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## Germination potential of *Sesbania cannabina* in 2 Chromium (Cr) spiked growth media

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Sediments of the banks of the Buriganga River, Bangladesh, are contaminated with heavy metals from industrial activity, especially Chromium (Cr). These carcinogens pose a serious risk to human and environmental health (Nargis et al., 2018). *Sesbania cannabina*, a leguminous fodder crop with rapid growth and high biomass production, is found to be naturally growing in these areas (Sarwar et al., 2015) and may have phytoremediation potential (Varun et al., 2017). This study aims to determine whether *Sesbania cannabina* can be grown from seed under chromium stressed conditions to establish this species as a possible phyto-extractor.

In this experiment toxicity testing of Chromium ( $K_2Cr_2O_7$ ) on seed germination was carried out using two growth media: Murashige and Skoog basal medium (MS0); and filter paper (Whatman Grad 1), by top of media or top of paper method respectively. In all cases, seeds were germinated under controlled conditions; 12 h full spectrum light at temperature  $28^\circ C \pm 1^\circ C$  and relative humidity of ~ 75% for 5 days. Seeds were pre-treated with  $H_2O_2$  (6% v/v) for 5 minutes and primed with  $65^\circ C$  water for 5 minutes, before the addition of Cr. Under low Cr concentrations (0 to 50 ppm) there was no significant effect observed in germination or root length. Under high Cr concentrations 98-100% of seeds germinated in both growth media, but root length decreased to almost half that of controls in  $\geq 500$  ppm Cr, and root elongation was negligible or stopped in  $\geq 1000$  ppm Cr. Confocal micrographs (stained with propidium iodide) indicate that damage to the cell wall of lateral root tips of germinated seeds increased with the concentration of Cr. There was no significant difference observed between the two growth media.

Thus it can be concluded that *Sesbania cannabina* can tolerate Cr contamination, and is able to germinate and grow in up to 500 ppm Cr. Given the ability of SC to grow in semi-arid to sub-humid climates, and a range of environmental conditions including seasonally submerged soils, there is great potential for SC to be adopted as a tool for phytoremediation of Cr contaminated soils in Bangladesh and elsewhere.