Pre-Treatment of Surface Water and Groundwater Mixtures at Deir Alla Pumping Station Using Low Cost Geological Materials.

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Abstract

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Deir Alla – Jordan

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Natural water is rarely of satisfactory quality for human consumption or industrial uses and nearly always need to be treated. Natural water is abstracted from dams, lakes, rivers, or ground water sources and treated to standards acceptable for human consumption or industrial requirements.

In the current study the powder form of nonmetallic raw materials such as Azraq bentonite (AB), Azraq diatomite samples at different depths (AD), palygorskite (P), porcellanite (PO), reddish volcanic tuff (RVT), brownish volcanic tuff (BVT) and calcite (CL) were used in the treatment of real raw surface water and groundwater mixtures at Deir Alla Station. There are variations in chemical and physical characteristics of raw water.
mixtures at Deir Alla Station. These variations can be explained by the differences in sources of raw water mixtures at King Abdullah Canal.

The samples were subjected to some mineralogical and chemical investigations. In addition, jar test experiments were conducted to remove turbidity, total dissolved solids (TDS), $\text{PO}_4^{3-}$, $\text{NO}_3^-$, $\text{NH}_4^+$ and total organic contents (TOC) from real raw surface and ground water mixtures at Dier Alla Station. The efficiency of the different geological samples, in removing some water pollutants from the raw water mixtures, was evaluated. The statistical evaluation of the experimental reagents showed that palygorskite and porcellanite are more efficient in removing average of total pollutants from raw water mixtures followed by Azraq bentonite, reddish volcanic tuff and Azraq diatomite. Brownish volcanic tuff is not recommended in treating raw water mixtures, since the efficiency of brownish volcanic tuff is insignificant. Palygorskite (P), porcellanite (PO) and Azraq bentonite (AB) are low cost, locally available and are efficient materials in treating raw water mixtures. However, palygorskite is more efficient than porcellanite and Azraq bentonite. Thus, P is the best available treatment reagent followed by PO and finally AB.

**Key Words:** Natural Water, Deir Alla Station, King Abdullah Canal, Nonmetallic Raw Materials, Raw Water Mixtures, Mineralogical and Chemical Investigations, Efficiency Treatment, Water Pollutants.

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