Balaban Desalination Publications

مؤتمر الخليج الخامس عشر للمياه
The 15th Gulf Water Conference

(2025) 146–152
doi: 10.5004/700086

WSTA 15th Gulf Water Conference
Water in the GCC, The Role of Technology in Effective Water Management
28–30 April 2024, Doha, Qatar

Assessment of groundwater suitability for drinking and irrigation purposes using physicochemical parameters at Al-Jouf Area, Saudi Arabia

Raid Alrowais[1,*], Mahmoud M. Abdel daiem[2]

[1]*Department of Civil Engineering, College of Engineering, Jouf University, Sakakah 72388, Saudi Arabia,*
[2]*Environmental Engineering Department, Faculty of Engineering, Zagazig University, Zagazig 44519, Egypt,*
Tel.: +966 502229973, email: rnalrowais@ju.edu.sa

ABSTRACT

Al-Jouf region is one of the most agricultural areas in Saudi Arabia. Due to the increase in drinking and irrigation water requirements in this region, there is an urgent interest in studying groundwater quality. Thus, the main aim of this study is to analyze the physicochemical parameters of groundwater in the Al-Jouf region for irrigation and drinking purposes. Thus, this study investigated some parameters including total dissolved solids (TDS), pH, electric conductivity (EC), hardness, and various anions and cations were compared with national and international standards. The groundwater quality index (WQI) was estimated to evaluate the suitability of groundwater for drinking purposes. The electric conductivity (EC), sodium percentage (Na^+ %), magnesium hazard (MH), sodium adsorption ratio (SAR), potential salinity (PS), and Kelley's ratio (KR) were assessed to evaluate the suitability of groundwater for irrigation. The results of the water quality analysis showed the suitability of groundwater in most parts of the studied area for drinking and irrigation use except that of the Al Qaryat region. Moreover, the groundwater was dominated by alkali metals and controlled by rock–water interaction domain, and the ionic abundance ranking was $Na^+ > Ca^{2+} > Mg^{2+} > K^+$ for cations, and $Cl^- > SO_4^{2-} > NO_3^-$ for anions.

Keywords: Groundwater; Drinking water; Irrigation

* Corresponding author.

ISBN 0-86689-078-5