

## Groundwater Quality and Its Suitability for Agricultural Use in the Jeloula Basin, Tunisia

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**Abstract :** Groundwater quality assessment is crucial for sustainable water use, especially in semi-arid regions like the Jeloula basin in Tunisia, where groundwater is essential for domestic and agricultural needs. The present research aims to characterize the suitability of groundwater for irrigational purposes by considering various parameters: total salt concentration as measured by Electrical Conductivity EC, relative proportions of  $\text{Na}^+$  as expressed by %Na and SAR, Kelly's ratio, Permeability Index, Magnesium hazard and Residual Sodium chloride. Chemical data indicate that the percent sodium (%Na) in the study area ranged from 26.3 to 45.3%. According to the Wilcox diagram, the quality classification of irrigation water suggests that analyzed groundwaters are suitable for irrigation purposes. The SAR values vary between 2.1 and 5. Most of the groundwater samples plot in the Richards' C3S1 water class and indicate little danger from sodium content to soil and plant growth. The Kelly's ratio of the analyzed samples ranged from 0.3 to 0.8. These values indicate that the waters are fit for agricultural purposes. Magnesium hazard (MH) values range from 27.5 to 52.6, with an average of 38.9 in the analyzed waters. Hence, the  $\text{Mg}^{2+}$  content of the groundwater from the shallow aquifer cannot cause any problem to the soil permeability. Permeability index (PI) values computed for the area ranged from 33.6 to 52.7%. The above result, therefore, suggests that most of the water samples fall within class I of the Doneen chart and can be categorized as good irrigation water. The groundwaters collected from the Jeloula shallow aquifer were found to be within the safe limits and thus suitable for irrigation purposes.

**Keywords :** Kelly's ratio, magnesium hazard, permeability index, residual sodium chloride

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