ISEE 2023
KAOHSIUNG, TAIWAN

35th Annual Conference of the International Society for Environmental Epidemiology

September 17-21, 2023

Kaohsiung, Taiwan

Connecting the East and the West, One Health in One Planet

Abstract E-Book

ISEE

#ISEE2023

www.ISEEconference.org

EP-020[Exposures » Food/nutrition]

Utility of wild soil mushrooms to monitor cerium and characterise oral risks

Antonio Peña Fernández[1], Manuel Higueras[2], Tziana Sgamma[1], Nazia Nazar[1], Mark D Evans[1], Edna Segura[2], Gurminderjeet S Jagdev[1], M. Carmen Lobo Bedmar[3]

[1]Leicester School of Allied Health Sciences, De Montfort University, Leicester, LE1 9BH, UK

[2]Scientific Computation & Technological Innovation Center (SCoTIC), Universidad de La Rioja, Logroño, Spain.

[3]Dpt. Agroenvironmental Research. IMIDRA. Finca el Encín, Crta. Madrid-Barcelona Km, 38.2, 28800 Alcalá de Henares, Madrid, Spain.

BACKGROUND AND AIM:A study of cerium (Ce) in urban/rural topsoils from Leicestershire (England) showed minimal risk through inhalation for the population. Wild mushrooms were collected to identify oral risks for Ce.
METHOD:106 mushrooms were collected from Leicester city and Bradgate Park. Species identification was confirmed by DNA barcoding. Ce was monitored by ICP-MS in cleaned/dried/homogenised mushrooms mineralised with HNO3/H2O2 [LoD=0.795 ng/g dry weight (dw)] and in 850 topsoils collected in these areas. Organic matter content, pH, electric conductivity (EC) and soil textures were determined in topsoils using standard methods.
RESULTS:Higher levels of Ce were found in mushrooms collected in urban areas (median and ranges, in µg/g dw): 0.352 (0.019-16.260) vs. 0.198 (0.196-5.084). Moreover, lower levels were detected in mushrooms sampled in NW urban areas [0.225 (0.185-7.094)], meanwhile higher levels were found in samples collected in the SW [1.930 (1.293-7.457)]. Although a similar pattern was found in the urban topsoils, i.e. lower levels of Ce in the NW (p=0.037; NE>SW>SE>NW), no correlation was shown with the mushroom content. The differences observed in mushrooms could be attributed to different factors, including the use of fertilisers, as Ce in mushrooms showed significantly negative correlation with topsoil EC (-0.2630; significance level of 10%, p-value=0.0980). EC content (in dS/m) was significantly higher in rural areas (0.4615 vs. 0.3404; p-value=0.0086) and higher in NW vs. NE (0.396 vs. 0.304; p-value=0.0741) urban topsoils. Ce also significantly varied between major mushroom species collected (ranges, in µg/g): Agaricus bitorquis (edible; 0.185-0.297), Panaeolus foenisecii (poisonous; 0.481-16.260) and Mycena citrinomarginata (unclassified; 0.557-12.256), and were within the values reported in large monitoring studies.
CONCLUSIONS:Our results would be in line with those studies that have reported that wild mushrooms show a weak predilection to bioconcentrate Ce. The presence of Ce in wild mushrooms would not represent a risk for the Leicester's population.

Keywords: Cerium, mushrooms, Leicester, topsoils, risks.