroxycoumaric acid, and ferulic acid were more concentrated in the former, while procyanidin B2, myricitrin, and quercitrin were prevalent in the latter one.

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