

Water quality assessment of Mardan district with special emphasis on heavy metals contamination

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Water quality has been changing rapidly for the last few decades in developing countries. This large scale alteration in the water quality could be either due to geogenic or anthropogenic sources. Like other South Asian countries, Pakistan is also facing health-related problems due to water contamination. Therefore, assessment of water quality of an area becomes imperative before it is used for drinking purpose by the inhabitants of the area. The present study was conducted on water samples collected from different localities of Mardan district. During this study, representative water samples from different available sources (i.e., surface, shallow and deep groundwater) were collected. These water samples were analyzed for various physico-chemical parameters (i.e., such as pH, T, (EC), resistivity, TDS) by COSORT electrochemical analyzer C931, anions (i.e., SO₄, NO₃, Cl, HCO₃) by Hach DR2800 spectrophotometer and major cations (i.e., Ca, Mg, Na, K) and heavy and trace metals (i.e., Fe, Mn, Cu, Cr, Cd, Pb, Ni, Zn and As) by atomic absorption spectrometer equipped with graphite furnace in the Geochemistry laboratory of the Nation Centre of Excellence in Geology, University of Peshawar. Bicarbonates were recorded in relatively high concentrations, while the rest of the anions were found within the permissible limits of WHO. Among the major cations and heavy and trace metals, concentrations of Ca, Na, Fe, Cu and Pb were relatively high in some water samples. However, concentrations of K, Mg, Cd, Cr, As, Ni and Zn in all the water samples were found within the permissible limits of WHO and USEPA.

Various statistical parameters and health risk assessment tools were used to evaluate health-related problems associated with the water of Mardan district. Health risk assessment for heavy and trace metals in drinking water showed almost no health risk due to low hazard quotient (HQ) and cancer risk (CR) values. However, few shallow ground water samples were having low risk due to relatively high HQ values for Fe and Cu. This study suggests that generally the drinking water of Mardan district is safe for drinking purposes.