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Impact Assessment of Phosphogypsum on the Groundwater of Sfax-Agareb Aquifer, in Southeast of Tunisia

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Abstract : In Tunisia, solid wastes storage continue to be uncontrolled. It is eliminated by land raising without any protection measurement against water table and soil contamination. Several industries are located in Sfax area, especially those of the Tunisian Chemical Group (TCG) for the enrichment and transformation of phosphate. The activity of the TCG focuses primarily on the production of chemical fertilizers and phosphoric acid, by transforming natural phosphates. This production generates gaseous emissions, liquid discharges and huge amounts of phosphogypsum (PG) stored directly on the soil surface. Groundwater samples were collected from Tunisian Chemical Group (TCG) site, to assess the effects of phosphogypsum leatchate on groundwater quality. The measurements of various physicochemical parameters including heavy metals (Al, Fe, Zn and F) and stable isotopes of the water molecule (^{18}O, ^{2}H) were determined in groundwater samples and are reported. The moderately high concentrations of $SO_4^{=}$, Ortho-P, NH_4^{+} Al and F^{-} in groundwater particularly near to the phosphogypsum storage site, likely indicate that groundwater quality is being significantly affected by leachate percolation. The effect of distance of the piezometers from the pollution source was also investigated. The isotopic data of water molecule, showed that the waters of the Sfax-Agreb aquifer amount to recent-evaporation induced rainfall.

Keywords : phosphogypsum leatchate, groundwater quality, pollution, stable isotopes, Sfax-Agareb, Tunisia
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