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Assessing the Growth and Metal Accumulation Ability of Some Crops in Soil Polluted with Zinc salts

Abstract

The ability of some selected plants to grow, tolerate and accumulate zinc in soil polluted with varying concentration of Zinc sulphate was investigated using Zea Mays, amaranthus, pepper, *Axonopus* and *Sida species* of weed. The plants were grown in a 57.5, 287.5, 575 and 1150mg Zn /kg soil for a period of four weeks for the food crops and two weeks for the weeds. The results indicated that most of food crops were intolerant of zinc concentration above 287.5mg Zn /kg. Amaranthus bio-concentrated more zinc in its edible portion than the other plants considered. All the food crops investigated accumulated significantly below the maximum zinc tolerance for human health (20mg /kg) as recommended by the Chinese department of preventive medicine.(p> 0.05). In the weed group, the *axonopus spp* of weed tolerated up to 2300mg Zn /kg soil zinc pollution, this ability may be useful in the reclamation of soil heavily polluted with Zinc. Caution should be taken when growing amaranthus on soil with low extent of zinc pollution since it can accumulate a large amount of it in its shoot part over a longer period of time.

Introduction

Zinc has been described as an essential heavy metal and micronutrient because of the important role it plays in the normal growth and reproduction of all higher plants and animal and of human beings (Frassinetti et al., 2006). This includes its role in immune function (Rink and Haase, 2007) and its participation in the control of oxidative stress (Zhou et al., 2002). It also serves vital function for the activities of more than 300 metalloenzymes, for the stabilization of DNA and for gene expression (Frassinetti et al., 2006).

As reported by many authors, the amount of zinc needed by living organisms is in trace quantities, at a higher concentration toxicity symptoms begins to become evident. Elevated levels of zinc gets into the human system through inhalation and ingestion (Islam et al., 2007; Lone et al., 2008; Kos et al., 2008) with ingestion as the most frequent source of contamination.