

## Assessment of underground water quality for drinking use

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### ABSTRACT

Qualitative evaluation of water resources is the first step for having clean drinking water according to health standards and it is the requirement for properly designing of filtration processes. Realization of this issue requires reliable and accurate information about the concentration and quantity of raw water quality parameters. In this research, the ground water quality of Dehloran region was investigated in terms of anions and cations according to the monthly sampling data which was collected over 10 years in 3 wells in Barebijeh region. In this study, the highest concentration level (UCL) (upper control limit) and the lowest concentration level (LCL) (lower control limit) were calculated based on t-test at 95% level and these values were used to evaluate the quality of drinking water according to 1053 national standards. The average of sodium concentration in wells 1 to 3 in Barebijeh was 13.17, 13.01, 14.00mg/l and the average of calcium concentration was 21.57, 21.82, 22.11mg/l, respectively. Also, the average of chloride in the mentioned wells was 11.89, 12.05, 12.79mg/l, the average of sulfate concentration in the wells was 10.13, 11.44, 12.04mg/l, respectively and the average of carbonate concentration in all wells was almost zero. The average of bicarbonate in the mentioned wells was 78, 77.76, 77.76mg/l, the average of nitrite concentration was 0.0003, 0.0009, 0.0003mg/l, and the average of nitrate concentration was 8.1, 8.48, 8.22mg/l, respectively. By comparing the calculated concentrations of ions according to the fifth revised edition of ISIRI 1053 of the Institute of Standards and Industrial Research of Iran, the water quality of these wells is good for drinking.

**Keywords:** water resources, water quality, Underground water

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### 1. INTRODUCTION

Water quality is one of the most important factors which should be evaluated while assessing the proper development of a region. Water quality should be defined based on the physical and chemical variables associated with the use of water. Although the concept of groundwater quality seems to be clear, but its assessment requires some tricks. The chemical composition of groundwater is a measure proportion as a water source for human and animal consumption, irrigation, and industrial purposes, etc. Therefore, the purpose is not water quality definition, but also, it is the optimum use of water in the target population of experts. According to different standards, acceptable and unacceptable values are defined for each variable that water must be refined before using if it exceeds this standard [1],[2],[3],[4].

Evaluating the quality of the water supply is one of the most important issues in the management of water resources that the quality of groundwater and surface water can be studied using different methods (1). Since, limited resources of groundwater and surface water are the most important water supply resources in the world [5],[6],[7] and on the other hand, they are constantly at the risk of infection, ensuring their quality for edible use is necessary [8],[9]. Consequently, new methods for assessing the quality of surface water and groundwater in order to achieve the proper safety for human health are progressing and developing so that several methods have been used in the recent 60 years [10],[11],[12],[13],[14],[15].

Many researchers have raised the measurement of the quality index of groundwater and surface water. Brown et al. have expressed Water Quality Index (WQI) [16].

Bachmann et al. have presented an index for assessing and mapping the degree of pollution of groundwater and testing its application in South-West of Finland and the center of Slovakia [17]. Xing Shilu et al. (2011) have evaluated the water resources in QingShuiHe region by the single classification method [18]. Meenakshi et al. (2004) have studied the groundwater of Haryana region which was considered as drinking water. In this study, parameters such as pH, electrical conductivity, total dissolved solids, total hardness, total alkalinity, and other parameters were measured [19]. Helmy et al. (1983) have evaluated the quality of drinking water in 13 wells in El-Salaam region. In this study, biological parameters such as coliforms, chemical parameters such as pH and hardness were measured [20]. Hu, Wong (2013) conducted an analyzing on the quality of water supply and they have provided a method for determining the water quality [21].