

## **Comparison of low-molecular-weight organic acids and ethylenediaminetetraacetic acid to enhance phytoextraction of heavy metals by maize**

### **Abstract**

We compared acetic, ascorbic, and oxalic acids with ethylenediaminetetraacetic acid (EDTA) to enhance phytoextraction of nickel (Ni), manganese (Mn), zinc (Zn), copper (Cu), cadmium (Cd), and lead (Pb) by maize. Except ascorbic acid, acids significantly ( $P < 0.05$ ) decreased shoot dry weight with maximum (5.60 g pot<sup>-1</sup>) recorded with ascorbic acid and minimum with oxalic acid (4.06 g pot<sup>-1</sup>). Maximum ammonium bicarbonate-diethylenetriaminepentaacetic acid (AB-DTPA)-extractable nickel (19.94 mg kg<sup>-1</sup>) was recorded with EDTA and it was minimum (10.57 mg kg<sup>-1</sup>) with oxalic acid. The EDTA significantly ( $P < 0.05$ ) increased AB-DTPA-extractable lead while other acids decreased it. Except acetic acid, other acids significantly ( $P < 0.05$ ) increased Ni and Zn concentration in shoots with maximum Ni (9.22 mg kg<sup>-1</sup>) and Zn (37.40 mg kg<sup>-1</sup>) with EDTA.

**Keyword:** Cadmium; Chelant-assisted phytoextraction; Copper; Lead; Maize growth; Manganese; Nickel; Zinc