



UNIVERSITY OF THE AEGEAN



Global NEST

PROCEEDINGS OF THE  
14<sup>th</sup> INTERNATIONAL  
**CONFERENCE on**  
**ENVIRONMENTAL SCIENCE**  
**and TECHNOLOGY**  
**CEST2015**



Occurrence of Polycyclic Aromatic Hydrocarbon Metabolites in Urine of  
Portuguese Firefighters

Pág. 349

Oliveira M., Slezakova K., Fernandes A., Vaz J.A., Delerue-Matos C., Teixeira J.P., Pereira M.C., Morais S.

**VOLUME OF ABSTRACTS**

**3 - 5 September 2015**  
**Rhodes, Greece**

**Editor: T. D. Lekkas**

## OCCURRENCE OF POLYCYCLIC AROMATIC HYDROCARBON METABOLITES IN URINE OF PORTUGUESE FIREFIGHTERS

OLIVEIRA M.<sup>1,2</sup>, SLEZAKOVA K.<sup>1,2</sup>, FERNANDES A.<sup>3</sup>, VAZ J.A.<sup>3</sup>, DELERUE-MATOS  
C.<sup>1</sup>, TEIXEIRA J.P.<sup>4,5</sup>, PEREIRA M.C.<sup>2</sup> and MORAIS S.<sup>1</sup>

<sup>1</sup> REQUIMTE, Instituto Superior de Engenharia do Porto, Instituto Politécnico do Porto, Rua Dr. António Bernardino de Almeida 431, 4200-072 Porto, Portugal, <sup>2</sup> LEPABE, Departamento de Engenharia Química, Faculdade de Engenharia, Universidade do Porto, Rua Dr. Roberto Frias, 4200-465 Porto, Portugal, <sup>3</sup> Escola Superior de Saúde, Instituto Politécnico de Bragança, Avenida D. Afonso V, 5300-121 Bragança, Portugal, <sup>4</sup> Instituto Nacional de Saúde Pública, Departamento de Saúde Ambiental, Rua Alexandre Herculano 321, 4000-055 Porto, Portugal, <sup>5</sup> Universidade do Porto, Instituto de Saúde Pública, Rua das Taipas 135, 4050-600 Porto, Portugal  
E-mail: sbm@isep.ipp.pt

### ABSTRACT

The present work estimates occupational exposure of healthy and non-smoking Portuguese firefighters to polycyclic aromatic hydrocarbons (PAHs) through the analysis of four urinary metabolites (OH-PAHs): 1-hydroxyacenaphthene, 1-hydroxynaphthalene, 1-hydroxypyrene (PAH biomarker of exposure), and 3-hydroxybenzo[a]pyrene (PAH biomarker of carcinogenicity). Firemen from several Portuguese corporations were asked to provide urine samples during the winter period (without exposition to fires; pre-fire season) and during the summer season of 2014 after fires fighting. The selected OH-PAHs were extracted from urine samples by solid-phase extraction and analyzed by high-performance liquid chromatography with fluorescence detection. Normalization of the urinary PAH-metabolite levels was achieved by analyzing the creatinine concentrations. 1-hydroxynaphthalene and 1-hydroxyacenaphthene were the most abundant metabolites, followed by 1-hydroxypyrene. The metabolite 3-hydroxybenzo[a]pyrene was not detected. Total OH-PAHs ranged from 0.02 to 4.01  $\mu\text{mol/mol}$  creatinine and between 0.55 to 8.39  $\mu\text{mol/mol}$  creatinine, respectively, for non exposed and exposed firefighters. In general, the detected concentrations of urinary PAH metabolites were higher during the fire season than in the winter season.

**Keywords:** firefighters, occupational exposure, biomonitoring, urinary PAH-metabolites, liquid chromatography

**Paper ID:** CEST2015\_00336