

# Seasonal Variation in Alkalinity of Mansi Wakal Dam of Udaipur District

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**Abstract:** Mansi Wakal Dam is situated in Jhadol tehsil of Udaipur district of Rajasthan. Dam is constructed on the Mansi river of Berach basin, which have capacity of holding 24.4 million cubic meters of water. The main aim of this dam is to supply drinking water to rural areas as well as, water for industrial purpose to Hindustan Zinc. Present study is undertaken to assess the seasonal variation in alkalinity of the Mansi Wakal Dam's water. Alkalinity in natural waters show the capacity of that water to neutralize the acidic medium. The consumption of alkaline water is controversial. The alkalinity of water is not significantly affected by season, but it gets higher along transboundary of the reservoir. Total alkalinity of the surface water of the dam is observed higher during monsoon season than that of winter and summer season.

**Keywords:** Water quality, Alkalinity, Seasonal Variation

## 1. Introduction

Water is regular solvent. Fine quality of water have a brilliant influence at the life and boom of aquatic existence in freshwater bodies. The quality of water, in all aquatic ecosystems in large part depends on the meteorological situations of the area and chemical aspects of the water (Agrawal, 2009).

In natural sources of water the alkalinity is due to rocks and soil which contains carbonates, bicarbonates, borates, phosphates, silicates and hydroxide compounds. Alkalinity is essential for aquatic fauna as it acts as shield against swift changes in pH of water system. The presence of carbonates in water contributes to the buffering system in water body. The alkalinity of water is not significantly affected by season, but it gets higher along transboundary of the reservoir.

Chemical traits of water not simplest have an effect on the physical properties of the medium but additionally exert giant effect on the distribution and metabolic activities of aquatic organisms, which in turn can alternate the chemical propertieess of water in due route of time APHA, (2005).

Alkalinity in natural waters show the capacity of that water to neutralize the acidic medium. The consumption of alkaline water is controversial. On the basis of productiveness, water bodies are classified as oligotrophic, mesotrophic, eutrophic and dystrophic water bodies (Sharma, 2010).

Natural water is particularly vulnerable to the inputs of chemical pollutants (Etesin *et al.*, 2013).

The Mansi Wakal Dam is constructed on river Mansi of Berach Basin, and is situated in Jhadol tehsil of Udaipur, Rajasthan. The main aim of the dam is to supply water to rural areas for drinking and 30% of water to Hindustan Zinc industrial uses. Present study is undertaken to assess the seasonal variation in alkalinity of the Mansi Wakal Dam's

water, because monitoring of physico-chemical quality of water is the first step which can lead to manage and conserve the aquatic habitat.

## 2. Materials and Methods

Morphometric features of Mansi Wakal Dam are depicted in (Table 1). To assess alkalinity water samples were collected seasonally (winter, summer, and monsoon) from the three stations of Mansi Wakal dam and were analysed in the research laboratory. Alkalinity is estimated by using standard method (APHA, 1998):

Acid titrant method was followed for the estimation of total alkalinity. For this purpose 50 ml of water sample was treated with a few drops of phenolphthalein indicator. The appearance of pink colour indicates presence of carbonate alkalinity. This was titrated against 0.02N H<sub>2</sub>SO<sub>4</sub> until the colour disappeared. For estimating bicarbonate alkalinity a few drops of methyl orange indicator were added to the same sample and titrated again with 0.02 N H<sub>2</sub>SO<sub>4</sub> until the yellow colour changed to faint orange (yellowish pink). Total alkalinity was derived using the formula:

$$\text{Total Alkalinity (mg/l)} = \frac{\text{Volume of standard H}_2\text{SO}_4 \text{ used} \times 1000}{\text{Volume of sample water used}}$$

**Table 1:** Morphometric features of Mansi Wakal Dam

Morphometric features	Description
Longitude	73.487928°E
Latitude	24.476518°N
Gross capacity	226.73 sq. km
Live capacity	862 Mcft
Average Annual Yield	466 Mcft.
Type of Dam	Masonry

## 3. Result and Discussion

The imperfection and inadequacy of our knowledge of water resources become increasingly apparent (Gleick, 1996).

The seasonal and statistical variation observed at the three stations of Mansi Wakal Dam is listed in table 2.1 whereas Mean values are summarized in table 2.2. The highest value of alkalinity calculated is 180 mg/l during monsoon season and lowest calculated is 140 mg/l during summer season. By statistical analysis (applying CRD ANOVA) the mean values for station 1, 2 and 3 are between 115-140 mg/l. it reflects the tolerable alkalinity.

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**Table 2.1:** Values of alkalinity calculated at three stations of Mansi Wakal Dam in Three Seasons:

Location	Season	Station	Alkalinity (mg/l)
Mansi Wakal Dam	Monsoon	1	180
		2	160
		3	175
	Winter	1	160
		2	150
		3	155
	Summer	1	150
		2	140
		3	140

**Table 2.2:** Statistical variation and Mean values for alkalinity at the three stations of Mansi Wakal Dam

S. no.	Levels	Total Alkalinity
1	1	137.46
2	2	126.70
3	3	118.59
	GM	127.58
	SE	1.44
	CD5	4.29
	CD1	5.88
	CV	3.39

#### 4. Conclusions

Alkalinity of Mansi Wakal dam is found within permissible limits. The present study results that water of Mansi Wakal dam can be appropriate for drinking, domestic usage, agriculture and industrial purpose, and also for fish culture, without any scientific treatment. However regular management of water quality is required for further consumption and conservation of Mansi Wakal Dam water.

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