ABSTRACT

Water resource management and the investigation of the quality and quantity of groundwater and surface water is important in the Kurdistan Region of Iraq. The growing population, as well as agricultural and industrial projects, consume huge amounts of water, especially groundwater. A total of 572 ground and surface water samples were collected for physicochemical analysis to determine the availability and quality of the water in the Kurdistan region. The physicochemical parameters such as pH, electrical conductivity, and total dissolved solids were analyzed to evaluate the suitability of the water for different purposes like livestock, irrigation, and agriculture. GIS-based multi-criteria decision analysis (MCDA) was used to determine the suitability map of water for irrigation purposes. Most of the groundwater samples were suitable for irrigation except for some samples from Erbil City, especially those taken in the Makhmur district, and samples from some small areas in the cities of Sulaymania and Duhok. All groundwater samples were acceptable for all types of agricultural crops, except for 15 well samples that were determined not to be usable for fruit crops. However, this water was acceptable for livestock and poultry. Most of the water wells provided freshwater except for 36 deep wells, which supplied slightly brackish to brackish water. Water samples were found to have low to medium salinity levels except for 26 well samples and one spring sample that had high salinity levels, and 2 well samples with very high salinity levels. Most of the samples had an excellent to good water classification except for 85 samples classified as permissible, 8 classified as doubtful, and 4 classified as unsuitable for irrigation according to the Todd classification. According to the Rhoades classification, all water samples were non-saline to slightly saline except for 11 samples that were moderately saline