

In-situ Phytoremediation Of Polluted Soils By Micropollutants From Artisanal Gold Mining Processes In Burkina Faso

Authors : Yamma Rose, Kone Martine, Yonli Arsène, Wanko Ngnien Adrien

Abstract : Artisanal gold mining has seen a resurgence in recent years in Burkina Faso with its corollary of soil and water pollution. Indeed, in addition to visible impacts, it generates discharges rich in trace metal elements and acids. This pollution has significant environmental consequences, making these lands unusable while the population depends on the natural environment for its survival. The goal of this study is to assess the decontamination potential of *Chrysopogon zizanioides* on two artisanal gold processing sites in Burkina Faso. The cyanidation sites of Nebia (1Ha) and Nimbrogo (2Ha) located respectively in the Central West and Central South regions were selected. The soils were characterized to determine the initial pollution levels before the implementation of phytoremediation. After development of the site, parallel trenches equidistant 6 m apart, 30 cm deep, 40 cm wide and opposite to the water flow direction were dug and filled with earth amended with manure. The *Chrysopogon zizanioides* plants were transplanted 5 cm equidistant into the trenches. The mere fact that *Chrysopogon zizanioides* grew in the polluted soil is an indication that this plant tolerates and resists the toxicity of trace elements present on the site. The characterization shows sites very polluted with free cyanide 900 times higher than the national standard, the level of Hg in the soil is 5 times more than the limit value, iron and Zn are respectively 1000 times and 200 more than the tolerated environmental value. At time T1 (6 months) and T2 (12 months) of culture, *Chrysopogon zizanioides* showed less development on the Nimbrogo site than that of the Nebia site. Plant shoots and associated soil samples were collected and analyzed for total As, Hg, Fe and Zn concentration. The trace element content of the soil, the bioaccumulation factor and the hyper accumulation thresholds were also determined to assess the remediation potential. The concentration of As and Hg in the soil was below international risk thresholds, while that of Fe and Zn was well above these thresholds. The CN removal efficiency at the Nebia site is respectively 29.90% and 68.62% compared to 6.6% and 60.8% at Nimbrogo at time T1 and T2.

Keywords : chrysopogon zizanioides, in-situ phytoremediation, polluted soils, micropollutants

Conference Title : ICPPPD 2024 : International Conference on Phytoremediation Processes and Project Development

Conference Location : Paris, France

Conference Dates : February 19-20, 2024