



## Content of lutetium in wild soil mushrooms from Leicester city and surroundings areas in England.

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### INTRODUCTION

Despite the ingestion and dermal contact to lutetium (Lu) recently measured in topsoils across Leicester (UK) and surrounding rural areas representing a low risk (Peña-Fernández et al., 2023), this heavy-rare earth element (HREE) was biomonitored in wild mushrooms.

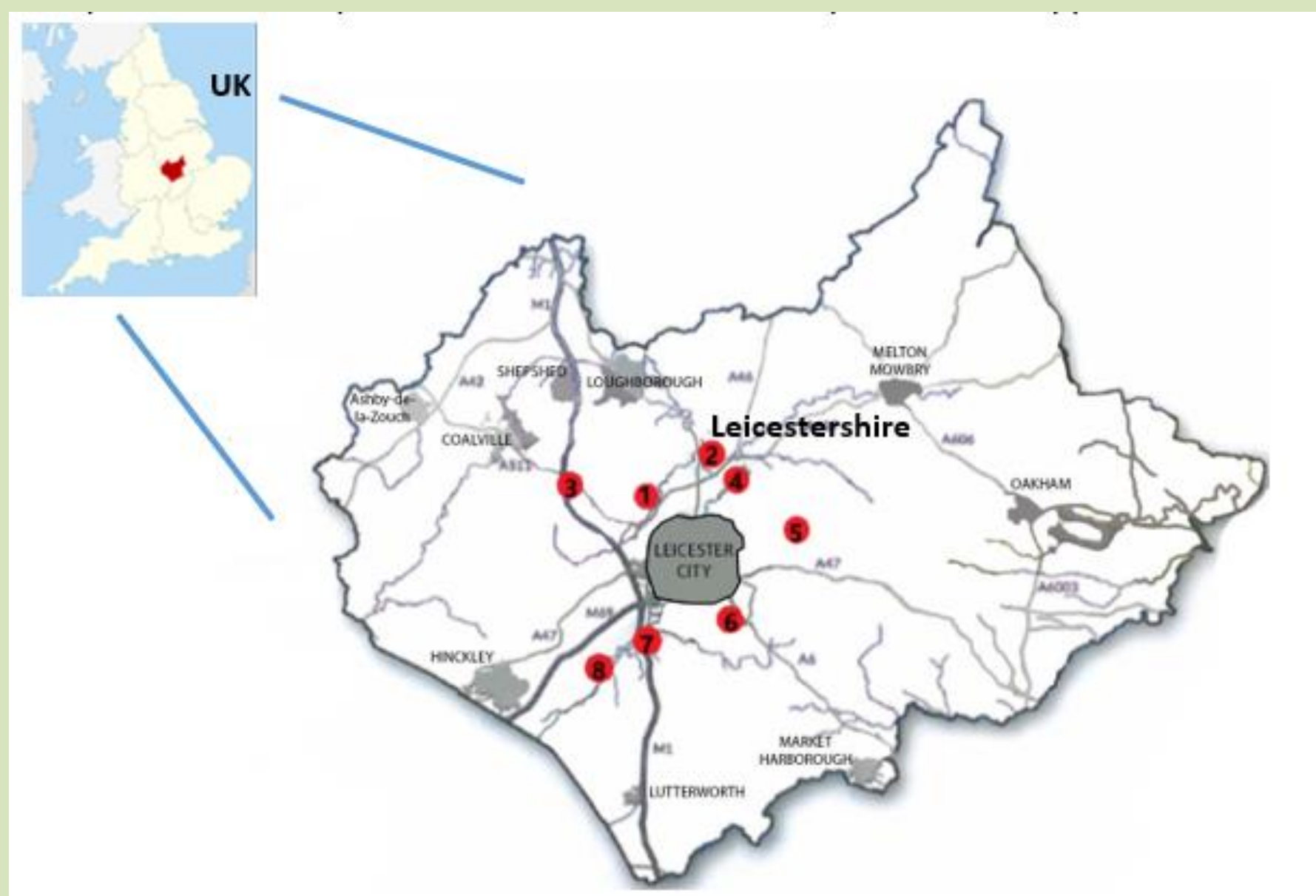


Fig 1. Study area. The city of Leicester is indicated in grey (Leicestershire, UK).

### MATERIAL AND METHODS

106 mushrooms were collected from Leicester city and Bradgate Park (Fig 1).

- ❑ Species identification was confirmed by DNA barcoding after extracting DNA from frozen homogenised ground mushroom material using DNeasy Plant Mini Kit® (Sgamma et al., 2018).
- ❑ Lu was monitored by ICP-MS in cleaned/dried/homogenised mushrooms [LoD=0.506 ng/g dry weight (dw)] and in topsoils collected in these areas; physicochemical properties and textures were also determined in topsoils using standard methods.
- ❑ Data was processed with NADA available in R software owing to the censored values detected in mushrooms (60.8%).

### RESULTS AND DISCUSSION

✓ Contrarily to the distribution determined in topsoils [0.123 (0.069-0.162) vs. 0.117 (0.084-0.182); median and ranges, mg/kg], levels of Lu were higher in mushrooms collected in the main urban area (median and ranges, in ng/g dw): 0.347 (0.285-293.837) vs. 0.196 (0.780-8.116).

✓ Content of Lu in topsoils would only have a small effect on the levels of Lu detected in mushrooms, which would be supported by the lack of correlation found between mushrooms and topsoils ( $p$ -value=0.506), and with the different physicochemical properties and soil textures monitored.

✓ This pattern is different to other HREEs studied in the same areas, which might be explained by an unknown appetite of Lu by the different local species of wild soil mushrooms collected.

✓ Lu also varied between major mushroom species collected (median or 95-percentile and range, in ng/g): *Agaricus bitorquis* [edible; 88.6% of censored values, 1.518 (0.798-6.715)], *Panaeolus foenisecii* [poisonous; 1.740 (0.812-49.692)] and *Mycena citrinomarginata* [unclassified; 0.855 (0.285-10.351)]. Lu also seemed to show little appetite for wild edible species when comparing with non-edible.

### REFERENCES

Sgamma T., Masiero E., Mali P., Mahat M., Slater A. Sequence-Specific Detection of Aristolochia DNA - A Simple Test for Contamination of Herbal Products. *Front Plant Sci* 2018; 9:1828.

Peña-Fernández, A., Higuera, M., Repetto, G., Álvarez-Herrera, C., Llana-Ruiz-Cabello, M., Maisanaba, S., ... & Lobo-Bedmar, M. C. (2023). Environmental distribution and exposure to heavy-rare earth elements in Leicestershire (UK). In *ISEE Conference Abstracts* (Vol. 2023, No. 1).

### CONCLUSIONS

Although our results should be considered as preliminary, in general, collecting local wild edible mushroom species in Leicestershire would represent a small risk for humans due to their content in lutetium.