

## Physical and chemical properties of some Turkish spa waters

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The physical and chemical properties of spa water samples taken from 20 springs were investigated. The order of anions in thermal waters are  $\text{Cl}^- > \text{HCO}_3^- > \text{SO}_4^{2-} > \text{CO}_3^{2-}$ . B, Cl,  $\text{SO}_4$  and  $\text{HCO}_3$  contents varies widely. Alkali-alkaline earth cation contents of the water are determined as  $\text{Na}^+ > \text{Ca}^{2+} + \text{Mg}^{2+} > \text{K}^+$ . pH, Eh, and temperatures, values of waters range from 6.4 to 9.3, and 88 to 43600 ( $\mu\text{S}/\text{cm}$ ) and 27 to 86 °C, respectively. Total dissolved solids (TDS), alkalinity and salinity values are between 589 and 2900 ppm, 241 and 2714 mg/l, and 0.4 and 28 ppt. The most of TDS contents of the spa waters are between acceptable ranges in swimming pools. In many spa waters, concentration of Al, Cr, Ni, Fe, and Mn are usually higher than those of the drinking water. As content is over 100-220 times the drinking water limit, its content may be caused some skin irritations in bath therapy. Most of the spa waters are characterized as hard waters. Due to containing very high  $\text{SO}_4$  than drinking water may be suitable for the treatment of some skin diseases. The spas water is defined as “thermo-mineral” water. In general, spa waters can be used for relaxation of muscles, reduction of pain, and the elasticity of connective tissue and for joint mobility treatments in the spa environment. The majority of the analyzed spa waters is suitable for thermal and hyper thermal bathing.