



Shallow water proved higher levels of potentially harmful elements and human health risk along the Sadkal oil exploration and production

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ABSTRACT

This study investigates the concentrations of potentially harmful elements (PHEs) in various drinking waters along the Sadkal oil exploration and production in Fateh Jang, Pakistan. For this purpose, representative water samples were collected from various drinking water sources (bore wells, dug wells and hand pumps). Water samples were analyzed for physicochemical parameters, such as anions using electrochemical analyzer (C6030) and titration methods, and PHEs by graphite furnace atomic absorption spectrophotometer (Perkin-Elmer model 700, USA). Results revealed that especially in shallow waters (hand pumps), the pH, chloride (Cl), nitrate (NO₃) and PHEs including chromium (Cr), nickel (Ni), manganese (Mn), iron (Fe), cadmium (Cd), lead (Pb) and copper (Cu) concentrations surpassed their respective safe drinking water guidelines set by World Health Organization (WHO). Determined PHEs concentrations in drinking water were evaluated for the potential risk assessment through the daily intake (DI) of metals and health risk index (HRI). Higher DI values for Zn (1.90E-01 mg kg⁻¹-d), and the HRI values >1 for Cd and Ni through hand pumps water consumptions were observed. Higher HRI values could cause various chronic and acute health problems to the exposed human population.

Keywords: Wastewater; Drinking water; Physicochemical parameters; Fateh Jang

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