

# Chloride Estimation in Drinking Water of different Academic Institutes of District Vehari, Pakistan-A Lab Project

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## Abstract

To investigate the chloride hardness in drinking water, Five samples of drinking water were taken from five different academic institutes of District Vehari, Pakistan which are; sample-1 from University of Education Vehari Campus; sample-2 from Government Post Graduate College for Women Vehari; sample-3 from Government Post Graduate College for Boys Vehari; sample-4 from COMSATS Institute of Information Technology (IIT) Vehari Campus; and sample-5 from BZU Vehari Campus. This project was performed in chemistry Lab of University of Education Vehari Campus. After that, the results obtained from these experiments indicated that sample-3 is very polluted with large amounts of salts which cause its hardness and made it unfit for drinking purposes, because this hardness causes health diseases in humans. The sample-3 contains large amounts of chloride ions which hardened it, as its temperature is also low. Except Sample-3, all other four samples are not much polluted and are fit for drinking. So, author recommended to leave the use the sample-3 of Water of Government Post Graduate College for Boys Vehari.

**Keywords:** Drinking water; Hardness; Quality parameters; Argentometric; Overwhelming metals

## Introduction

Water is a requisite natural resource on earth. Nonviolent drinking water is the prime need of every human being [1]. The water which entities drink and use for different reasons for existing is perfect water [2]. Common assets are the imperative abundance of our nation, water is one of them. Water is a meander of the nature. "No existence without water" is a typical motto relying on the way that water is the one of the normally happening fundamental prerequisite of all life supporting exercises [3]. This infers the water must be free of germs and chemicals and be cleared. Groundwater is the real source of drinking water [4-7]. Water quality parameters are the physical, substance and organic attributes of water [8-11].

Since it is a dynamic framework, containing living and in addition nonliving, natural, inorganic, solvent and additionally insoluble substances. So its quality is probably going to change step by step and from source to source. Any adjustment in the common quality may bother the balance framework and would end up plainly unfit for assigned employments. The accessibility of water through surface and groundwater assets has turned out to be basic every day. Just 1% section is accessible ashore to drink, agribusiness, local power era, modern fulfillment, transportation and waste transfer [12,13]. Over half populace on the earth relies on ground water. In many ranges of the Pakistan the ground water is hotspot for drinking reason. Safe drinking-water is a fundamental requirement for human advancement, and wellbeing. So, it is a globally acknowledged human right [14-17]. By and large, drinking water containing distinctive Calcium and Magnesium salts and other overwhelming metals including Cd, Cr, Co, Hg, Ni, Pb, Zn and so on, have critical unfavorable consequences for human wellbeing either through insufficiency or harmfulness because of unnecessary admission [18,19].

New water shortage is expanding internationally on account of overpopulation [20,21]. Numerous scientists have likewise dealt with the water and human right [22]. The extreme ingestion of every one of these salts and overwhelming metals including Cd, Cr, Co, Hg, Ni, Pb and Zn effectively affect human wellbeing [23]. The total populace is expanding step by step and this ceaseless increment in populace brings about

lack of new water accessibility around there. The persistent expanding populace raises the necessity of water for the generation of sustenance stuff, agribusiness, industry and the local usage [24,25]. Hard water contains a higher than typical grouping of calcium and magnesium particles [26]. The explanation for is shake sort, sedimentary shake, which is rich in Calcium and Magnesium [27]. Water hardness causes various distinctive issues, for example, evaporator scaling, washing, spots on sink, sturdiness of hair and skin. It is additionally said that hard water likewise causes different medical issues like as urolithiasis, cardiovascular confusion, kidney issues, anencephaly and disease [28].

In Pakistan drinking water is persistently being disintegrated because of untreated domestic and mechanical water and waste from farming affluent. There are various potential sources that can make the pollution of water make it hazardous for drinking. It is additionally said that hard water likewise causes different medical issues like as urolithiasis, cardiovascular confusion, kidney issues, anencephaly and disease [29]. Most extreme reasonable level endorsed by WHO for drinking water is 500 mg/l as set. As per a few orders, water having hardness up to 75 mg/l is named soft, 76-150 mg/l is decently soft, 151-300 mg/l as hard and more than 300 mg/l as very hard [30].

## Experimental

### Materials/Chemicals

Five Different samples were taken from different academic institutes; sample-1 from University of Education Vehari Campus; sample-2 from Government Post Graduate College for Women Vehari;

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sample-3 from Government Post Graduate College for Boys Vehari; sample-4 from COMSATS Institute of Information Technology Vehari Campus; and sample-5 from BZU Vehari Campus. While Erichrome Black-T (EBT) was used as indicator,  $\text{AgNO}_3$  was used as titrand and water samples were used as titrant (Table 1).

## Method

The test for chloride estimation in water is argentometric titration. 10 ml from each of five samples was added in different five beakers.  $\text{AgNO}_3$  was added into water, while 2-3 drops of indicator Erichrome Balck-T (EBT) were added into beaker of each sample. When the reaction had been completed, dark pink color turned into milky colored precipitates of  $\text{AgCl}$ . Then the precipitates were dried on the filter paper and measured on analytical balance.

## Results and Discussion

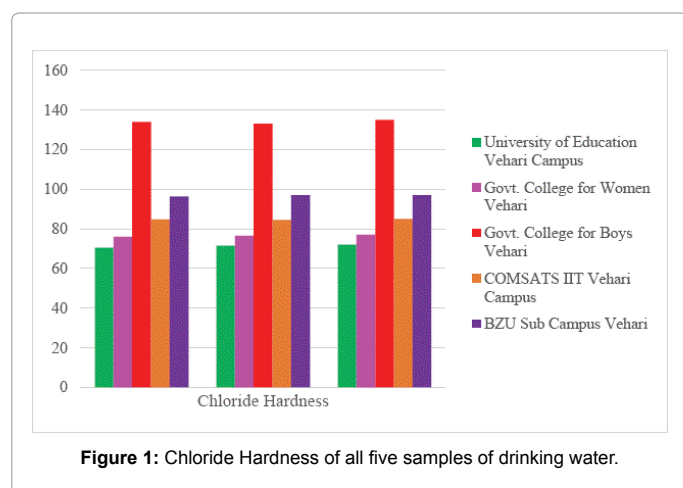
The results of all five samples were; sample-1 has 72 mg/L, sample-2 has 77 mg/L, sample-3 has 135 mg/L, sample-4 has 85 mg/L and sample-5 has 97 mg/L of chloride ions amounts (Table 2, Figure 1). The maximum value of 135 mg/L indicates that sample-3 is unfit for drinking.

No.	Sample	Source
1	Sample-1	University of education, vehari campus
2	Sample-2	Govt. college for women vehari
3	Sample-3	Govt. college for boys vehari
4	Sample-4	COMSATS IIT vehari campus
5	Sample-5	BZU sub campus vehari

**Table 1:** Selection of five different samples of drinking water.

No.	Sample	Source	Chloride (mg/L)
1	Sample-1	University of education vehari campus	72
2	Sample-2	Govt. college for women vehari	77
3	Sample-3	Govt. college for boys vehari	325
4	Sample-4	COMSATS IIT vehari campus	85
5	Sample-5	BZU sub campus vehari	88

**Table 2:** Final values of chloride hardness in five samples of drinking water.



**Figure 1:** Chloride Hardness of all five samples of drinking water.

## Conclusion

After that, the results obtained from these experiments indicated that Sample-3 is very polluted with large amounts of salts which cause its hardness and made it unfit for drinking purposes, because this hardness causes health diseases in humans. The sample-3 contains large amounts of chloride ions which hardened it, as its temperature is also low. Except sample-3, all other four samples are not much polluted and are fit for drinking. So, author recommended to leave the use the sample-3 of Water of Government Post Graduate College for Boys Vehari. While another suggestion, author recommended to use this water after boiling and its chlorination by an expert chemist.

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