

Ecophysiological response of *Lavandula pedunculata* from different origins growing in contaminated and uncontaminated soils

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Mining activity has turned many areas from the Iberian Pyrite Belt into extreme environments with high concentrations of potentially hazardous elements (PHE). These harsh conditions can inhibit or reduce vegetation growth. However, some species have developed mechanisms of response to these conditions and have colonized some contaminated soils of these areas. The development and ecophysiological behaviour of *Lavandula pedunculata* (Mill.) Cav. from seeds collected in different areas and growing in soils contaminated and uncontaminated was evaluated.

Soils and seeds of *L. pedunculata* were sampled in São Domingos mine and in an uncontaminated area from Caldeirão. Seedlings from São Domingos (LC) and Caldeirão (L) were planted in a contaminated soil developed on gossan (CS) and in an uncontaminated soil (US) in greenhouse and controlled conditions. Multielemental concentrations were determined in soils (total and available fractions) and plants (shoots and roots). Concentrations of pigments (chlorophylls, anthocyanins and carotenoids), glutathione, ascorbate, H₂O₂ and antioxidative enzyme activities were determined in plant shoots.

Total concentration (mg/kg) of As (3030) and Pb (9210) were significantly higher in CS than in US (As: 19; Pb: 48). Similarly, concentrations (mg/kg) of Zn (3-5), As (2-3) and Pb (2-3) in the available fraction were also significantly higher in CS than in US (<1). Shoots and roots from plants growing on CS contained higher As, Pb and Zn concentrations than those from US, and concentrations were higher in LC than in L plants. Potentially hazardous elements were stored mainly in roots, preventing their translocation to shoots. No significant differences were found in the development of LC and L plants in CS, although leaves were slightly smaller than LC and L developed in US.

Physiological analyses showed a decrease in pigments and an increment of H₂O₂ contents in plant leaves growing in CS. As a response to the increase of oxidative stress, ascorbate and glutathione contents were the highest in plants developed in CS. Therefore, *L. pedunculata*, regardless of its origin, is adapted to unfavourable environments with high concentrations of PHE.

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