Phytoremediation potential and tolerance of *Echinochloa polystachya-Gigaspora margarita* symbiosis to benzo[a]pyrene

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Arbuscular mycorrhizal fungi (AMF) play an important role in plant adaptation to contaminated soils. However, little is known about the role of AMF on the development of specific plants utilized for phytoremediation such as *Echinochloa polystachya* (H.B.K.) Hitchcock. In Mexico, *E. polystachya* was recently evaluated on petroleum and benzo[a]pyrene (BaP) contaminated soils. This plant species showed excellent potential for phytoremediation. In addition, the arbuscular mycorrhizal associations of *E. polystachya* have not been reported. The present work evaluated the role of *Gigaspora margarita* (*Gm*) Becker & Hall on BaP degradation from the rhizosphere of *E. polystachya* established in artificially contaminated sand. Rooted cuttings of *E. polystachya* were inoculated with 300 spores of *Gm*. Non-mycorrhizal (Non-AMF) and AMF-plants were exposed to sterile sand contaminated with several concentrations of BaP diluted in acetone [0, 25 (0.1 mM), 50 (0.2 mM), 75 (0.3 mM) and 100 mg kg⁻¹ (0.4 mM)]. After 70 days, neither AMF colonization nor plant biomass was significantly affected by the presence of the BaP. Root colonization of *Gm* measured by alkaline phosphatase stain, was increased at 75 mg BaP kg⁻¹. Dehydrogenase activity in the rhizosphere of AMF-plants was not significantly affected by BaP; however, this activity was higher at 50 to 100 mg BaP kg⁻¹ in comparison with Non-AMF plants. Polyphenoloxdase (PPO) activity in roots was low in plants growing in contaminated sand. *Gm*-plants showed a diminished root PPO activity. Although AMF did not improve the intrinsic tolerance of *E. polystachya* to BaP, the degradation of this contaminant in AMF-plants was enhanced.