

Physico-chemical assessment of drinking water quality of Salarzai tehsil, Bajur Agency, FATA, Pakistan

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Abstract

The previous studies decipher that the drinking water quality of Pakistan exceeded global standards due to various natural and anthropogenic contaminations. The current study aims to assess physical and chemical behavior of drinking water of Salarzai Tehsil, Bajur agency (FATA) Pakistan. Twenty two representative samples were collected in clean polyethylene bottles from different sources including ground water (dug well, tube well and bore well) and surface water (springs and streams). All water samples were analyzed to demarcate its physical characteristics such as odor, taste, color, pH, temperature, turbidity, salinity, Total Dissolved Solids (TDS), Total Suspended Solids (TSS), Electrical Conductivity (EC) and Dissolved Oxygen (DO). Similarly, the chemical properties including total hardness, alkalinity, chloride (Cl), potassium (K) and sodium (Na) were also tested in the drinking water samples of the study area. Physically water was found colorless, odorless and tasteless. The values of pH, EC, temperature, turbidity, TDS, TSS and DO ranged between 6.7-7.22 (mean: 7.034), 146-600 $\mu\text{S}/\text{cm}$ (mean: 283.63 $\mu\text{S}/\text{cm}$), 23.9-25.2 $^{\circ}\text{C}$ (mean: 24.70 $^{\circ}\text{C}$), 25-542 NTU (mean: 174.09), 80-390 mg/L (mean: 175.636 mg/L), 2-15 mg/L (mean: 6.195 mg/L), 2.97-3.17 mg/L (mean: 3.045 mg/L) respectively. The results showed that turbidity and TSS exceeded the permissible limit of WHO and Pak-EPA. Moreover, the results of total hardness, alkalinity, chloride (Cl), potassium (k) and sodium (Na) were ranged between 88-461 mg/L (mean: 232.37 mg/L), 91-280 mg/L (mean: 163.31 mg/L), 8.193-527.85 mg/L (mean: 117.171 mg/L), 1.00-8.00 ppm (mean: 2.45 ppm) and 5.00-28.00 ppm (mean: 10.54 ppm) respectively. All chemical parameters were found within permissible limit by comparing with WHO and Pak-EPA guideline values except chloride which were above WHO and Pak-EPA standards (250 mg/L). Higher concentration of turbidity and TSS can be subjected to the erosion and weathering of rocks and soil. However, the consumption of drinking water poses no health risk to the exposed population of the study area and the water was found to be safe for washing and drinking purposes.