

## Assessing the Efficiency of Remediating Agents on Pb Contaminated Soils in Horton Plains

P.K. Lakmini<sup>a</sup>, P.I.Yapa<sup>a</sup>, R. Bandara<sup>b</sup> and A.A. Seneviratne<sup>c</sup>

<sup>a</sup> *Department of Export Agriculture, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka, Belihuloya, Sri Lanka*

<sup>b</sup> *Faculty of Geomatics, Sabaragamuwa University of Sri Lanka, Belihuloya, Sri Lanka*

<sup>c</sup> *Faculty of Applied Sciences, Sabaragamuwa University of Sri Lanka, Belihuloya, Sri Lanka  
Kasun92pm@gmail.com*

Forest dieback in the Upper Montane Rain Forest in Sri Lanka, Horton Plains, has by now grown out of control resulting in a disastrous environmental problem in the country. Horton Plains may be the most important forest resource in the country in terms of its service offered as the major water catchment and the biodiversity hot spot. Soil pollution by Pb has been identified as one of the major reasons for the forest dieback in Horton Plains. This study focuses on finding a cost-effective solution to remediate the contaminated soils in Horton Plains. The efficacy of three (3) natural geo-sorbents made from plant materials were used to assess the immobilization of soil Pb. Soil samples collected from the worst affected area with 100% forest dieback, Thotupolakanda in Horton Plains, were used for the laboratory trial. Three types of biochar materials, i.e. (a) Rubber Nut Shell (RNB) (b) Rice Husk (RBH) and (c) Naturally developed Biochar (HPB) in Horton Plains, were used to study the immobilization capacity of them with Pb in contaminated soils. Soils were spiked with standard Pb, treated with biochar and left for incubation at room temperature for 14 weeks. Soil pH and the Cation Exchange Capacity (CEC) were recorded as 5.4 and 210 c mols kg<sup>-1</sup> respectively. Soil organic matter (SOM) content was extraordinarily high at 13.4%. Soluble Pb in each treatment was analyzed in the Atomic Absorption Spectrophotometer (AAS). Before adding treatments, the content of Pb in all the biochar types used for the study was analyzed and was undetectable. It was evident that the Pb immobilization capacity of RBH was the highest followed by RNB ( $P < 0.0001$ ). HPB was proven to be ineffective in immobilizing soil Pb. HPB collected from Horton Plains have not been made under controlled pyrolysis process and cannot even be considered as biochar. Thus, RBH appears to be a cost-effective material to remediate Pb contaminated soils in Horton Plains

**Keywords:** forest dieback, lead, immobilization, bio char