

HEAVY METAL CONTENT IN FOOD CHAIN COMPONENTS AND ITS HEALTH RISK ASSESSMENT IN THE COASTAL WATERS OF KALPAKKAM, SOUTH-EAST COAST OF INDIA

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Hheavy metals play major role in our materialistic life and thus have an obvious place in the industrialized world. However, they are toxic when their concentration exceeds the permissible limit. Kalpakkam, located on the Southeast Coast of India, has witnessed intense nuclear power and research activities resulting in substantial increase in social and industrial development. This necessitated assessing heavy metal content in water, sediment, zooplankton and fish in the coastal milieu to understand their seasonal fluctuations, distribution, source apportionment, pollution load, bioaccumulation pattern and risk assessment. Metal concentration were in the order, Fe > Zn > Pb > Cr > Mn > Ni > Cu > Cd > Co in water, Fe > Zn > Pb > Cr > Mn > Ni > Cu > Cd > Co in zooplankton, Fe > Zn > Cu > Mn > Cr > Pb in fish and Fe > Cu > Cu > Pb > Cr > Ni > Cd in sediment. Signature of monsoonal imprint on the levels of heavy metals was typified. Metal concentrations in plankton were much higher than those of water, sediment and fish. Wide variations in metal concentrations were noticed among the four components and land based anthropogenic source contributed significantly. Sediment is moderately polluted with Pb, Cd and Cr as reflected in CF and Igeo values. Dissolved heavy metals were relatively low at this site as compared to the other sites and were of autochthonous and allochthonous origin. Bio-concentration factors were significantly different among different metals. Metal concentration in fish species was safe for human consumption. The bioavailability of the metals in dissolved form suggested that the non-cancer and cancer risks posed by them are minimal and was within the WHO safe limits. However, the carcinogenic risks revealed that dermal absorption of Fe might be a matter of concern.

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