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**Abstract
E-Book**



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Environmental monitoring of lanthanum in wild mushrooms from urban and rural areas across Leicestershire (UK)

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BACKGROUND AND AIM: A monitoring study in Leicestershire's topsoils (UK) revealed that lanthanum (La) exceeded the established soil screening level (SSL). To gain a better understanding of the environmental presence/distribution/risks of La by using wild mushrooms collected in the same areas. **METHOD:** 106 mushrooms were collected from Leicester city and Bradgate Park. Species identification was confirmed by DNA barcoding. La was monitored by ICP-MS in cleaned/dried/homogenised mushrooms mineralised with HNO₃/H₂O₂ [LoD=0.533 ng/g dry weight (dw)]. La was also monitored in 850 topsoils collected in these areas.

RESULTS: Significantly higher levels were found in mushrooms collected in the urban area (median and ranges, in µg/g dw; p-value=0.04): 0.238 (0.013-10.580) vs. 0.198 (0.131-2.670), which might be attributed to the technological uses of La in catalytic converters and phosphors. Content of La varied between mushrooms collected across the four cardinal subareas in which Leicester city was divided (p-value=5E-18); the lower levels were observed in mushrooms sampled in NW areas [0.146 (0.123-4.866)], meanwhile the higher levels were found in those collected in the SW [1.286 (0.842-4.953)]. La also varied between major mushroom species collected (ranges, in µg/g; p-value=1E-19): *Agaricus bitorquis* (edible; 0.123-0.180), *Panaeolus foenisecii* (poisonous; 0.298-10.580) and *Mycena citrinomarginata* (0.374-8.194; unclassified), which might suggest a minimal exposure to La despite consumption of edible wild mushrooms collected in Leicestershire. Although a similar distribution of La was found in the topsoils, i.e. significant (p-value=0.0153) higher levels in the SW (19.621 µg/g) and lower in the NW (16.447 µg/g), no correlation was found between the content of La in mushrooms and the respective topsoils.

CONCLUSIONS: The presence of La in wild mushrooms in Leicester was within the same ranges as those reported in other similar European cities. Although the risks would be minimal, La presence could contribute to the maximum level of intake of total REEs for vegetables set at 0.7 µg/g.

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