

SECTION D

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Phytoremediative potential of mustard (*Brassica juncea* L.) genotypes in Sri Lanka

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Heavy metal pollution is a serious environmental concern today. In Sri Lanka, many instances were reported on accumulation of toxic heavy metals such as Cd, Cu, Zn and Co in soil, water and in plant/animal biomass. Phytoremediation, removal of toxic heavy metals from soil and water through hyperaccumulator plants is a low cost, environmental friendly approach to solve this problem. Different genera of Brassicaceae are known to absorb heavy metals from soil. Mustard (*Brassica juncea*) has long been considered as a plant with hyperaccumulative potential in reducing heavy metals in soil. Sri Lanka has a rich mustard germplasm collection with a considerably high genetic variation. The present study was conducted in a site at Nagollagama in the Kurunegala District, where wide agricultural practices are undertaken. It is anticipated that soil is contaminated with heavy metals due to heavy use of fertilizer, herbicides and insecticides. The study was conducted between October 2007 to September 2008 (during Maha and Yala) to evaluate the variability in phytoremediative capability of ten different mustard accessions obtained from germplasm collection at Plant Genetic Resource Centre. There were ten replicates in each accession. Heavy metal contents of Mn, Co, Pb and Zn in oven dried mustard accessions (whole plant) were estimated 12 weeks after planting in each season using Atomic Absorption Spectroscopy. Soil heavy metal contents were also estimated for soil samples collected from the study site during two seasons. All comparisons were made at $\alpha=0.05$ level. Soil Mn and Co concentrations were significantly high in Maha than in Yala. Difference in heavy metal concentrations in mustard accessions between Maha and Yala seasons were not significant. However, all mustard accessions contained higher concentrations of heavy metals than standard values which were recommended for a plant to be considered as a heavy metal hyperaccumulator. Significantly high concentrations of Mn were found in accessions 7788, 515 and 8831 ($0.236, 0.225, 0.22 \mu\text{g g}^{-1}$). Co was significantly high in accession 5088 ($0.238 \mu\text{g g}^{-1}$). Pb was significantly high in accessions 8831 and 5088 ($0.156, 0.148 \mu\text{g g}^{-1}$) and Zn was significantly high in accession 501 ($6.413 \mu\text{g g}^{-1}$). However, further studies are necessary to confirm the present findings. The study also revealed that it is worthwhile screening the entire mustard germplasm in Sri Lanka for their variability in heavy metal accumulation capacity to identify highly potential heavy metal accumulators to be grown in heavy metal contaminated areas.

Keywords: *Brassica juncea*, heavy metals, phytoremediation.