OPEN ACCESS

Scientific Letters

II TOXRUN
International Congress 2023
27-28 April, 2023 | Porto, Portugal

Poster 65

Variation of the physical-chemical parameters of diverse water bodies for study of diatom distribution and composition for forensic investigations

M. Portugal [1], C. Couto [1,2,*], A. Madureira-Carvalho [1,3] and C. Ribeiro [1]

[1] TOXRUN – Toxicology Research Unit, University Institute of Health Sciences, CESPU, CRL, Gandra, Portugal
[2] LAQV/REQUIMTE, Department of Chemical Sciences, Faculty of Pharmacy, University of Porto, Porto, Portugal
[3] LAQV/REQUIMTE, Laboratory of Pharmacognosy, Department of Chemistry, Faculty of Pharmacy, University of Porto, Porto, Portugal

* Correspondence: cristina.couto@iucs.cespu.pt

Abstract

Background: Diatoms are microalgae of fundamental ecological role in aquatic ecosystems; however, these microorganisms have been shown to provide valuable information for forensic investigations. Due to the characteristic diatom distribution in a water body, the presence of diatoms in objects may allow to correlate to a specific aquatic system and/or a suspect. Additionally, in cases of suspicious of death by drowning, the presence of diatoms in some organs and/or bones may give important information to support confirmation [1-3]. The occurrence of diatoms, concerning diversity and frequency in a water body, depends on temporal and physical-chemical water parameters [3,4]. **Objective:** The aim of this study was to determine the seasonal and spatial variation of the physical-chemical parameters of different water for further correlation with the presence and geo-temporal variation of diatom composition. **Methods:** Six sampling points were selected in different regions of the Porto District: two wells (Póvoa de Varzim and Paredes); two on the Asprela streams; two in the natural reserve area of the Ave River. Samples were collected seasonally (Summer, Autumn and Winter) and temperature, conductivity, turbidity, pH, dissolved oxygen, nitrate, nitrite and phosphate were measured. Water samples aliquots were separated for further analysis for diatom composition. **Results:** The results showed a seasonal and spatial variation of physical-chemical water parameters. High levels of turbidity were found in autumn, in all water bodies and the sampling point located in natural reserve showed the highest value (589.6 NTU), and the highest content of nutrient which may affect diatom composition. Preliminary studies showed a low occurrence of diatom in well water samples. **Conclusions:** These results suggest that, for these water bodies, the presence of suspended diatom may be low which may difficult the use of these organisms for forensic investigation. Nevertheless, further experiments are ongoing to correlate physical-chemical parameters with composition of other water bodies.

Keywords: diatoms; physical-chemical parameters; well; river; streams

Acknowledgments

This research received no external funding.

References

1. Smol, J. P.; Stoermer, E. F. *The diatoms applications for the environmental and earth sciences*. 2nd ed.; Cambridge University Press: Cambridge; New York; Melbourne; Madrid; Cape Town; Singepore; São Paulo; Dehli; Dubai; Tokyo; Mexico City, 2015.
2. Lunetta, P.; Miettinen, A.; Spilling, K.; Sajantila, A. False-positive diatom test: A real challenge? A post-mortem study using standardized protocols. *Legal Medicine* **2013**, 15, 229-234.

3. Seckbach, J.; Gordon, R. *Diatoms: fundamentals and applications*. Publisher: Wiley; Salem, Massachusetts, 2019.
4. Luís, A. T.; Durães, N.; de Almeida, S. F. P.; da Silva, E. F. Integrating geochemical (surface waters, stream sediments) and biological (diatoms) approaches to assess AMD environmental impact in a pyritic mining area: Aljustrel (Alentejo, Portugal). *J Environ Sci* **2016**, 42, 215-226.