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Health risk from heavy metal and pesticide residue via consumption of food crop in Huitong, Zhuhai, China

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Vegetables can absorb not only nutrients but also pollutants such as heavy metals from the soil. This is commonly accompanied with high input of fertilizers and agrochemicals during the period of growth. In the first part of this experiment, 16 vegetable samples were collected from four representative areas in Huitong, Zhuhai City to detect pesticide residues using enzyme inhibition assay. The results showed that about 50% of vegetable samples were contaminated by pesticides, with 75% of them being leafy vegetables. The vegetables investigated have shown potential to bioaccumulate pesticides in their tissues. As a result, neurological health impacts are concerned for a long-term exposure to pesticides. In the second part of the experiment, the above 16 vegetable and four soil samples were collected and analysed using inductively coupled plasma optical emission spectrometry (ICP-OES). The results revealed that no soil samples exceeded the maximum residue levels (MRLs) of copper, zinc, cadmium, manganese, nickel, chromium and lead compared to those of the China National Standard (GB 1516-1995). However, based on the Nemerow pollution index, about 88% of vegetable samples were contaminated with various amounts of heavy metals. According to the China National Standard (GB 18406.1.2001), cadmium in *Zay mays* (0.13 mg/kg, spot B; 0.073 mg/kg, spot C) and *Lactuca sativa* L (0.066 mg/kg, spot B) exceeded about 2.6, 1.5 and 1.3 times of MRLs (0.05 mg/kg), respectively. Moreover, lead in *Zea mays* (1.72 mg/kg, spot B; 1.57 mg/kg, spot C) from two sampling spots, exceeded about eight times of MRLs (0.20 mg/kg). It is notice that vegetable has shown a great potential for bioaccumulation of heavy metals from the soil. Thus, such bioaccumulation can be explained by the plant and soil factors that affect the uptake of heavy metals by vegetables.

Biography

Huada Daniel Ruan has completed his first PhD in Mineralogy from The University of Western Australia and second PhD in Chemistry from Queensland University of Technology. He has a background in Chemistry, Earth Sciences, Environmental Science, and Biological Science with more than 25 years of experience in teaching and research in Australia, the U.S., Mainland China, Hong Kong and Macau, and published more than 120 articles including papers, book chapters, teaching materials and technical reports. He is the founding Head and Professor of the Environmental Science Program (Department), Beijing Normal University-Hong Kong Baptist University, United International College (UIC).

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