

# CONTAMINATION OF ZOOPLANKTON BY LEAD(II); EVALUATION USING SOLUTION X-RAY FLUORESCENCE SPECTROSCOPY

Panagiotis Salonikidis<sup>1,2</sup>, Christina N. Banti<sup>1,\*</sup>, Vasiliki Boumba<sup>2</sup>, Sotiris K. Hadjikakou<sup>1,\*</sup>

<sup>1</sup>Section of Inorganic and Analytical Chemistry, Department of Chemistry, University of Ioannina, 45110, Ioannina

<sup>2</sup>Section of Forensic Medicine and Toxicology, Faculty of Medicine, University of Ioannina.

E-mail: [cbanti@uoi.gr](mailto:cbanti@uoi.gr), [shadjika@uoi.gr](mailto:shadjika@uoi.gr)

Although lead(II) is a common chemical element, it is not considered essential for human health. It has various industrial applications such as batteries, radiation shielding, construction purposes. Lead(II) is a toxic metal and it affects several organs in human body.[1] Exposure to lead(II) can occur through food and drinks. In industrialized countries, the daily intake is around 8 to 282 µg, usually it's less than 100 µg on a daily basis. In blood the maximum tolerant limit for lead(II) is 40 µg/dl while in urine it's 80 µg/L.[2]

It's therefore important to monitor the lead(II) levels in the environment and in the human body. Currently, toxicology utilizes methods such as Atomic Absorption Spectroscopy (AAS), and Inductively Coupled Plasma Mass Spectrometry (ICP-MS) to monitor and determine the quantity of lead(II).[4-5] A very promising and developing method that can be used to determine heavy metals in environmental and human samples is X-ray Fluorescence (XRF).

Here we report our results on the evaluation of lead(II) levels in *Artemia Salina* incubated in various concentrations of lead(II) under various time periods using solution X-ray fluorescence spectroscopy.

## Acknowledgments:

This work was carried out in fulfilment of the requirements for the Master thesis of Mr. S.P. according to the curriculum of the International Graduate Program in "Biological Inorganic Chemistry", which operates at the University of Ioannina within the collaboration of the Departments of Chemistry of the Universities of Ioannina, Athens, Thessaloniki, Patras, Crete and the Department of Chemistry of the University of Cyprus (<http://bic.chem.uoi.gr/BIC-En/index-en.html>) under the coordination of Prof. S.K.H.

## References

- [1] Mohamed Abdulla, Chapter 13 - Lead, Editor(s): Ananda S. Prasad, George J. Brewer, Essential and Toxic Trace Elements and Vitamins in Human Health, Academic Press, 2020, Pages 181-191, ISBN 9780128053782, <https://doi.org/10.1016/B978-0-12-805378-2.00014-0>.
- [2] Antonis Koutselinis «Toxicology, Vol. A'», Editing by: Parisianou, Athens Greece, 2004.
- [3] Centers for Disease Control and Prevention: <https://www.cdc.gov/niosh/docs/2003-154/pdfs/8003.pdf>
- [4] Goullé JP, Mahieu L, Castermant J, Neveu N, Bonneau L, Lainé G, Bouige D, Lacroix C. Metal and metalloid multi-elementary ICP-MS validation in whole blood, plasma, urine and hair. Reference values. Forensic Sci Int. 2005 Oct 4;153(1):39-44. doi: 10.1016/j.forsciint.2005.04.020.