

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

Authors : Pulcherie Matsodoum Nguemte, Adrien Wanko Ngnien, Guy Valerie Djumyom Wafo, Ives Magloire Kengne Noumsi, Pierre Francois Djocgoue

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 hydrocarbon-polluted 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 †, *Commelina 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

Conference Title : ICPEP 2017 : International Conference on Plants and Environmental Pollution

Conference Location : Cape Town, South Africa

Conference Dates : November 02-03, 2017