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ECOPHYSIOLOGICAL AND BIOCHEMICAL PARAMETERS FOR ASSESSING Cr^{+6} STRESS CONDITIONS IN *Pterogyne nitens* Tul.: NEW AND USUAL METHODS FOR THE MANAGEMENT AND RESTORATION OF DEGRADED AREAS

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Abstract

Heavy metals, such as Cr (chromium), have received attention during recent years due to their disposal in soil and water. Brave peanut (*Pterogyne nitens* Tul.), a tropical tree, was cultivated in 500 μmol L^{-1} Cr^{+6} to observe how this species responds to this stress, with a view to its possible application in the restoration of degraded areas. In the present study, we report the use of a new method, photoacoustic spectroscopy, to evaluate the emission of CO_2 and ethylene and the use of other standard techniques for assessing stress (chlorophyll *a* fluorescence, photosynthetic pigment determination, leaf relative water, specific leaf area, NO (nitric oxide) and polyamines. Photoacoustic spectroscopy appears to provide an innovative and efficient technique for detecting stress induced by heavy metals soon after their contact with plants. Polyamine content, as well as ethylene and NO, were seen to be sensitive to Cr^{+6}; polyamines were decreased in leaves and increased in roots, ethylene was increased in the whole plant and NO was increased in the roots. Our results demonstrating alterations in ethylene in response to Cr^{+6} are, to date, unreported and the technique used for these measurements is novel. With regard to the polyamines, modulations in their concentrations may have protected the photosystem II, since no photosynthetic alterations were observed for pigments and chlorophyll *a* fluorescence.

Key words: arboreal tropical species, chlorophyll *a* fluorescence, nitric oxide, photoacoustic spectroscopy, polyamines

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