PASPALUM NOTATUM ROOTS AS BIOSORBENT FOR METALS PRECONCENTRATION

A.R.A. NOGUEIRA
Grupo de Análise Instrumental Aplicada, Embrapa Pecuária Sudeste, PO Box 339, 13560-970, São Carlos SP, Brazil
G.C.L. ARAÚJO AND J.A. NÓBREGA
Grupo de Análise Instrumental Aplicada, Departamento de Química, Universidade Federal de São Carlos, PO Box 676, 13560-970, São Carlo SP, Brazil

Biological materials such as fungi, bacteria, algae and parts of plants have been successively employed to preconcentration, bioremediation and recover elements with commercial value due to their diversity and selectivity. Among the procedures that comprise parts of plants, those that employs roots must be pointed out due to the great number of available organic functional groups carrying out as active sites for metal sorption. These functional groups adsorb metal ions effectively, and behave similarly to exchange ionic resins in response to changing solution pH. In this work, roots of *Paspalum notatum*, a native forage from Brazil, were evaluated as metal biosorbent. After cleaning with acid baths, the roots were lyophilised and metal binding experiments were performed using a multi-metal spiked containing the following 13 metals: Al^{3+}, Cd^{2+}, Co^{2+}, Cr^{6+}, Cu^{2+}, Fe^{3+}, Mn^{2+}, Ni^{2+} and Zn^{2+} (5.0 mg L^{-1}), and Ca^{2+}, K^{+}, Mg^{2+} and Na^{+} (200 mg L^{-1}) in 0.5 mol L^{-1} ammonium acetate buffer solutions, with pH varying from 3.5 to 7.5. The pH values were corrected with concentrate nitric acid or ammonium hydroxide. After exposure to the roots, the solutions were centrifuged and the metals present in supernatants determined by inductively coupled plasma optical emission spectrometry (ICP-OES) with radial view. Metal binding capacity of *Paspalum* roots showed the order Al > Fe > Cr > Zn >Cu, based on the sorption isotherms. At pH 7.5, it was possible adsorb 98 % of Al, Fe, and Cr and around 40 % of Cu, Mn, and Zn. The adsorption step was performed in lower than one minute. The evaluated biosorbent presented potentiality to efficiently be applied us bioremediator in polluted environments for Cr, Al and Fe. Although in the multi-elemental solution, its was used to preconcentrate Cu, Mn and Zn to increase ICP-OES detection limit.