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Comprehensive environmental study for arsenic-polluted well drinking water

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Abstract

Arsenic pollution in well drinking water is a very important issue in developing countries because long-term exposure to arsenic from well drinking water causes serious health problems including various cancers. Comprehensive environmental study is essential to solve the environmental issue. I will introduce our recent comprehensive environmental study with international interdisciplinary collaboration. This lecture is classified with 4 parts including 1) fieldwork in developing countries, 2) health risk assessment for elements, 3) Tailor made health risk assessment and 4) development of remediation system. Our fieldwork study showed that well drinking water was polluted by barium, iron, and uranium as well as arsenic. Our study for health risk assessment proposed novel toxicity for sole exposure to the elements and showed synergistic increase of carcinogenic toxicity by coexposure to arsenic and another element. We further suggested a biomarker to identify the patients with arsenicosis who may develop cancer in the near future (Challenge for the detection of high risk group for cancer). We finally developed original remediation system using a hydrotalcite-like compounds (MF-HT; patent No. 5857362). MF-HT can remove barium, iron, and uranium in addition to arsenic from well drinking water. Since MF-HT is easily produced with very cheap cost, it may be available various elemental pollution in developing countries. Thus, our interdisciplinary study including environmentology, analytical chemistry and molecular biology suggests a direction to solve the worldwide issue.

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