
Title: Optimised extraction of heterocyclic aromatic amines from blood using hollow fibre membrane liquid-phase microextraction and triple quadrupole mass spectrometry

Author: Kevin M. Cooper Natcha Jankhaikhot Geraldine Cuskelly

PII: S0021-9673(14)00987-X
DOI: http://dx.doi.org/doi:10.1016/j.chroma.2014.06.061
Reference: CHROMA 355540

To appear in: *Journal of Chromatography A*

Received date: 16-4-2014
Revised date: 3-6-2014
Accepted date: 19-6-2014

Please cite this article as: K.M. Cooper, N. Jankhaikhot, Optimised extraction of heterocyclic aromatic amines from blood using hollow fibre membrane liquid-phase microextraction and triple quadrupole mass spectrometry, *Journal of Chromatography A* (2014), http://dx.doi.org/10.1016/j.chroma.2014.06.061

# Optimised extraction of heterocyclic aromatic amines from blood using hollow fibre membrane liquid-phase microextraction and triple quadrupole mass spectrometry

Kevin M. Cooper*, Natcha Jankhaikhot, Geraldine Cuskelly

Institute for Global Food Security, School of Biological Sciences, Queen's University Belfast, David Keir Building, 18-30 Malone Road, Belfast, BT9 5BN, United Kingdom

Email addresses: k.cooper@qub.ac.uk; natcha.j@gmail.com; g.cuskelly@qub.ac.uk

*Corresponding author at: Institute for Global Food Security, School of Biological Sciences, Queen's University Belfast, David Keir Building, 18-30 Malone Road, Belfast, BT9 5BN, United Kingdom. Tel.: +44 (0)28 90976562; Fax: +44 (0)28 90976513; Email: k.cooper@qub.ac.uk

**Abstract**

Heterocyclic aromatic amines (HCA) are carcinogenic mutagens formed during cooking of proteinaceous foods, particularly meat. To assist in the ongoing search for biomarkers of HCA exposure in blood, a method is described for the extraction from human plasma of the most abundant HCAs: 2-Amino-1-methyl-6-phenylimidazo(4,5-b)pyridine (PhIP), 2-amino-3,8-dimethylimidazo[4,5-f]quinoxaline (MeIQx) and 2-amino-3,4,8-trimethylimidazo[4,5-f]quinoxaline (4,8-DiMeIQx) (and its isomer 7,8-DiMeIQx), using Hollow Fibre Membrane Liquid-Phase Microextraction. This technique employs 2.5 cm lengths of porous polypropylene fibres impregnated with organic solvent to facilitate simultaneous extraction from an alkaline aqueous sample into a low volume acidic acceptor phase. This low cost protocol is extensively optimised for fibre length, extraction time, sample pH and volume. Detection is by UPLC-MS/MS using positive mode electrospray ionisation with a 3.4 min runtime, with optimum peak shape, sensitivity and baseline separation being achieved at pH 9.5. To our knowledge this is the first description of HCA chromatography under alkaline conditions. Application of fixed ion ratio tolerances for confirmation of analyte identity is discussed. Assay