

ABSTRACT

This thesis contains the results of hydrochemical and isotopes studies conducted between dry of 2013 to wet season of 2014 on Soreq catchment /West Bank. The study area is located in the western part of the West Bank. Its location is within the western catchments. The study catchment with an area of 70 km². This work aims to compensate for the lack of information about hydrochemical characteristics of the springs water, as well as to identify the different pollutants and impact on the spring water, and assessment of the environmental recharge of spring water. The hydrochemical study which involved collection and analysis of water samples from the springs. The EC, pH, TDS and temperature were measured in the field. The chemical and microbiological analyses, including determination of the cations, anions and heavy metals, as well as total and fecal coliform bacteria count, were carried out in the laboratory. The spring water quality is generally low. The pH of all spring water ranged between 7-8 with mean temperature of 20.2 °C, which is neutral to slightly basic. Electrical conductivity and total dissolved solids for spring water ranged from 421-1385 µs/cm, 185-763 mg/L, respectively. The concentration of anion and cation of the spring water within the allowable WHO limits except in Ein Beit Soreq and Ein Albalad. The water of most of the springs in the Soreq catchment is contaminated fecal Coliform and total Coliform were found in springs water. The concentration of nitrate show moderate values below the WHO limits. Hardness of water between hard to very hard types. The order of cation abundance (mg/L) was (Ca⁺² > Mg⁺² > Na⁺ > K⁺), but that of anions (HCO₃⁻ > Cl⁻ > SO₄⁻² > NO₃⁻) was similar in both seasons. The water of springs in the study area is polluted with some heavy metals like (Zn⁺², Cd⁺², Mn⁺², As⁺², Co, Cu, Ni, Pb, Al, Fe⁺², and V) because their concentrations are higher than the permissible limits according to WHO (2007) and PWA (2001). Most springs in the study area have water type of (Ca-Mg- HCO₃⁻) and the other springs range between (Ca-HCO₃⁻) and (Ca-Cl-HCO₃⁻). According to Piper's classification the spring water in the study area between the areas of earth alkaline water with increased portion of alkali with prevailing bicarbonate and alkaline water with prevailing bicarbonate in both

seasons. Comparing the quality of spring water with standards for different uses proved that some springs unsuitable for human drinking purposes like Ein Beit Soreq and Ein Albalad, but it's suitable for agricultural and irrigation, except some samples which are poor due to high salinity.

Stable isotopes (^{18}O , ^2H) are used to study the recharge of spring water. The study shows that the isotopic composition, ranges for $\delta^{18}\text{O}$ between (-5.06 ‰) to (-5.89 ‰) and for $\delta^2\text{H}$ between (-20.28 ‰) and (-24.44 ‰). The mean is about (-5.53 ‰) and (-22.59‰), in oxygen-18 and deuterium respectively. The relationship between ($\delta^2\text{H}$, $\delta^{18}\text{O}$) contents in spring water samples are used to define the Local Meteoric Water line (LMWL), according to the equation: ($\delta^2\text{H} = 4.74 \delta^{18}\text{O} + 3.65$). The isotopic content of the analyzed water samples plot on the Mediterranean Meteoric Water Line, signifying recharge from recent precipitation.