Effect of sample treatment methods for PAH4 determination in cocoa

ABSTRACT

Polycyclic aromatic hydrocarbons (PAHs) are carcinogenic and some have been reported to be present in cocoa. Therefore, PAHs determination in cocoa is very important. In this study, a simple procedures based on maceration extraction, solid phase extraction (SPE), saponification and high-performance liquid chromatography with fluorescence detection (HPLC-FLD) were presented for rapid PAH4 (sum of four different PAHs; benzo (a) anthracene, chrysene, benzo (b) fluoranthene, and benzo (a) pyrene) determination in cocoa samples (cocoa bean, cocoa nib and cocoa shell). The effect of using different sample extractions (different type of solvents and extraction time) and purification methods (different SPE treatments) were investigated. The most satisfactory recoveries (59.83 ï 116.99% at concentration levels; 1.00, 5.00 and 10.00 µ/kg) and clean extracts were obtained by extracting the cocoa samples (cocoa nib, cocoa shell and whole cocoa bean) with hexane for two hours and purification with SPE using silica cartridge (cyclohexane as elution solvent). In this study, detection limit was in the range of 3.36 ï 13.90 ng/kg thus, the method meets the Commission Regulation (EU) No. 836/2011 and may be useful to be applied for assessment of cocoa beans quality.

Keyword: PAHs determination; Cocoa