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SEASONAL VARIATION IN PHYSICO – CHEMICAL PARAMETERS OF SURFACE WATER IN NILWANDE DAM OF AKOLE TEHSIL, AHMEDNAGAR DISTRICT, M.S.(INDIA)

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Short Profile

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ABSTRACT:
Nilwande Dam is a major irrigation dam. The water in Nilwande Dam is used for irrigation, fish culture, drinking and domestic purpose. The present investigation deal with the study of seasonal variationof physico-chemical parameters of Nilwande Dam surface water. The study was carried out during pre-monsoon and post-monsoon season. The parameters such as pH, Electrical conductivity, Calcium, Sodium, Potassium, Chloride, Sulphate etc. were assessed. It was found that all parameters are within the permissible limits as per prescribed by WHO.

KEYWORDS
Physico – Chemical Parameters , Nilwande Dam , Seasonal Variation .

INTRODUCTION :

Water is most needful in Ecosystem. Organism cannot survive without water. Plenty of water is present over the surface of earth. Water is in the form of ice, rain, lake, ocean, glaciers; wells etc. Only 1% fresh water is available on earth for drinking, agriculture, industrial and domestic use. Only rain water has nearest approaches to clean and pure water. Water is excellent solvent for inorganic chemicals and picks up impurities easily. When an ecosystem gets polluted, the natural balance in the system is disturbed. Natural phenomena such as volcanoes, algae blooms, storms and earthquakes also cause major changes in water quality and ecological status of water. In monsoon, due to runoff; water gets dissolved mineral from soil. So mineral gets dissolved in water, which affects physico-chemical parameters of water. So entire eco-system gets disturbed. Due to unfavorable alteration of surrounding, environment is changing continuously. When the concentration of chlorine increases in stagnant water then chlorine decomposes the organic matter to form hypochlorous compound and water becomes polluted.

Very few works like Rohit Muthe et.al. (5) Has studied on water quality of Nilwande Dam, hence the work is undertaken to know seasonal variation in physico-chemical parameters. Water of Newlands Dam is supplied to several areas of Ahmednagar District especially to north/south region. The physico-chemical parameters are altered or moulded due to the activities of the aquatic biota particularly the metabolism of the aquatic organism. Any alternation in the environmental parameters may be bringing in an undesirable aquatic condition which may lead to the aquatic pollution. Hence need to study the change in physico-chemical parameters of Nilwande Dam water.

STUDY AREA-

Akole tehsil is full of Historical places like Kalsubai peak, the highest peak in Maharashatra, Ratangad, WilsonDam, Amruteshwar Temple,Harishchandragarh, Nilwande Dam, etc. A full of bio-diversity is observed in and near Nilwande dam. Nilwande Dam is a Government project constructed over the River Pravara in Akole Tehsil Dist Ahmednagar M.S. (India). The Dam is situated at the one end of Ahmednagar District near to Western Ghats region in valley of Sahyadri Mountains Region. Nilwande Dam is situated 180 K.M. away from Ahmednagar city and 60 K.M. away from Ghoti (National highway No.3). It lies between $19^{0}32^{1}53.4^{11}$N and $73^{0}54^{1}04.4^{11}$ E longitude and altitude. Nilwande Dam is elevated from mean sea level 715 ft.Nilwande Dam is full of water; water is used for irrigation, fish culture, drinking, domestic and power generation.

GEOGRAPHICAL LOCATION–A SATELITE VIEW

MATERIAL AND METHOD-The sample bottles were cleaned by soap solution and then treated with 5% HNO_3 acid over a night and finally washed with de-ionsed water repeatedly to avoid contamination. The surface water samples were collected from Nilwande Dam from in one liter size plastic bottles as per norms of the APHA (4) in the morning session. All the experiment was done within 24 hrs. of the sampling. The pH, E.C., were recorded at the time of sample collection by using digital pH meter and digital conductometer respectively. Other parameters like Calcium, Magnesium, and Chloride etc. were estimated in the laboratory by using Indian standard procedure.

RESULT AND DISCUSSION –

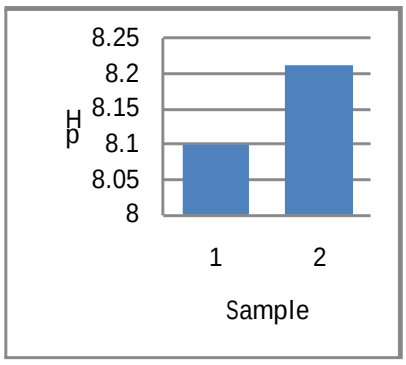
Post-monsoon (Dec - 2014)
Table No. 1

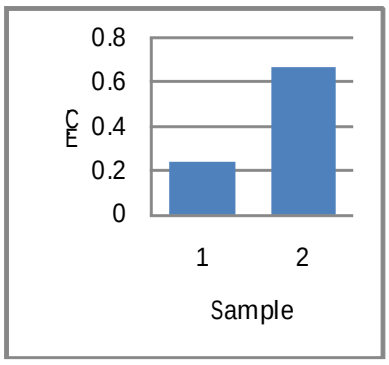
Particulars	Test Values/Unit	
	S_1	S_2
pH	8.73	8.19
E.C.	0.15dsm^{-1}	0.16dsm^{-1}
Calcium	100.00 P.P.M.	100.00 P.P.M.
Magnesium	100.00P.P.M.	100.00P.P.M.
Sodium	24.50 P.P.M.	21.50 P.P.M.
Potash	0.33P.P.M.	0.36P.P.M.
Carbonate	0.00meq/L	0.00meq/L
Bicarbonate	4.01meq/L	3.66meq/L
Chloride	2.14meq/L	2.56meq/L
Sulphate	23.66meq/L	25.46meq/L
Sodium Absorption Ratio	4.12meq/L	4.01meq/L

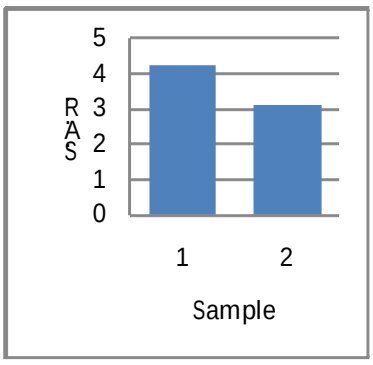
Pre–monsoon (May- 2015)
Table No. 2

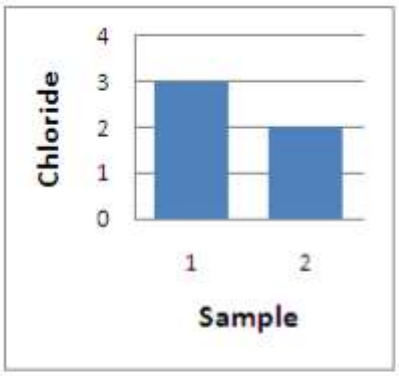
Particulars	Test Values/Unit	
	S_1	S_2
pH	8.10	8.21
E.C.	0.24 dsm^{-1}	0.67dsm^{-1}
Calcium	100.00 P.P.M.	110.2 P.P.M.
Magnesium	100.00 P.P.M.	91.4P.P.M.
Sodium	20.15 P.P.M.	21.7 P.P.M.
Potash	0.32 P.P.M.	0.70P.P.M.
Carbonate	---- meq/L	0.00meq/L
Bicarbonate	4.12meq/L	5.3meq/L
Chloride	3.00 meq/L	2.01meq/L
Sulphate	28.60meq/L	11.4meq/L
Sodium Absorption Ratio	4.20meq/L	3.12meq/L

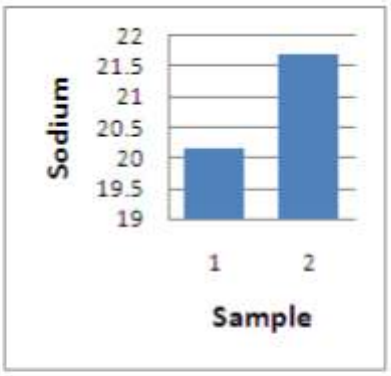
GRAPHICAL PRESENTATION - Pre–monsoon (May- 2015)

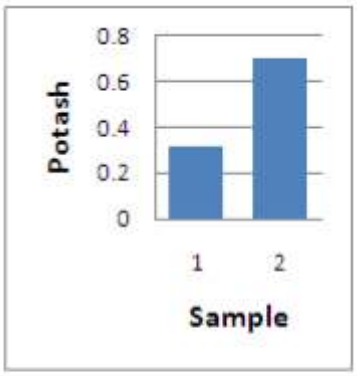


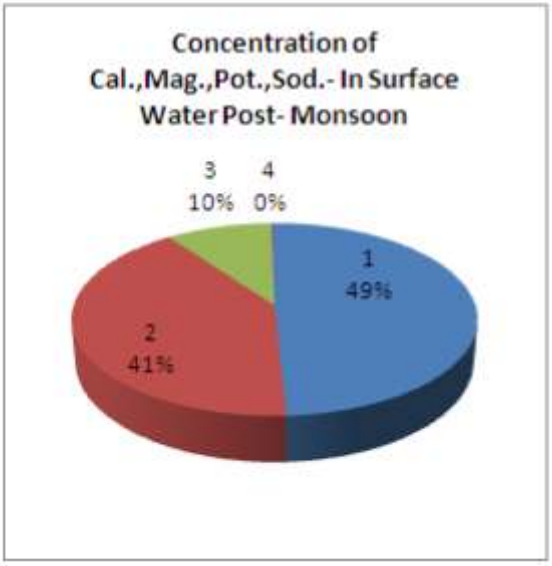


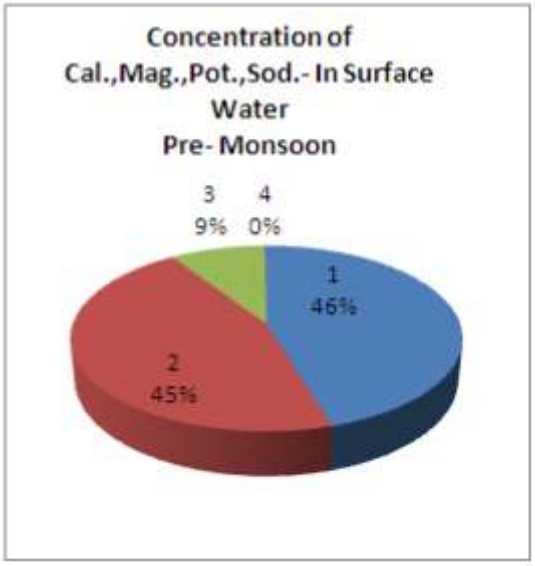












RESULT AND DISCUSSION –

The result of Surface water quality assessment in terms of physico -chemical parameters are summarized in Table no. - 1 and Table no. - 2.

In the present investigation, pH values vary between the ranges 8.10 to 8.73.It was too highest in Post Monsoon at S_1 and lowest in pre-Monsoon at S_1. The pH values in Post Monsoon are slightly alkaline at station S_1. The alkaline nature of water is due to presence of CO_2 in water. All values of pH are within the prescribed limits as per norms of WHO.

In the present investigation, the Electrical Conductivity varies from 0.15 to 0.67dsm^{-1} .The lowest recorded Electrical Conductivity was noted in post -monsoon season at S_1. Electrical conductivity is a measure of water capacity to convey electric current. At most the salts in the water are present in the ionic forms, capable of conducting current. Higher is the value of Electrical conductivity higher is the concentration of ion present in water. Electrical conductivity is directly proportional to its mineral matter content. All values of Electrical Conductivity are within the prescribed limits as per norms of WHO.

In present investigation, the values of Chlorides ranges from 2.01mg/l and 3.00 mg/l. Chlorides

are found in practically all natural waters. This is the most common inorganic anion present in water. The maximum values were recorded in pre-monsoon season. The lowest values of Chlorides were recorded in pre monsoon season at S_1. All values Chlorides of are within the prescribed limits as per norms of WHO.

In present investigation, the values of Calcium were in the range of 110.2 to 100.00 p.p.m. in post monsoon as well as in pre-monsoon respectively. At station – I the seasonal studies showed that calcium ranges between 110.2 to 100 p.p.m. in pre- monsoon season. For station- II calcium values ranges between 100.0 to 100 p.p.m. during post-monsoon. Higher concentration of calcium directly related to hardness of water. All values of Calcium are within the prescribed limits as per norms of WHO. In present investigation, Sodium concentration was found in between ranges 21.15To24.50 mg/l. sampling site show higher concentration of Sodium in post monsoon season. Lower concentration Sodium was recorded in pre - monsoon season. Sodium is dietary need of human being. Concentration of Sodium must be kept at minimum level in human body. Higher concentration of Sodium may cause health problem to human being. All values of Sodium are within the prescribed limits as per norms of WHO.

In present investigation, Potassium values range from 0.70 P.P.M.to 0.32 P.P.M. The lowest values of Potassium were recorded in pre- monsoon season. Higher values of Potassium were recorded in pre- monsoon season. Potassium is a dietary need of human being. All values of Potassium are within the prescribed limits as per norms of WHO.

In present investigation, the Sulphate values range from 11.4 meq/L to 28.60 meq /L. Higher values of Sulphate were recorded in pre- monsoon season. Lower values of Sulphate were recorded in post monsoon season. Sulphate occurs naturally in water as result of leaching from gypsum and other common minerals. All Sulphate values of are within the prescribed limits as per norms of WHO. The consumption of drinking water containing high amounts of magnesium or Sodium Sulphate may result in intestinal discomfort, diarrhea and consequently dehydration.

CONCLUSIONS -

The present study show detailed physico-chemical characteristics and quality of surface water of Newlands dam of Akole Tehsil (M.S) India becomes pure and useful for drinking, fish culture, domestic and agriculture. The physico–chemical parameters of surface water of Nilwande dam are within permissible limits prescribed by WHO.

RECOMMENDATIONS –

The researcher would like strongly to recommend that Nilwande dam surface water is pure and suitable for irrigation, domestic and drinking purpose.

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