

**TRACE ELEMENT CONTAMINATION OF GROUNDWATER AROUND KIRANA HILLS,
DISTRICT CHINIOT, PUNJAB, PAKISTAN**

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Abstract

Thirteen groundwater samples and one river water samples were collected from wells and water source in Rabwah area, District Chiniot, Punjab in July 2017, in order to analyze trace elements composition of water. The water samples were directly analyzed using an inductively coupled plasma mass spectrometry (ICP-MS). Judging from the maximum contaminant level (MCL) and secondary maximum contaminant level (SMCL), and Maximum Contaminant Level Goal (MCLG) as defined by USEPA and WHO Guidelines for Drinking-water Quality, the concentration of 5 elements, As, Mn, Cl, Br and S, in groundwater samples exceeded the standards. In particular, the contamination of As (max. 25.1 µg/l) and Mn (max. 443 µg/l) is high level, which may cause negative effect if continuously drink the contaminated water. High concentration of As (max. 161 mg/kg) and Mn (max. 355 mg/kg) is also detected in the Precambrian meta-volcano sedimentary rock samples collected from the Kirana Hills, according to the aqua regia digestion ICP-ES/MS analysis. The groundwater contamination by As and Mn is possibly caused by a rock-water interaction in the subsurface zone. High salinity of groundwater is inherent in the area, but the contamination by Cl, Br, and S is probably accelerated by anthropogenic origins such as septic tank and wastewater.

Keywords: Groundwater contamination, Trace elements, Rock-water interaction