

## The determination of polycyclic aromatic hydrocarbons in some foods from industrialized areas in South Eastern Nigeria: human health risk impact

Uchechi Bliss ONYEDIKACHI\*, Chuka Donatus BELONWU, and Mattew Owhonda WEGWU

*Environmental Toxicology Unit, Department of Biochemistry, Faculty of Science, University of Port Harcourt, River State, Nigeria*

**Abstract.** This study investigated the potential health risk due to dietary exposure to Polycyclic Aromatic Hydrocarbons (PAHs) for the populace living around selected industrial areas in the south eastern states of Nigeria. The concentrations of PAHs were measured in edible food crops using Gas Chromatography - Flame Ionization Detection (GC-FID). The mean concentration of PAHs in food crops collected ranged from  $< 0.01$  to  $2.64 \pm 0.02$ ,  $5.27 \pm 0.04$ ,  $0.96 \pm 0.02$ ,  $8.94 \pm 0.01$  and  $1.95 \pm 0.06$  in mg/kg for Osisioma, Ishiagu, Irete, Akwu-uru, and Ngwo respectively. PAHs distributions in food samples analyzed in this study showed vegetables to be significant higher ( $p \leq 0.05$ ) in the order vegetables > fruits > nuts > tubers. Total PAHs ( $\Sigma$ PAHs) concentrations in most crop samples had highest values 14.49, 36.29, 4.59, 23.36 and 21.8 mg/kg for *Chrysophyllum albidum*, *Telferia occidentalis*, *Vernonia amygdalina*, *Talinum triangulare* and *Elaies guinnensis* for Osisioma, Akwuuru, Irete, Ishiagu and Ngwo respectively. The low molecular weight-PAHS/ high molecular weight-PAHS were  $< 1$  with values 0.76, 0.18, 0.28, 0.91 and 0.12 for Osisioma, Irete, Akwuuru, Ishiagu and Ngwo respectively. 58.3% and 71.7% of  $\Sigma$ B(a)P and  $\Sigma$ PAHs in food samples in the study areas exceeded the permissible limits set by DPR and EU. The estimated daily intake of PAHs via the ingestion of food crops were within the tolerable range. The carcinogenic risk values for the food crops were within the predicted permissible lifetime risks of carcinogen ( $10^{-6}$ - $10^{-4}$ ) for adults and children in Osisioma, Akwuuru, Ishiagu and Enugu respectively. Therefore, this study suggests that the populace around industrialized areas in South Eastern Nigeria, may be at risk due to PAHs exposure through food consumption.

**Keywords:** polycyclic aromatic hydrocarbons (PAHs); incremental life time cancer risk (ILCR); benzo(a)pyrene toxicity equivalence (TEBaP).

\*Corresponding author. E-mail address: ucheonyedi@gmail.com; ub.onyedikachi@mouau.edu.ng (Uchechi Bliss Onyedikachi).