

Identification of arsenic accumulator from traditional upland rice genotypes: A field survey in interior division, North Borneo

ABSTRACT

The Pan Borneo Highway provide traditional farmers better access to modern agronomic products that changes the rice agricultural management practices in rural areas. This study provides baseline data on selected heavy metal (As, Cd, Cr, Cu, Fe, Ni, Pb, Zn) concentration in rice and rhizosphere soil of four traditional rice landraces (Lantai, Tesik, Kembulaung & Sepulut) that was cultivated by the Dusun Minokok ethnic group residing in the small district of Sook, Interior Division, North Borneo. Heavy metals in soils and rice were determined by Inductively Coupled Plasma-Optical Emission Spectrometry (ICP-OES). The soil pH value for all rice landraces except Lantai had increased in between the rice life cycle at the vegetative and reproductive phase. Certain heavy metals bioavailability had decreased at reproductive phase when soil pH had increased. Cd and Cr was not detected in any rice landraces grains. None of the heavy metals concentration for all rice landraces had exceed the maximum allowable limit of Malaysia Food Regulation 1985. However, arsenic was efficiently mobile from root to grain of the late-maturing rice landraces' Kembulaung and Sepulut. The Kembulaung and Sepulut landrace is an accumulator of arsenic with Enrichment Factor value more than 11 and 2 respectively. Increase of As phytoavailability in this cultivation area might pose health hazard if not manage sustainably.