

Poster 44

## Ecotoxicological effects of elutriates from coal mining waste in *Lactuca sativa* seed germination

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### Abstract

**Background:** Fojo mine (Castelo de Paiva, Douro Carboniferous Basin) was used for anthracite exploitation until 1994, resulting in the production of coal waste piles without any environmental management [1,2]. In October 2017, a wildfire triggered the ignition of some of these waste piles. The extinguishing process of the fire included the remobilization of the coal mining residues using water mixed with a cooling accelerator agent. **Objective:** To assess the ecotoxicological effects of soil elutriates from the Fojo coal mine waste in seed germination assay with *Lactuca sativa*. **Methods:** 25 soil samples were taken: unburned coal waste (ENA); burned coal waste (EA); burned coal waste cover (EAC); mixed material (EE) resulting from the extinguishing process; uphill from the waste pile (B); downhill from the waste pile (SJ). The assay was performed with elutriates from each soil sample and four replicates were prepared per elutriate with 10 seeds. The percentage of germination, fresh biomass, and total size were measured at the end of 14 days. **Results:** The percentage of seed germination, leaf, and root growth were differently affected revealing high heterogeneity of soil characteristics. The highest seed germination was in EE soil samples (>80%), and the lowest values were in different heterogenic zones (ENA3, ENA5, EAC10, and SJ5). The lowest total size was observed in EE6 (< 4.3 cm) and ENA3 (< 5.3 cm). Leaf fresh biomass and size were higher in soil samples from B zone (1.64 g and 4.64 cm, respectively), and lower values in SJ (0.63 g and 3.34 cm). **Conclusions:** The results highlight the importance of the phytotoxicity studies with coal mining waste, since the lixiviates may affect the terrestrial ecosystems, reducing plant establishment and growth. Seed germination, and shoot and root elongation proved to be a sensitive endpoint to evaluate the phytotoxicity of coal waste.

**Keywords:** phytotoxicity; seed germination; *Lactuca sativa*; coal mining waste

### Acknowledgments

This research was supported by SHS Project, funded by NORTE-45-2020-75- SISTEMA DE APOIO À INVESTIGAÇÃO CIENTÍFICA E TECNOLÓGICA - “PROJETOS ESTRUTURADOS DE I&D- HORIZONTE EUROPA, Ref. NORTE-01-0145-FEDER-000056 and framed within the ICT GI3 activities (UIDB/04638/2020 and UIDP/04683/2020). Sara Antunes is hired through the Regulamento do Emprego Científico e Tecnológico – RJEC from the FCT program (CEECIND/01756/2017), and Bárbara Diogo is supported by FCT Ph.D. grants (2022.10505).

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