Phytoremediation of Hydrocarbon-Polluted Soils: Assess the Potentialities of Six Tropical Plant Species

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Abstract : The identification of plant species with the capacity to grow on hydrocarbon-polluted soils is an essential step for phytoremediation. In view of developing phytoremediation in Cameroon, floristic surveys have been conducted in 4 cities (Douala, Yaounde, Limbe, and Kribi). In each city, 13 hydrocarbon-polluted, as well as unpolluted sites (control), have been investigated using quadrat method. 106 species belonging to 76 genera and 30 families have been identified on hydrocarbonpolluted sites, unlike the control sites where floristic diversity was much higher (166 species contained in 125 genera and 50 families). Poaceae, Cyperaceae, Asteraceae and Amaranthaceae have higher taxonomic richness on polluted sites (16, 15,10 and 8 taxa, respectively). Shannon diversity index of the hydrocarbon-polluted sites (1.6 to 2.7 bits/ind.) were significantly lower than the control sites (2.7 to 3.2 bits/ind.). Based on a relative frequency > 10% and abundance > 7%, this study highlights more than ten plants predisposed to be effective in the cleaning-up attempts of soils contaminated by hydrocarbons. Based on the floristic indicators, 6 species (Eleusine indica (L.) Gaertn., Cynodon dactylon (L.) Pers., Alternanthera sessilis (L.) R. Br. ex DC⁺, Commelinpa benghalensis L., Cleome ciliata Schum. & Thonn. and Asystasia gangetica (L.) T. Anderson) were selected for a study to determine their capacity to remediate a soil contaminated with fuel oil (82.5 ml/ kg of soil). The experiments lasting 150 days takes into account three modalities - Tn: uncontaminated soils planted (6) To contaminated soils unplanted (3) and Tp: contaminated soil planted (18) - randomized arranged. 3 on 6 species (Eleusine indica, Cynodon dactylon, and Alternanthera sessilis) survived the climatic and soil conditions. E. indica presents a significantly higher growth rate for density and leaf area while C. dactylon had a significantly higher growth rate for stem size and leaf numbers. A. sessilis showed stunted growth and development throughout the experimental period. The species Eleusine indica (L.) Gaertn. and Cynodon dactylon (L.) Pers. can be qualified as polluo-tolerant plant species; polluo-tolerance being the ability of a species to survive and develop in the midst subject to extreme physical and chemical disturbances.

Keywords : Cameroon, cleaning-up, floristic surveys, phytoremediation

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