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Attenuating Transition Metals/REE's by X- ray fluorescent Spectroscopy of Ground Water of the South Mahanadi Delta, India

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Abstract : Heavy/transition Metals and rare earth elements present in ground water have proved to be important for human growth. Some heavy and transition metals like cobalt, chromium, copper, iron manganese, selenium and zinc are nutritionally essential whereas mercury, cadmium and lead are toxic. Element like boron, silver, barium, arsenic and aluminum are noxious at high concentration in ground water and affect heart, kidney, lever, nervous and digestive system of people. The concentration of those transition metals present in ground water is gradually increasing due to increased industrial, agriculture and urban activities. The southern part of the Mahanadi delta includes Chilika lagoon of the Mahanadi system in Odisha India. After inception of Bhubaneswar city (1950) and high population growth in the south Mahanadi delta, the ground water is being polluted increasingly with metals and REE contaminants. Various methods like neutron activation analysis. X-ray fluorescent spectrometry, polarography, Gas chromatography Analysis, Anodic stripping voltammetry and atomic absorption spectrograph are used for ascertaining and quantizing the trace and different metals (heavy or trace) present in ground water. Versatility, unique properties of XRF spectrometer have urged to access the quantity of heavy metals and rare earth elements present in the ground water samples in the wells/bore wells of the south Mahanadi delta. It is observed that there is overdose of Phosphorous, Iron, Titanium, cobalt and tin in the water samples. Rare earth elements like samarium, europium, gadolinium, terbium, dysprosium, Erbium are present in ground water in traces were also found. Strategies have been proposed to ameliorate the concentration of higher dose of the heavy metals and the rare earth elements in the present study.

Key Words : South Mahanadi delta, XRF spectrometer, Ground water, heavy metals, REE.

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