ASSESSMENT OF GLYPHOSATE AND AMPA IN URINE SAMPLES FROM PREGNANT AND POSTPARTUM WOMEN IN THE STATE OF RIO DE JANEIRO USING HPLC-FLD: ENVIRONMENTAL AND PUBLIC HEALTH IMPLICATIONS

BELONI, H. O.[1,2]; EMIDIO-DABKIEWICZ,V.[2]; SANTOS, T. P. S.[2]; ALVES, S. R[2].; FROES ASMUS, C. I. R[2]; MEYER, A.[2]; ARAUJO, J.G. [2]; COSTA, C.S. [2]; SAMPAIO, A.C. [2]; JESUS, R.[2]; NEVES, A.P. [2]; BAPTISTA, F. P. [2]; ROSA; A. C. S.[2]; PADILHA, M. C.[1] 1. Technology Development Support Lab/DQA/IQ/CT/UFRJ/Rio de Janeiro/RJ, 2. Laboratory of Toxicology/CESTEH/ENSP/FIOCRUZ/Rio de Janeiro/RJ.

INTRODUCTION: Glyphosate is the most widely used herbicide globally, raising concerns about its potential health impacts, particularly for vulnerable populations like pregnant and postpartum women. Despite its widespread use in Brazil, there is a lack of comprehensive biomonitoring data for this population group in Rio de Janeiro. OBJECTIVE: To develop and to validate an analytical methodology for glyphosate and its primary metabolite, aminomethylphosphonic acid (AMPA) quantification, in urine specimens from pregnant individuals residing in Rio de Janeiro. MATERIALS AND METHODS: A validated analytical protocol, following INMETRO/DOQ-CGRE-008 guidelines, uses solid-phase extraction (SPE) and high-performance liquid chromatography with fluorescence detection HPLC-FLD with using 9-fluorenylmethyl chloroformate (FMOC-Cl) derivatization to detect analytes. The method's performance was evaluated for linearity, sensitivity, matrix effects, recovery, reproducibility and limits of detection and quantification, with calibration standards prepared in pooled urine matrix (0.1-10 $\mu g \cdot L^{-1}$). RESULTS: The developed method demonstrated limits of detection and quantification of 0.18 $\mu g \cdot L^{-1}$ and 0.59 $\mu g \cdot L^{-1}$ for glyphosate, and 0.20 $\mu g \cdot L^{-1}$ and 0.72 $\mu g \cdot L^{-1}$ for AMPA, respectively. Calibration curves exhibited excellent linearity ($R > 0.998$), and the method showed high inter-replicate reproducibility and applicability to real-world biological samples under environmental exposure conditions. CONCLUSION: This validated analytical approach enables the sensitive and accurate biomonitoring of glyphosate and AMPA in a population of heightened biological vulnerability. The method's reproducibility is a valuable tool for environmental exposure assessment and inform future public health surveillance and regulatory strategies aimed at mitigating pesticides risks in urban maternal populations.

Key-words: Glyphosate, AMPA, HPLC-FLD, biomonitoring, maternal health.

Financial support: Oswaldo Cruz Foundation (FIOCRUZ/MS), Federal University of Rio de Janeiro (UFRJ), Brazilian Ministry of Health (MS).