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### **Air pollution at an urban traffic tunnel in Lisbon, Portugal—an INAA study**

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## **Abstract**

In this study, the results of chemical concentrations inside and outside of a Lisbon (Portugal) traffic tunnel were compared, during one week. They were obtained by Instrumental Neutron Activation Analysis (INAA). The tunnel values largely exceed the Air Ambient legislated values and the Pearson Correlations Coefficients point out to soil re-suspension/dispersed road dust (As, Ce, Eu, Hf, Fe, Mo, Sc, Zn), traffic-markers (Ba, Cr), tire wear (Cr, Zn), break wear (Fe, Zn, Ba, Cu, Sb), exhaust and motor oil (Zn) and sea-spray (Br, Na). On all days these elements

inside the tunnel were more enriched than outside; significant statistical differences were found for Co ( $p=0.005$ ), Br ( $p=0.008$ ), Zn ( $p=0.01$ ) and Sb ( $p=0.005$ ), while enrichment factors of As and Sc are statistically identical. The highest values were found for As, Br, Zn and Sb, for both inside and outside the tunnel.

## Keywords

- Air pollution;
- Urban;
- Traffic Tunnel;
- Chemical elements;
- INAA;
- Enrichment factors

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