Validation of an Analytical Method for Determination of Benzo[a]pyrene Bread using QuEChERS Method by GC-MS

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Abstract

A fast and simple modified QuEChERS (quick, easy, cheap, rugged and safe) extraction method based on spiked calibration curves and direct sample introduction was developed for determination of Benzo[a]pyrene (BaP) in bread by gas chromatography-mass spectrometry single quadrupole selected ion monitoring (GC/MS-SQ-SIM). Sample preparation includes: extraction of BaP into acetone followed by cleanup with dispersive solid phase extraction. The use of spiked samples for constructing the calibration curve substantially reduced adverse matrix-related effects. The average recovery of BaP at 6 concentration levels was in range of 95-120%. The method was proved to be reproducible with relative standard deviation less than 14.5% for all of the concentration levels. The limit of detection and limit of quantification were 0.3 ng/g and 0.5 ng/g, respectively. Correlation coefficient of 0.997 was obtained for spiked calibration standards over the concentration range of 0.5-20 ng/g. To the best of our knowledge, this is the first time that a QuEChERS method is used for the analysis of BaP in breads. The developed method was used for determination of BaP in 29 traditional (Sangak) and industrial (Senan) bread samples collected from Tehran in 2014. These results showed that two Sangak samples were contaminated with BaP. Therefore, a comprehensive survey for monitoring of BaP in Sangak bread samples seems to be needed. This is the first report concerning contamination of bread samples with BaP in Iran. © 2016 by School of Pharmacy.