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Community level physiological profiling in a first generation phytoremediation experiment

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While biological methodologies have gained patronage in remediation of petroleum-impacted farmlands, only limited records are available on the functional ecosystem structure of such treated soils. Here,we conducted successfully a first generation soil heavy metal clean up in a 90d 4-factor phytoremediation pot experiment and studied the effect of such clean up on microbial communities. Influences with organic manure application were also evaluated. Microbial ecology of community was evaluated using BIOLOG. On analysis using multivariate factor, we observed correlation of consumption rates for polymer, carbohydrates, amines and amides correlates with metabolic patterns in the studied communities. Analysis of microbial diversity using Shannon H index, identified indigenous *Hevea brasilensis* cultivated soil populations with the highest diversity in polluted regimes and were more resistant, maintaining a steady growth after day 1 for the 9 days of incubation study. Lead removal was efficient using all four species studied with or without soil conditioner. *Vigna subterranea* may be a poor candidate for remediation of Cr contaminated soil following poor results obtained. Generally, legumes and indigenous plant species promoted distribution of communities more equitably among species. This study reveals the importance of plant-based bioremediation in microbial ecology and highlights the significance of soil conditioners and plants in microbial community behaviour.

Keywords: Crude oil pollution, Functional ecosystem, Heavy metals, Microbial community behaviour, Plant-soil interactions, Soil conditioners, Substrate consumption rate