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## Assessment of Dibdibba Groundwater Quality Using the Multivariate Statistical Technique in Zuber area South of Iraq

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### Abstract

Thirty-three samples of groundwater were taken from Dibdibba unconfined aquifer in the Zuber area southwestern parts of Basrah governorate south of Iraq to assess the groundwater quality. A statistical multivariate analysis was done using cations and anions, pH, total dissolved solids (TDS), and electrical conductivity (EC) that were measured for drinking, livestock, and construction purposes. Residual sodium bicarbonate (RSBC), Magnesium Ratio (MR), and Permeability index (PI) were used to evaluate the suitability of the present samples for irrigation activity. The quality of groundwater in the study area is unsuitable for drinking water, industrial and building uses. But it is suitable for livestock uses. According to Residual Sodium Carbonate and Magnesium Ratio the groundwater in the study area are suitable for irrigation purposes, but unsuitable for Permeability index. Multivariate analysis results indicate the high positive correlation between Ec and TDS with other constituents, two significant clusters I and II are obtained with significant Ec and TDS responsible for playing the most effective in classifying the present samples. 71.85% and 12.21% of the present of the total variance of the groundwater samples were explained by Factor analyses, Factor I indicated increasing  $Cl^-$ ,  $Mg^{+2}$ ,  $Na^+$ , and  $Ca^{+2}$  with the highest weight and Factor II show lower weight average of  $K^+$  concentration only. The results confirm the dissolution of sulfate salts and evaporate minerals, in addition to high agricultural lands and farm activities, besides the wastes from chemical construction industries.

**Keywords:** Groundwater quality, Multivariate analyses, Dibdibba formation, Zuber, Iraq.

التقييم النوعي لخزان الدبديبة باستخدام التقانات الاحصائية المتعددة المتغيرات في منطقة الزبير جنوب

العراق

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الخلاصة

تم نمذجة 33 عينة من المياه الجوفية من خزان الدبديبة غير المحصور في منطقة الزبير ضمن محافظة البصرة، جنوب العراق لغرض تقييم نوعية المياه الجوفية. تم اجراء التحليل الاحصائي المتعدد المتغيرات باستخدام الايونات الرئيسية الموجبة والسالبة، دالة الحامضية Ph، المواد الصلبة الكلية الذائبة TDS،

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