

Assessment of Groundwater Quality for Drinking and Agriculture Purpose in Nighawal Village, District Jamshoro, Sindh, Pakistan

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Nighawal village is a rural area in Sehwan, located in Jamshoro district where inhabitants rely on groundwater for domestic use and agricultural activities but the quality of water is unknown for its intended uses. Therefore, present study is aimed at assessment of groundwater quality for drinking and agriculture. For this purpose, groundwater (n = 21) samples were collected from various sites of study area. Data reveal that groundwater is slightly alkaline and spam around circum-neutral range (pH range: 7.2-7.96; mean: 7.46; stdev: 0.155) with a mean temperature of 29.48 °C suggesting the occurrence of alluvial aquifer as a hosting matrix. Eh varies in a narrow oxic range (range: 173-192; mean: 184.38 mV, stdev: 6.025mV). TDS content varied in a wide range (range 431-1110; mean: 773.95 mg/L, stdev: 213.95mg/l) where except two, all samples exceeded the WHO permissible limit (500 mg/L) and about one-fourth exceeded the Pakistani guidelines (1000 mg/L) for drinking purpose. Similarly, a wide range of hardness (470-980; mean: 680.95 mg/l, stdev: 165.103 mg/L) is observed where about 64% samples exceeded the WHO guideline value (500 mg/L) for drinking purpose. Interestingly, high hardness is mainly influenced by high sulphate content (range: 155-346; mean 275 mg/L, stdev: 53.016 mg/l). On the other hand, only three samples are found turbid (< 1 NTU) and within WHO permissible limit (5 NTU). Major cations and anions varied in the order of Na > Mg > Ca > K and SO₄ > Cl > HCO₃ > NO₃. WQI value was found to be 72 indicating that groundwater falls in fair category for irrigation and industrial purpose but unfit for human consumption. PCA analysis revealed that both natural and anthropogenic factors are controlling the chemistry of water. It is concluded from present study that groundwater is of marginally acceptable quality which is mainly influenced by the high occurrence of sulphate. Detailed studies are required to explore the reason of high sulphate occurrence.