

DETERMINATION OF APPROPRIATE PROCESS FOR PH ADJUSTMENT OF KHASH GROUNDWATER (SISTAN-BALUCHESTAN,IRAN)

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The Khash aquifer is used in city of Khash in Sistan-Baluchestan (Iran) as the only source of water supplying approximately 63MCM/yr of water (mainly from deep wells) for domestic use as well as for agricultural and industrial activities. Groundwater from this aquifer has been extensively utilized from last two decades. The aquifer comprises of coarse alluvial sediments, which can absorb most of runoffs. Due to vicinity of the aquifer to Taftan volcanic mountain, the nature of water is acidic and corrosive. In recent years due to substantial utilization from the aquifer, cause gradual draw-down in groundwater table, also intensified the acidic problem.

In this study, we look to make a diagnosis of the acidic pollution source and the physical and chemical heterogeneity of this groundwater reserve. During one year field study program a sampling scheme was carried out on 45 water wells in the area, taking 200 samples during one month, field study. pH, hardness and Fe and Mn, CO₂, H₂S concentration and water temperature.

Studies showed that groundwater contains high concentration of soluble gases; e.g. carbon dioxide and hydrogen sulfide, causing to maintain the pH of water in acidic range(5.36-7.12). We studied the relationship between the agricultural practices, industrial and urban development on changing the quality of the aquifer. We detected the main causes of groundwater acidity and evaluate the spatial risk of water quality deterioration in the region. The risk factors are volcanic activities of Taftan Mountain, big urban concentrations, using high quantities of water in particular for drinking water, and, secondary for agricultural usage.

Based on in situ pilot plant studies, various aeration tests were performed. Results showed that: 1-Aeration process with the aids of stepped aerator as well as cascade type is efficient to remove gases from the groundwater. 2- To achieve high performance in the aeration process for removing acidity of the water, it is necessary to adjust and decrease pH of water at the beginning of the process.

Keywords: Groundwater, Free Carbon Dioxide, Aeration