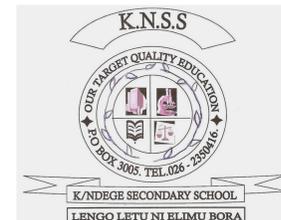




Hardness Of Water In Dodoma Water Supply



Fred Mkomochi, Grace Mussa and Jumanne Mrisho

Introduction:

Dodoma Urban use water from MZAKWE PLANT which hold about 98% of cubic centimeters. Hardness of water is the water which does not readily form rather with soap. As water runs over the soil it dissolves many minerals substance and deposited in lakes and oceans.

Water is essential compound for all living things. Without it life on Earth would be impossible. Scientists looking for signs of life else where in the universe, start is made up of water. There is difficult supply of clean water to every body in Dodoma. Two-third of Earth's surface is made up of oceans and seas. Also two-third of our body is made up of water. Some areas they face a problems of water.



Source of water in Dodoma Urban, may come from;

- Water pipes delivering from a water works.
- Delivering by road tanker.
- Wells and underground source. Eg. Mzakwe resources of water (Dodoma).
- Rivers and streams.

Some areas water is fetched very far from their homes, while some areas water is within their surroundings. After being collected, it is boiled or added chemicals to kill harmful micro-organisms and be safe for drinking or using.

Some areas face a problem of water which lead up to death of some plants and grasses.

Areas with excess of water, carry on irrigation, planting vegetable, plant fruits and animal keeping



Test For Alkanility

PHENOLPHTALEIN ALKALITY:

Pipette accurately 50ml sample to a conical flask of 250 or 300 ml capacity. Add 0.1ml (2 drops) phenolphthalein indicator to sample. Titrate if necessary over a while surface vital standard acid till the faint pink: colour disappears.

TOTAL ALKALINITY by methyl orange indicator method

Add 0.2ml (4 drops) methyl orange to the solution in which the phenolphthalein alkalinity has been determined or to a sample of suitable size, 5c ml, in conical Pipette into another volumetric flask. Pipette into another volumetric flask 50ml of distilled water and add 4 drops methyl orange. This is the reference solution. Titrate the sample with the standard acid and continuously compare the colours in the two flasks as the acid is added, and at the first change of yellow to orange, stop adding the acid. In case the colours of the sample itself disturb the endpoint determination, take 50ml of sample instead of distilled water for your reference solution.

Total hardness

All contains constant total hardness

Calcium

Borehole 1, 3 and 4 are constant Reason- Borehole 2 has more conc. of calcium ions.

Total Alkalinity

Boreholes 1, 2 and 4 are constant reason – Boreholes 3 has less Conc. of total alkalinity.

Chloride

Boreholes 1, 2 and 4 are constant. Reasons –Borehole 3 has more conc. of chloride ions.

Magnesium

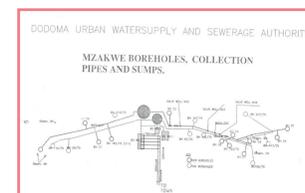
Boreholes 1, 3 and 4 are constant. Reasons – Borehole 2 has less conc. of magnesium ions.

Conclusion

The Dodoma urban water contains more calcium cations, less magnesium ions and chloride ions.

Treatment calcium and chloride is by boiling, chlorination, and other method used to treat hardness of water as mentioned above. Treatment and purification Hard water in Dodoma Urban.

Before use, public water supply it has to be treated. The aim of purification and treatment of hard water is to remove hardness and make it suitable for use.



$$\text{CALCULATION Phenolphthalein Alkalinity as Mg}^1 \text{ CaCO}_3 = \frac{A \cdot N \cdot 50,000}{\text{ml sample}} = 20$$

$$\text{Total Alkalinity as Mg}^1 \text{ CaCO}_3 = \frac{B \cdot N \cdot 50,000}{\text{ml sample}} = 20$$

Where A= ml titrated for sample to reach phenolphthalein end point.
B = Total ml titrated for sample to reach second end point.
N= Normality of standard acid.

NOTE: If total alkalinity is determined on the same solution used for phenolphthalein alkalinity, be sure to include the volume of the acid required for the phenolphthalein titration, A, in the total ml. 3 of standard acid.

TABLE OF INVESTIGATION OF IONS

S/N	SOURCE	DATE OF ANALYSIS	VOLUME USED	TOTAL HARDNESS				CALCIUM				Mg		T. ALKALINITY			P.ALK				CHLORIDE			
				INITIAL	FINAL	CONS. M/S	CONC. Mg/l	INITIAL	FINAL	M/S used	CONC.	DHT l/ltr	CONC. Mg/l	INITIAL	FINAL	M/S used	CONC. Mg/l	INITIAL	FINAL	M/S	CONC.			
1.	BH No. 147/78		50	0.0	27.4	27.4	27.4	27.4	43.2	15.8	63.2	11.6	28.2	0.0	13.0	13	260	NIL	0.0	14.4	14.4	102.01		
2.	BH NO 119/75			43.2	66.8	23.6	36	66.8	80.4	23.6	94.4	00.0	0	54.0	65.0	11	220	1.2	14.4	28.4	14	99.26		
3.	26/79			0.0	24.0	240	240	24.0	37.4	13.4	53.6	10.6	25.76	27.0	36.4	09.4	188	1.2	28.4	54.8	26.4	187.18		
4.	C9			37.4	58.0	20.6	206	58.0	71.2	13.2	52.8	7.4	17.91	36.4	48.8	12.4	248	5.2	54.8	68.8	14	99.26		

Conclusions:

Importance of Hard water in Daily life

Despite the fact that hard water has disadvantageous, but also has a number of benefits. Such as;
Supply calcium compounds required by the body for healthy bones and teeth. The calcium compounds are:
For the formation of animal shells and egg-shells.
Prevents the formation Toxic lead compounds in lead water pipes which are less soluble hard water.

DISADVANTAGES OF HARD WATER

Wastage of soap i.e. much soap is used to make lather with water.
Formation of scum (calcium strearate) on clothes and bath which makes dirty marks on clothes and damage silk and nylon clothes "fur".
Inside all the containers used for boiling the water, forms "fur". The container becomes thick, the fur as a poor conductors of heat, leads to wastage of fuel when boiling the water.
Formation of boiler scales
The scales are poor conductors of heat so it needs a lot of fuel when boiling the water.
Kills any harmful micro-organisms.

References:

CHEMISTRY BOOK 2 Longman
CHEMISTRY BOOKS 1 TIE
JOURNAL ARTICLE DUWASA

Further information:

Download at: www.youngscientists.co.tz/posters