

# **Contamination of Arsenic and its Mobilization in Paddy Field Soil of Bangladesh**

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Arsenic is a potentially toxic contaminant of concern even at relatively low concentrations in the environment. High concentrations of arsenic in drinking groundwater in the Ganges delta plain (Bangladesh and West Bengal, India) have significant risk of public health. Furthermore, the groundwater containing arsenic is widely used for irrigation in paddy field in these areas; therefore high-concentration arsenic is accumulated in paddy field soil. An incorporation of arsenic from soils to food would amplify the risk of arsenic poisoning among people living in the area.

In order to clarify the arsenic mobilization in paddy field soil, the batch experiment in different pH and oxidation-reduction potential (ORP) conditions was performed. In a strong reduction state, high and low pH, it was observed that the solubility of the arsenic in soil is high. In order to measure the arsenic part which tends to move in soil, application of an acid-alkali sequential method was proposed and the possibility of arsenic movement in the Bangladesh paddy field soil was evaluated using this method. The tendency of arsenic increase in the wet season as compared to the dry season was seen and it was suggested that the arsenic in soil moved by the irrigation groundwater, rain and flood water in the wet season.

In order to examine arsenic movement in soil and release from it under natural conditions of rainfall and irrigation groundwater column experiment was conducted with paddy field soil by de-ionized water and Bangladesh synthetic groundwater. It was obtained that with synthetic groundwater only surface bound easily soluble arsenic was released and de-ionized water a part of iron bound arsenic were also released in addition to easily soluble arsenic. It was suggested that the calcium and magnesium in synthetic groundwater inhibited the release of iron bound arsenic and it was clarified by batch experiment. Thereby, the mechanism of arsenic movement by rain and flood water in the rainy season became clear. Moreover, a possibility of controlling arsenic from soil was suggested by calcium and magnesium addition.