

Comparative Study of Physico-Chemical Aspects of Ponds in Palghar Taluka, Palghar District, Maharashtra State, India

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Abstract:

Ponds are the important freshwater habitat at landscape level and it plays critical role in maintaining biodiversity. When water quality is poor it badly affects not only aquatic ecosystem but also effects on the surrounding ecosystem. Ponds are intricate ecosystems that require constant monitoring and care in order to remain healthy. Water contamination is growing increasingly problematic nowadays. Nowadays, water pollution is becoming more serious. To find the solutions out of it, study of pond water condition and pollution by checking different parameters is important. The objectives of this study were to track variations in water quality parameters of Palghar ponds in order to assess their status and suitability from a portability and aquaculture perspective, as well as to compare observed levels of studied parameters to corresponding World Health Organization (WHO) guidelines for drinking-water, pisciculture and Agriculture. The present paper deals variations in physico -chemical parameter of three different ponds in Palghar taluka which includes Ganesh kund, Navalitalav and Mahimtalav during September 2017 to April 2018. Physico-chemical parameters for water sample such as pH, temperature, electrical conductivity, total hardness, acidity, alkalinity, dissolved oxygen, Biological oxygen demand and Chemical Oxygen demand are analyzed using standard methods. As compared to other two ponds, Ganeshkund was the most polluted, and recorded highest values for pH, Hardness, Acidity and COD due to excessive use of the pond for dumping of household wastes into it by locals. The water level in Navali Talav is not yet at the pollution mark, but the rising trend should be cause for concern; otherwise, it will soon exceed the pollution level, making it unsafe to use. Hence, conservation and pollution prevention is needed to maintain water quality.

Key words: ponds of Palghar, water quality, physico -chemical parameters, World Health Organization's standards.

Introduction:

Ponds are an integral component of the hydrological system and perform diverse roles in the biosphere. Even though, ponds are playing important role, very little investigative reports are available for study of water quality of ponds present in Palghar taluka, probably due to their size. In the absence of any research work on pond environments in Palghar it is hard to arrive at conclusion scientifically about their current status. Through this research project a preliminary attempt has been made to throw light on the health of ponds in Palghar taluka. This paper deals with study of water quality of ponds in Palghar taluka. Agriculture and fishing are the most important activities in this taluka. To carry out both these activities, the Palghar population depends upon three main pond of Palghar, viz., Ganesh kund, Navali talav Mahim talav. Study of physico-chemical parameters like pH, temperature, electrical conductivity, total hardness, Acidity, Alkalinity, Dissolve Oxygen (DO), biological oxygen demand (BOD), chemical oxygen demand (COD) was carried out. All parameters performed on samples using given standard

methods. The determined values are compared with standard values given by World Health Organizations (WHO) and Bureau of Indian Standards (BIS).

Material & methodology:

The present research work was carried out to determine pond water quality of three ponds of Palghar Taluka of Palghar district, Maharashtra state. The collection of samples and experiments were done during September 2017 to April 2018 from Ganesh kund, Navali talav, Mahim talav respectively. Monthly samples were collected to analyze physico chemical parameters of the site, a thermometer and a digital pH meter were used to record the temperature and the pH of the pond water respectively. For rest of the analysis, water samples were carried to the laboratory. In the laboratory, DO is followed by Winkler's method. To measure free CO₂, titrimetric method was followed by me.

Most of the time to check the all parameters such as **pH, Temperature, Hardness, Alkalinity, Acidity, Electrical conductivity, Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD) and Dissolved oxygen etc.**, standard methods prescribed by ASTM (2003)^[3] and APHA (1985)^[1], Trivedy and Goal (1986)^[12], Kodarkar (1992)^[9] were used.

Results and Discussion:

The ranges of mean values were obtained after analysis of three water samples, for water temperature (29-31°C), pH (7.32-7.89), electrical conductivity (391.9-422.1µmho/cm), total hardness (52-166mg/l), acidity (12-24mg/l), alkalinity (134-230 mg/l), dissolved oxygen (4.06-4.09mg/l), BOD (4.07 -4.83mg/l) and COD (10-14.56mg/l). The data was subjected to various statistical analysis in order to investigate the significant relationship among these parameters. The pH values are following WHO's standard limits. Total alkalinity exceeded the WHO standard in all ponds. In the progress of summer, dissolved oxygen decreased due to increase in temperature and also due to increased microbial activity shows the variation in DO of pond water. The permissible value recommended for biological oxygen demand is 5mg/L as per Indian standard and standards given by WHO. Most of the ponds in the study area showed high BOD which may be due to the increased solubility of oxygen at lower temperature. The optimum COD value of fishponds to be between 80 and 100 ppm. However, the standard limit set by WHO is 10 ppm, but two ponds exceeded the WHO standard. COD showed highly significant positive correlation with pH, chlorinity and salinity. As compared to other two ponds, Ganesh kund was the most polluted, and recorded highest values for pH, Hardness, Acidity and COD due to excessive use of the pond for dumping of household wastes into it by locals.

Table no.1: Data obtained after completion of experiments:

Ponds(Sample Water)/ Parameters	Ganesh Kund	Navali Talav	Mahim Talav
Ph	7.89	7.48	7.32
Temperature (°C)	31	29	30
E.C.(µmhos/Cm)	422.1	429.6	391.9
Total Hardness(Mg/L)	166	102	52
Alkalinity(Mg/L)	230	190	134
Acidity(Mg/L)	24	22	12
Do2(Mg/L)	4.09	4.08	4.06
Bod(Mg/L)	4.07	4.26	4.83
Cod(Mg/L)	14.56	12.54	10

Graphical representation of obtained data:

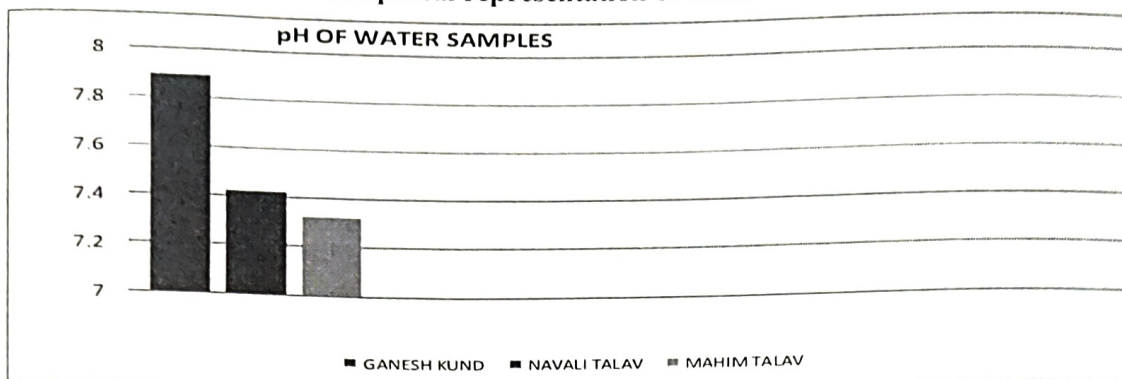


Fig.1: GRAPH SHOWING pH OF WATER SAMPLE

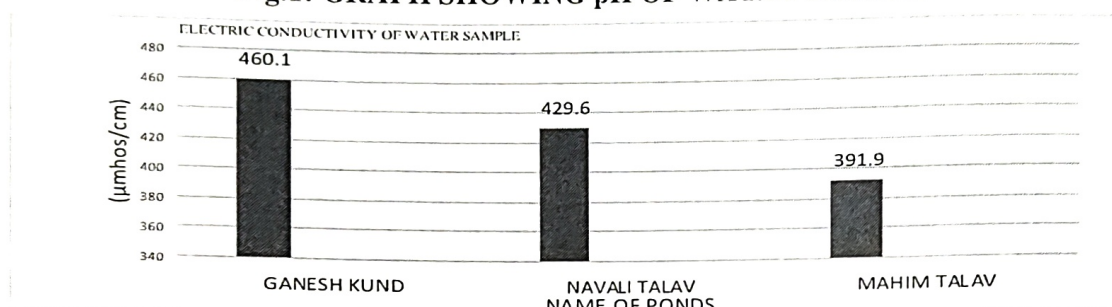


Fig.2: GRAPH SHOWING E.C OF WATER SAMPLE

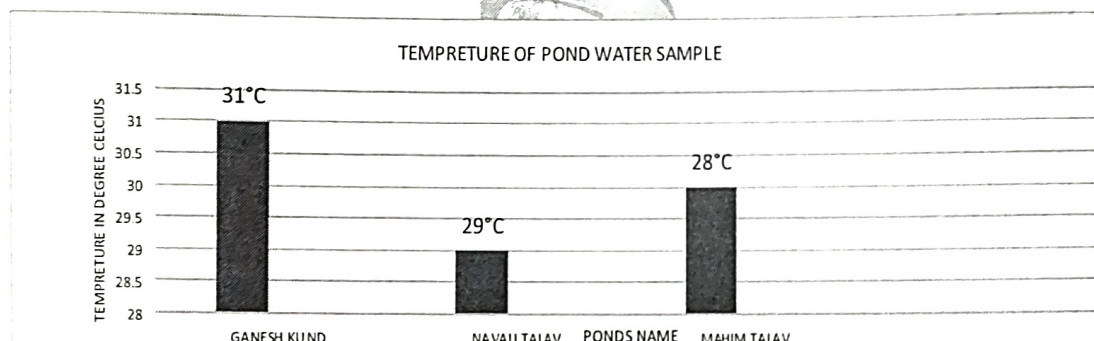


Fig.3: GRAPH SHOWING TEMPRETURE OF WATER SAMPLE

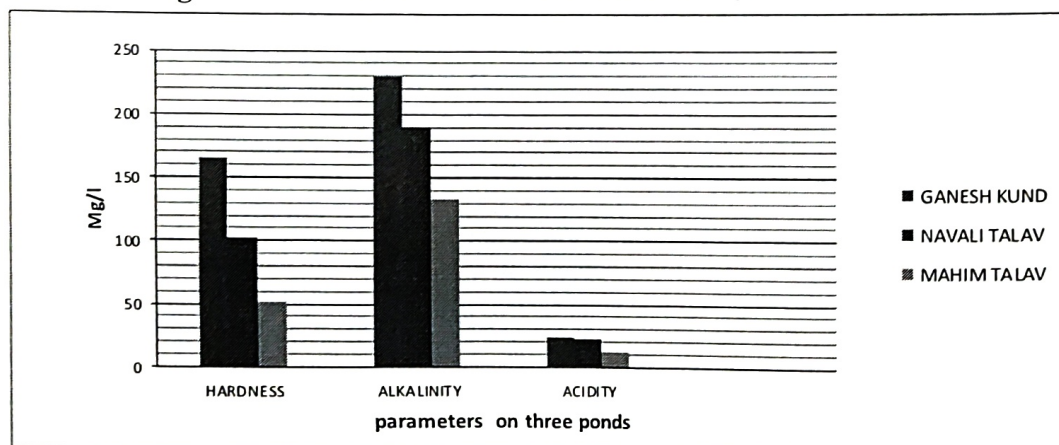


FIG.4: HARDNESS ,ALKALINITY ,ACIDITY OF THREE PONDS

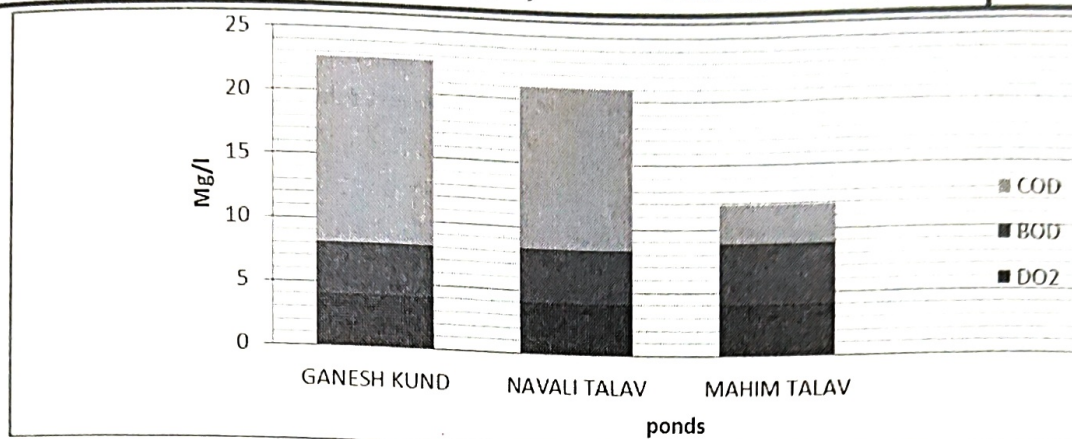


FIG.5: DO2, BOD, COD OF THREE PONDS

Conclusion:

Among all the studied ponds, Ganeshkund was the most polluted, and recorded highest values for pH, Hardness, Acidity and COD. It was due to excessive use of the pond by the local people and dumping of household wastes into it. Navali Talav water level is not up to the pollution level but the increasing trend are need to be of concern if this trend fallow, soon the level will increase and this pound will become unsafe for human use. Thus, the present study forms a platform for the future remedial work for the pond water health maintenance in Palghar taluka. However, it was also noticed that the most of the pond-banks are liberally utilized as dumping grounds for residential and agricultural wastes. This may lead to water pollution and serious health problems in future for the village community.

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