



## Biomonitoring lanthanum in tree bark samples from urban and rural areas across Leicestershire (UK)

Peña-Fernández A. <sup>\*1,2</sup>, Lobo-Bedmar MC.<sup>3</sup>, Evans MD.<sup>2</sup>, Jagdev GS.<sup>2</sup>, Peña MA.<sup>4</sup>

<sup>1</sup> Faculty of Medicine and Health Sciences, University of Alcalá, Ctra. Madrid-Barcelona, Km. 33.600, 28871 Alcalá de Henares, Madrid, Spain.

<sup>2</sup> Leicester School of Allied Health Sciences, De Montfort University. The Gateway, Leicester LE19BH, UK.

<sup>3</sup> IMIDRA. Departamento de Investigación Agroambiental. "Finca el Encín" Crta. Madrid-Barcelona Km, 38.2, 28800 Alcalá de Henares, Madrid, Spain.

<sup>4</sup> Facultad de Farmacia, Universidad de Alcalá, Crta. Madrid-Barcelona Km, 33.6, 28871 Alcalá de Henares, Madrid, Spain.



### INTRODUCTION

Email: [antonio.penafer@uah.es](mailto:antonio.penafer@uah.es)

The presence of lanthanum (La) in Leicestershire (UK)'s topsoils and wild edible mushrooms exceeded the established soil screening level and could contribute to the maximum level of intake of lanthanides for vegetables. Tree bark was used to gain a better understanding of the environmental presence of this metal.

### MATERIAL AND METHODS

Initial 2-6 millimetres of bark were collected from 55 different trees across Leicester city and 41 from surrounding rural/suburban areas (Fig 1); samples were taken at 1.50–1.80 metres from the ground to limit contamination from topsoil/dust (Guéguen et al., 2011) from September to November 2018.

- ❑ La was monitored by ICP-MS in cleaned/ground/homogenised samples (Minganti & Drava, 2018) mineralised with  $\text{HNO}_3/\text{H}_2\text{O}_2$  [LoD=0.00068 ng/g dry weight (dw)].
- ❑ Results were compared with previous studies performed on 106 mushrooms and 850 topsoils collected in the same areas.
- ❑ Data was processed using statistical methods applied to censored data available in the 'NADA' statistical package.

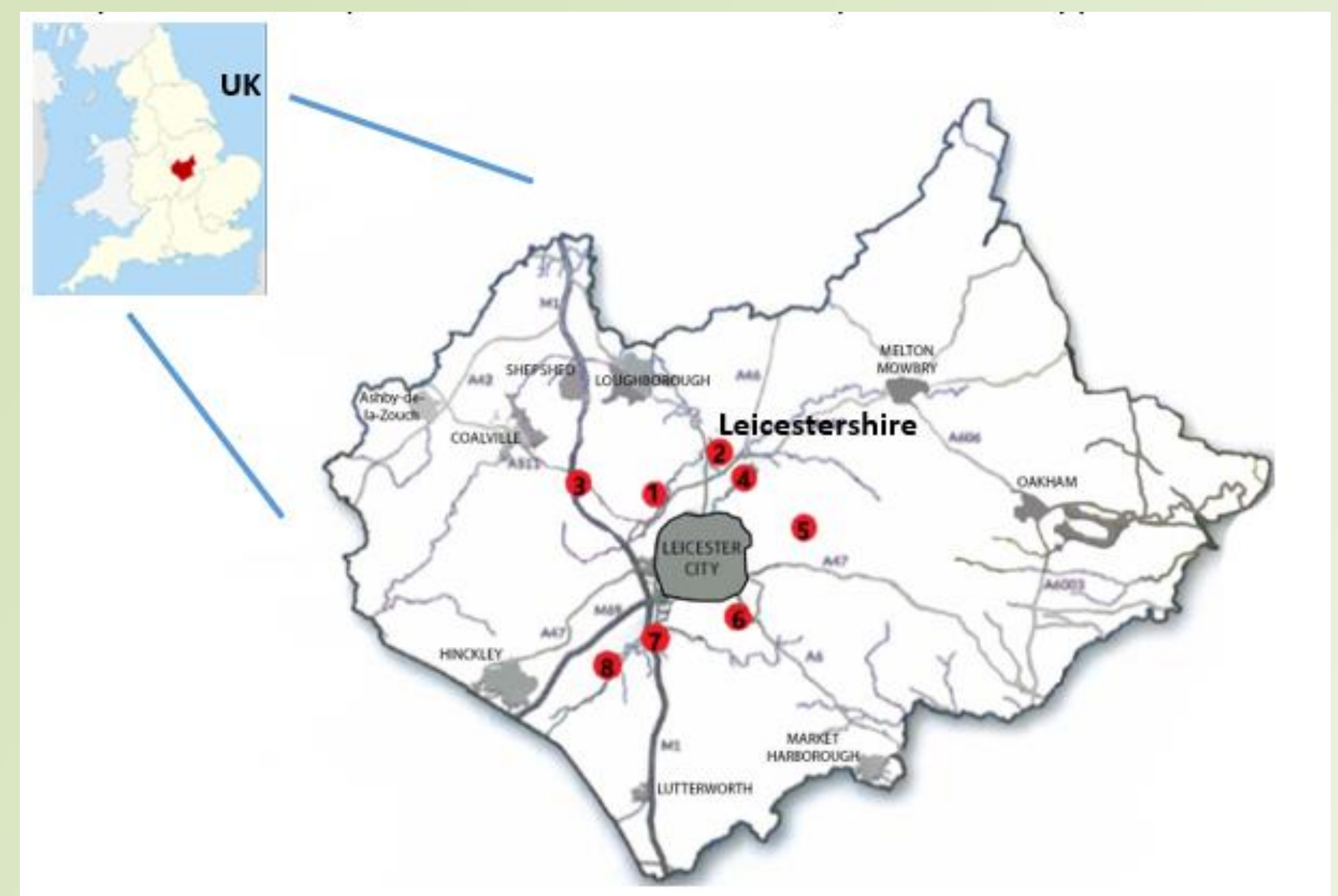


Fig 1. Study area. The city of Leicester is indicated in grey (Leicestershire, UK).



### RESULTS AND DISCUSSION

- ✓ Higher levels were found in bark samples collected in the urban area (median and ranges, in ng/g dw): 9.679 (2.128-150.769) vs. 8.344 (1.815-59.801), which is in line with our previous observations performed in wild mushrooms and topsoils (Peña-Fernández et al., 2022, 2023).
- ✓ Thus, our results could suggest a higher presence of sources of La in urban areas, attributed to the technological uses of this metal for example in catalytic converters and phosphors.

- ✓ Content of La varied between bark samples collected across the four cardinal subareas in which Leicester city was divided (median values, in ng/g): 38.664 (SE) > 17.104 (SW) > 9.128 (NE) > 6.707 (NW).
- ✓ A similar pattern was detected in mushrooms and topsoils (Peña-Fernández et al., 2022, 2023), although the higher levels were found in the southwest quadrant for both samples, respectively (1.286 and 19.621; both in  $\mu\text{g/g}$ ).

### REFERENCES

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### CONCLUSIONS

The presence of La in Leicestershire would be related to traffic volumes, much higher in the city. In general, this presence would be similar or lower to those described in similar studies, e.g. in oak tree bark from Genoa, Italy (0.1-1.7  $\mu\text{g/g}$ ), which might indicate a lower airborne contamination by La in Leicester.