

Investigation of geology condition and hydrogeology Kuhdasht area, Lorestan province, Iran

F. Hakimi¹, A. Ahmadi-khalaji², T. Dolatsha¹, H. Mollaei³, V. Shahrokhi⁴

1. Islamic Azad University, Khorramabad Branch and member of young researchers club

2- Department of Geology, Faculty of Sciences, University of Lorestan

3. Islamic Azad University, Mashhad Branch

4- Islamic Azad University, Khorramabad Branch

Abstract

The studied area lies 33° 25' - 33°45' N and between 47° 10' - 47° 45' E and located in Folded Zagros Zone.

Water resources underground of Kuhdasht zone are depth well, low depth well and springs.

The investigation of chemical quality based on chemical analyses different part show that these sources are good quality and suitable for agriculture and drinking consumptions.

Over exploitation of water ground aquifer in recent year occurs conditions critical in water bearing formations and fall on water ground table.

This critical condition in water bearing formation and carbonates formations in Kuhdasht area cause that necessary to draw of karstic Asmari-Shahbazan formation for Kuhdasht city water providence.

Over salty-chalk formation Gachsaran of karstic Shahbazan-Asmari influence to water source quality. The effect of this formation depended on erosion or outcrop its in area.

So, Gachsaran formation in this area is problem and basic factor in bitterness and salty water resource Asmari-Shahbazan formation.

The studies of area show that this formation involved of high erosion and low influence of water resource karstic and provide EC suitable content for drinking uses.

So, providence of water in Kuhdasht city is possible to karstic Shahbazan-Asmari formation.

Key words: *Kuhdasht, Zagros, karstic, ground water, Asmari*

Introduction

Kuhdasht is located in Lorestan province, 85 km far from Khorramabad, 47,10' – 47,45' E and 33,25' – 33,45' N , with 1197m average height (Fig 1).

At the present time, Kuhdasht's water is supplied by deep alluvial wells made in Kuhdasht plain. Over exploitation during the process of urbanization, as well as, penetration of urban drainage into underground water tables in recent years has headed towards a critical condition in the alluvial water tables in Kuhdasht plain. This critical condition, quantitatively and qualitatively, as well as, the presence of hard carbonate formations around kuhdasht have arrested the attentions towards the lime in the area in order to supply mid term water in Kuhdasht, which has been studied in this research.

Stratigraphy and geological setting

The area is classified geologically as a part of the Folded Zagros Zone. Constructing the structure of the area, the upper Alpine rock making movements (Mohajel and Fergusson, 2000, Mohajel et al., 2003) have induced the folds as syncline and anticline structures with NE-SE trends (Farhoudi, 1981 Alavi, 1994, Berberian and King, 1981). The formations of the area are present in most of these folds which are according to their ages as follows:

Gourpi, Amiran, Talezang, Kashkan, Asmari – shahbazan, Gachsaran and Quaternary alluvial.

Hydrogeologic features of the formations

Gourpi formation: This formation is considered as impenetrable classes respecting development of marl layers in it, and they are observed invaluable from viewpoint of underground water. Just limed Imam Hassan formation has solubility property and secondary porosity because of having high carbonate percentage; however, it does not have considerable value due to trail of the karstic water reservoirs.

Amiran formation: The weak penetrability is one characteristic of this formation; the other characteristic is the great amount of current surface water. Being too weak respecting the amount of water output due to development of marl – siltstone and shale layers, this formation cannot form favorable and full of water layers, also, it, generally, is too considerably weak to form underground water reservoirs.

Talezang formation: The presence of primary porosity, besides, the function of secondary geological processes has expanded substantially its karstic penetrability. The calculation of the formation current water amount does not show a great deal. The formation has had a favorable development in the southern part of Kuhdasht plain; however, it has not been regarded as a prior source of water for supplement of Kuhdasht's requirements, because of lack of any stream or pool with considerable water, also, its low thickness, as well as, respecting the presence of the limed formation, Asmari, in Kuhdasht area.

Kashkan formation: Having no considerable value respecting the underground resources of water, the formation can function as rock of floor in Asmari – Shahbazan formation reservoirs in the bottom of it in some part of the area, because of its location under the latter formation.

Asmari – shahbazan formation: The phenomenon of karst has developed a great deal in this formation, because of the presence of slits and holes and a high degree of porosity in it, and the most progressive karstic steps of these carbonate rocks can be found in the studied area (Aghasi, 1999). The quality of Asmari – Shahbazan karstic water reservoirs are affected overtly, because the salty – chalky Gachsaran formation is located upon it, and it has different effects, whether the salty - chalky Gachsaran formation has completely its manifestations in the area or it is eroded. Gachsaran formation is completely eroded in the studied area, therefore, it is anticipated that Gachsaran formation karstic water reservoirs will have enjoy appropriate amount of EC for being drunk. Thus, there can be possibly a proper option for supplement of half-time water in Kuhdasht via karstic - limed Asmari – Shahbazan formation.

Gachsaran formation: Being problematic regarding underground water, this formation chiefly causes the bitterness and salinity of Asmari – Shahbazan underground karstic alluvial water. It shows low degree of penetrability due to development of marl layers and tiny – grained sediment in it, and has rather a large amount of current surface water. Gachsaran

formation, having a high degree of sensitivity to erosion, So the water passing through the sediment can easily dissolve different kinds of salts in it, and when they enter to the lands, they can pollute the surface or underground sources of water. Fortunately being eroded in the studied area, the formation does not have much impact upon the karstic water reservoirs.

The calculations show that the amount of Mercury and Arsenic is zero in the area's water and the amounts of the other elements are: Plumb (-7.62-1.38 mg/lit), Chrome (13.47-32.29 mg/lit), Copper (0.6-4.30 mg/lit), Zink (3.15-26.43 mg/lit).

Geology and hydrology

This section's objective is the study for determination of the physicochemical quality of the area's karstic water resources, the variation's features of water qualitatively in the process of the research, and determination of limitations in water consumption both for drinking and culture.

The study and analysis of chemical quality of the area's karstic water resources is based upon the chemical results of the last picked up samples of water during the research, some parts of which have been carried out in Lorestan organization of water and the other parts performed by Kermanshah nuclear absorption system. Since the analysis of chemical quality of water have its own complexity, the displaying techniques of qualitative water conditions are used for facilitation to access them. Sholer diagram is used for displaying the condition of drinking and Wilcox diagram is used for displaying the condition of cultural consumption of the area's water.

As mentioned, there is Asmari karstic formation in the studied area According to the chemical results obtained from the water samples picked up water samples, the conditions of the water reservoirs of the formation in the studied area have been shown by Sholer and Wilcox diagrams (Fig 2, 3). The samples are placed from good to acceptable from drinking viewpoint (Fig 1) and because of low sodium percentage (%Na)they are from excellent class, and from cultural uses viewpoint are placed in classes C2S1 and C3S1 (Fig 3). PH of the water samples are as the minimum level 7.4 and the optimum level 7.8 and the optimum amount of choler 14.7 mg/lit and the minimum amount of insoluble solid materials (TDS) 350 mg/lit and the maximum 529 mg/lit, which are reduced during the flowing. Also total hardness (TH) of minimum is equal to 270 and maximum is equal to 486 according to CaCO₃ of standard level, so they are not problematic for drinking.

Results

Due to chemical data, the water of the area's wells has high quality, but the kind of the contacting formations with the formations with karstic water reservoirs can affect upon the quality of the resources considerably. In some parts where there is the evaporated sediment, the quality has been reduced and it has made the anions of Cl and SO₄ to be increased in their chemical syntheses, in fact, evaporating formation of Gachsaran is observed as a polluting, harmful, and advertizing formation for the area's karstic water.

Generally, according to the results obtained from the studies, the area's water resources do not have any limitation qualitatively for drinking and cultural uses.

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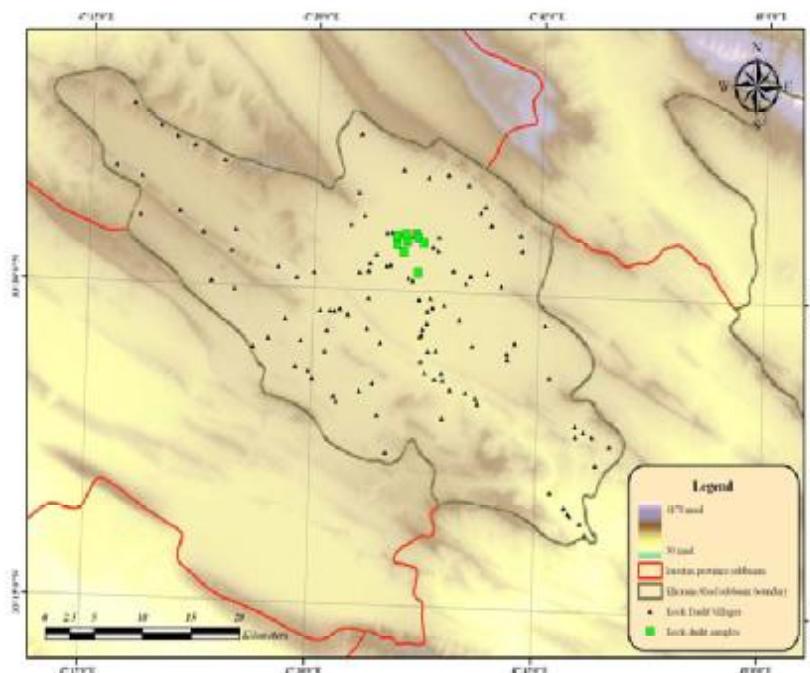


Figure 1: The geographic situation of Kuhdasht and the places of the studied area water resources.

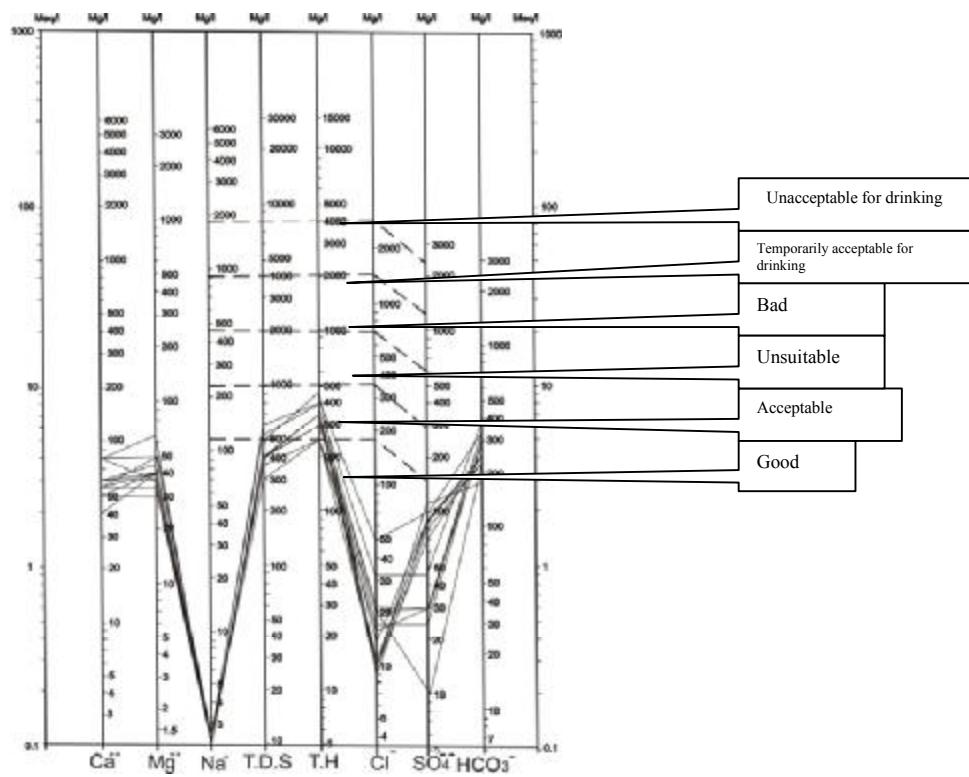


Fig 2: The chemical result of complete analysis of qualitative water resources in Kuhdasht, which shows that the water is from good to acceptable from drinking viewpoint.

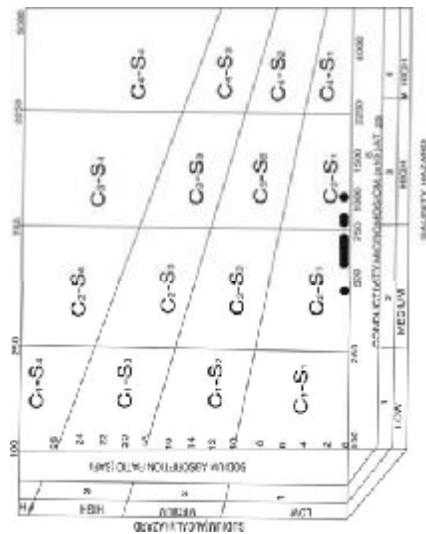


Fig 3: The chemical result of Kuhdasht resources which shows that the water is from excellent classes from cultural uses viewpoint respecting having low sodium percentage, placed in classes C2S1 and C3S1.