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Urinary neonicotinoids profiles in adults from Aveiro District, NW Portugal

Ana Catarina Sousa [1,2*], Yoshinori Ikenaka [2], Takahiro Ichise [2], Shouta M. M. Nakayama [2], Sara Souto-Miranda [3,4], Alda Marques [3,4], Carla Valente [5], Luís Taborda-Barata [6,7], M. Ramiro Pastorinho [8,9], Mayumi Ishizuka [2]

[1] CICECO – Aveiro Institute of Materials, Department of Chemistry, University of Aveiro, Aveiro, Portugal; [2] Laboratory of Toxicology, Department of Environmental Veterinary Science, Faculty of Veterinary Medicine, Hokkaido University, Sapporo, Hokkaido, Japan; [3] Lab 3R – Respiratory Research and Rehabilitation Laboratory, School of Health Sciences (ESSUA), University of Aveiro, Aveiro, Portugal; [4] Institute of Biomedicine (iBiMED), University of Aveiro, Aveiro, Portugal; [5] Centro Hospitalar do Baixo Vouga, EPE, Aveiro, Portugal; [6] NuESA-Health and Environment Study Unit, Faculty of Health Sciences, University of Beira Interior, Covilã, Portugal; [7] CICS-UBI, Health Sciences Research Centre, University of Beira Interior, Covilhã, Portugal; [8] Department of Biology, University of Évora, Évora, Portugal ; [9] Comprehensive Health Research Centre (CHRC)

* Corresponding author: anasousa@ua.pt

Neonicotinoid insecticides (Neonics - NNs) are systemic insecticides widely used in agriculture to control insects. Due to their broad-spectrum insecticide activity, they are also used in the domestic environment and on animals, including household pets. Owing to their toxicity towards non-target organisms, particularly honeybees, the agricultural outdoor use of some neonics was already banned. Nevertheless, they can still be used in indoor activities. Neonics' residues have been detected in food, water and indoor dust and, consequently, humans are exposed to these insecticides. However, human biomonitoring data is limited to a few studies worldwide, with no data for Portugal. In this study, levels of neonicotinoids namely acetamiprid (and its metabolite dm-acetamiprid), clothianidin, dinotefuran, imidacloprid, nitenpyran, thiacloprid and thiamethoxan, were quantified in spot urine samples provided by 46 volunteers from Aveiro district. The volunteers were recruited from RESPIRA project, an ongoing study that aims to evaluate the role of environmental contaminants in the progression of respiratory diseases. Overall, the obtained results disclose that 81.4% of the individuals were exposed to at least one neonicotinoid. Dinotefuran and dm-acetamiprid showed the highest detection frequencies (46.5%), followed by imidacloprid (41.9%), whereas nitenpyran and thiacloprid were never detected (bellow detection limit). The neonics with the highest concentrations were dm-acetamiprid (max: 1443 ug/g creatinine, average: 39.1 ug/g creatinine) and thiamethoxan (max: 152 ug/g creatinine, average: 6.9 ug/g creatinine). These results are in general accordance with previous reports that disclosed dm-acetamiprid as one of the most frequently detected NN in human urine samples.

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