HEAVY METALS ASSESSMENT IN SEDIMENT, SUBMERGED AQUATIC PLANTS AND ACCUMULATION RELATIONSHIP IN BAIYANGDIAN LAKE, NORTH CHINA

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Abstract - Baiyandiang Lake is the largest macrophyte dominated shallow freshwater in North china, which is known as euthrophyte Lake. Recently It became polluted due anthropogenic, (aquaculture, intensive agriculture, industrialization) and geographical background. This study focus was on investigating level of heavy metal occurrence in sediment and three submerged aquatic plants by microwave metals digestion followed ICP-AES analytical method. Mean sediment traced heavy metals of As, Cd, Cr, Cu, Mn, Ni, Pb, Zn content was 9.94, 0.35, 55.9, 26.1, 617, 30.1, 56.7, 83.5 in ug/g and for submerged plant of Potamogeton crispus (1.94, 0.13, 4.03, 8.51, 323.11, 25.55 , 1.42, 37.78), Potamogeton pectinatus (5.31, 0.13, 8.35, 6.82. 522.04, 27.38, 2.88, 55.84) and Ceratophyllum demersum (8.26, 0.24, 16.70, 31.00, 1703.69, 56.48, 5.79, 65.11)ug/g respectively. C. demersum is the highest accumulator among the three plant species of same biotope. Sediment available metals in all sites were lower than the corresponding consensus-based Probable Effect Concentration, illustrating no adverse effects to occur while obtained value for Ni and Cr showed above threshold effect concentration predicted to influence slight effect. Individual PEC-Q showed high for Ni, Cr with high probability of risk while mPEC-Q for integrated risk depicts no toxic pollution as value below reference point (0.5).Contamination factor and I-geo assessment indices revealed that Cd and Pb were in moderate pollution status. Ecological risk explained Cd had the highest in all the sites while ecological index (summation of individual risk) discovered moderate risk to biological species. Therefore Overall Cd result revealed that enough to cause impact even though its value was below Hebei province background soil. Bivariate Pearson coefficient had explored there was no positive correlation between sediment heavy metals and submerged plants available at $P<0.05$ for species Potamogeton crispus. One way ANNOVA identified sample area and plant species caused the plant available metals level. Therefore risk flow from sediment compartment to submerged plants feeding fish could pose serious risk to consumers and transfer to higher trophic level. Attention should be given to sediment further metal enrichment.

Keywords - Heavy metals, submerged aquatic plants, accumulation