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Study of Physico-Chemical Characteristics of ponds in Gohana District (Haryana)

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Abstract: This Paper Present to study of the Physico-chemical Parameters of ponds in Gohana District (Haryana) . Water samples were collected monthly from surface water and analyzed for Temp, pH, electric conductivity, total hardness, Alkalinity, TDS (Total dissolved solid), chloride, DO (Dissolved oxygen). This study was aimed to estimate current status of Physico-chemical chararacterstics.

Keywords: Water sample, physico-chemical parameters, pollution, aquatic organisms.

Introduction :

Water quality refers to the elements of water that must be present for aquatic organisms to thrive. The productivity of a water body is determined by its physico-chemical properties. Dissolved oxygen, hardness, turbidity, alkalinity, nutrients, temperature, and other factors all influence how well a water body grows. Other metrics, such as biological oxygen demand and chemical oxygen demand, on the other hand, show the extent of pollution in a certain water body. Various chemical characteristics are present at low amounts in most water bodies. However, discharged waste water from residential areas, sewage outlets, solid wastes, detergents, motor oil wastes, fishing facilities, and agricultural pesticides from farmlands damage the water in ponds, lakes, and rivers [3]. Water supplies are depleting at a quicker pace every day as a result of increased urbanisation and population growth. The degradation of water quality has become a major issue. Increasing water pollution not only affects water quality but also poses a threat to human health, aquatic ecological balance, economic development, and social prosperity. As a result, it is critical to take the first step in implementing an acceptable quality management system.

Materials And Methods

The physico-chemical characteristics of water is important determinant of the aquatic system. Their characteristics are greatly influenced by climatic vegetation and general composition of water. The water samples were collected from different sites in plastic bottles and transported immediately to the laboratory in bottles to avoid unpredictable changes in different physico-chemical parameters.

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Study Area

In present study involves the analysis of water quality in terms of Physico-chemical parameters of of ponds in Gohana District (Haryana)

Sample Collection:

The water samples were collected from 25 sampling sites / villages situated at different places of Gohana District (Haryana). The samples were collected in the winter season in the month of February 2019. The samples are collected during the morning hours 10-12 am. Villages under study is as follows:

Aanwali, Ahmadpur Majra, Bali Barhana, Barota, Bhainswal Kalan Bawala, Bhainswal Kalan Mithan, Bichpari, Bilbilan, Busana, Butana Khetlan, Butana Kundu, Chhatehra, Chichrana, Farmana, Gangana, Gangesar Gaumana Mundlana, Katwal, Kheri Damkan, Kiloi, Lath, Mundlana, Mohra Barota, Rukhi, Sikanderpur Majra, Nagar.

To analyze the water quality samples were collected in 1 ltr bottles from each sampling point before sampling, the bottles were cleaned and washed with detergent and dilute nitric acid. The bottles were finally rinsed with de-ionized water and dried in sun light.

PHYSICO CHEMICAL ANALYSIS OF VILLAGE PONDS:

Physical Parameters:

1. Odour: Odour of water was measured by sense organs i.e. knows on the spot.
2. Colour: It is also measured by sense organs i.e. naked eyes on the spot.
3. Temperature: It was measured by using calibrated mercury thermometer.
4. Turbidity: It was measured by using Turbidity meter.

Sample collection

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Turbidity Procedure:

a) Instrument was calibrated before each use.

b) It was allowed sufficient warm up period after switching on the instrument.

c) Test tube was taken with distilled water or blank solution, it was placed in the test tube holder and close the test tube holder cover. It was assured that the mark on the test tube coincides with the mark on the panel.

d) Display was adjusted to 00.0 by adjusting the set zero" knob.

e) Now in another test tube, standard suspension was taken. The range of instrument was put to appropriate range. For 0-200 NTU range 100 NTU solution was used for higher range (0-1000 NTU), 100 NTU and 400 NTU solutions were used as standard. Then test tube was put in the test tube holder.

f) Reading was taken and display was set to the value of standard suspension with the calibrate knob.

g) Again, the display zero was checked with test tube containing distilled water.

h) For measurement of turbidity less than 200 NTU the sample was thoroughly shaken, waited until bubbles disappeared. The range was switched to 200 NTU and put the sample into the test tube. Then, reading was directly taken from the digital display.

i) For measurement of turbidity above 200 NTU, the range was switched to 1000 NTU, reading of the sample was taken.

pH:

It is defined as the decimal logarithm of the reciprocal of hydrogen ion activity in a solution. In Chemistry it is a scale to specify how acidic or basic a water sample is. The acidic sample have a lower pH while the basic solution have a higher pH. Pure water has pH of 7 at room temperature, i.e. neither acidic nor basic. We calculate the pH by using pH meter.

Procedure:

a) The instrument was caliberated before each measurement.

b) The electrode was rinsed with distilled water and dried with soft tissue paper.

c) The electrode was diped in sample water and reading was noted.

Conductivity:

It is a measure of water capability to pass electrical flow. It depends on the concentration of ions in the water. More the ion present higher is the conductivity of water. Distilled water can act as an insulator due to its very low conductivity. This conductivity ions comes from

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dissolved salt and inorganic materials like alkalies, chlorides, sulfides and carbonates compounds.

Procedure:

a) The instrument was calibrated before each measurement.

b) The electrode was dipped in water.

c) The reading was noted from the screen of conductivity meter.

d) Switch off the meter and removed and washed the electrode.

TDS (Total Dissolved Solids):

Combine the sum of all ions particals that are smaller than two microns includes all the disassociated electrolytes that make up salinity concentration and other compounds like dissolved organic matter. At most fresh water can have 2000mg/ltr of TDS and most sources should have less than that. TDS can affect water taste and often indicates a high alkalinity or hardness.

Fig 3.4 : Digital Conductometer

Results :

S. No	Samples	Odour	Colour	Temperature(C)	TDS (mg/L)	Electrical Conduct	pH
1	Aanwali	--	--	17.6	890	-007	7.15
2	Ahmadpur Majra	Odourless	Clear	17.6	131	-028	7.50
3	Bali Barhana	Odourless	Light green	17.5	608	-014	7.43
4	Barota	Unpleasent	Dark green	16	984	-065	8.51
5	Bhainswal Kalan	Odourless	Light green	17.6	969	-010	7.23
6	Bhaiswal Kalan	Odourless	Clear	17.4	172	-010	7.18
7	Bichpari	Odourless	Clear	17.7	432	-014	7.30
8	Bilbilan	Odourless	Clear	17.5	612	-015	6.60
9	Busana	Algal smell	Dark green	17.7	109	-035	8.04
10	Butana Khetlan,	Unpleasent	Dark brown	17.3	365	-008	7.33
11	Butana Kundu	Algal smell	Light muddy	17.4	325	-013	7.35
12	Chhatehra	Odourless	Light brown	17.6	730	-035	8.09
13	Chhichrana	Unpleasent	Dark green	17.7	462	-009	7.32
14	Farmana	Unpleasent	Dark green	17.4	117	-005	7.21
15	Gangana	Unpleasent	Dark brown	17.6	106	-009	7.39
16	Gangesar	--	--	17.7	196	-006	7.18
17	Gaumana	Unpleasent	Green	17.4	909	-003	7.28
18	Katwal	Unpleasent	Yellowish	17.6	749	-012	7.44
19	Kheri Damkan	Odourless	Clear	17.5	975	-009	7.15
20	Kiloi	Odourless	Yellowish	17.5	146	-028	8.00

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21	Lath	Unpleasent	Dark Green	17.5	129	-010	7.43
22	Mundlana	Odourless	Light Yellow	17.4	540	-016	7.34
23	Mahra	Unpleasent	Green	17.5	723	-013	7.60
24	Rukhi	Odourless	Light Brown	17.7	887	-011	7.37
25	Sikanderpur Majra	Odourless	Light Green	17.6	630	-021	7.21

Table 1 : Values of Physical Parameters of Village Ponds in Gohana Block

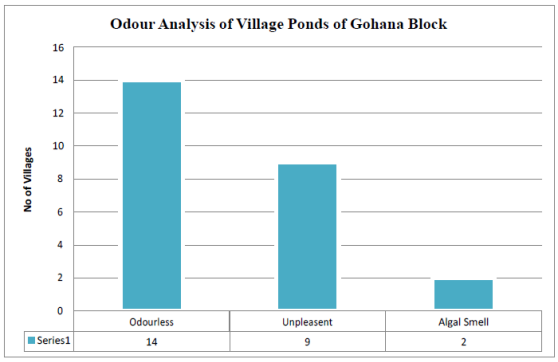

Fig. Analysis of Odour of Village Ponds in Gohana

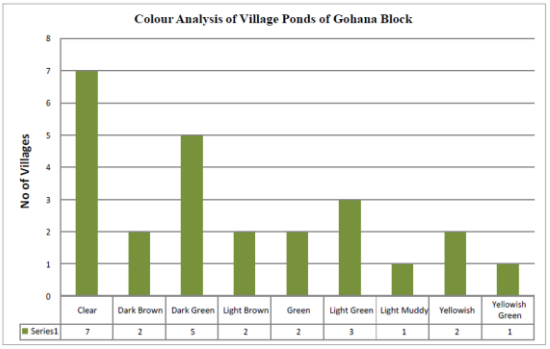

Fig. Analysis of Colour of Village Ponds

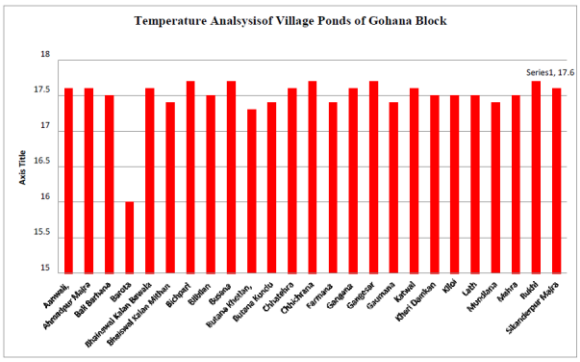

Fig : Analysis of Temprature of village pond

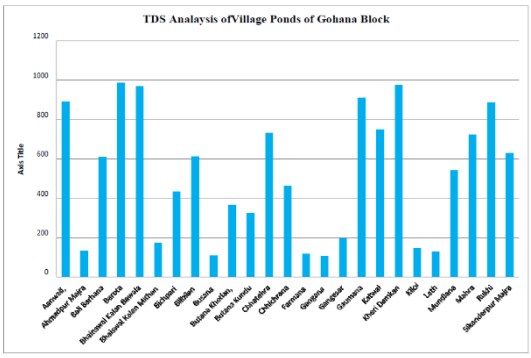

Fig : Analysis of TDS of village pond

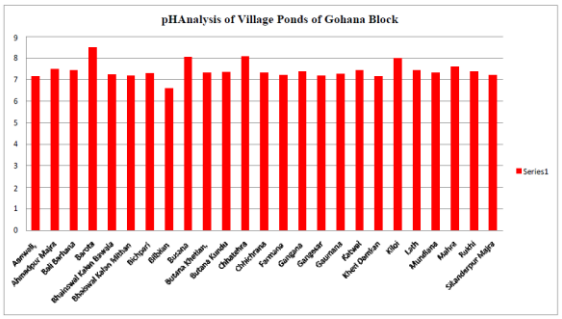

Fig : Analysis of pH of village ponds

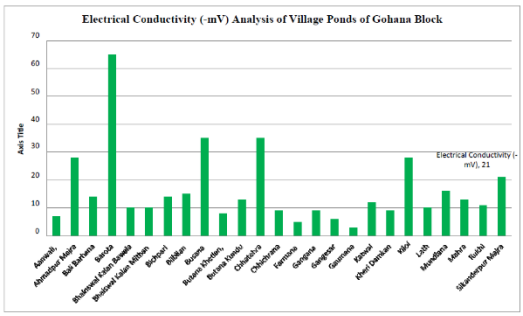

Fig : Analysis of Electrical Conductivity

Discussion

To check the water quality we use to analyze the physico - chemical properties to determine its pollution status. As ponds plays an important role in villagers life, so the water needed to be tested regularly. We analyzed 25 village ponds of Gohana Block, Sonepat District, Haryana. Temperature also plays an important role in the determination of various other parameters like pH, Conductivity, Saturation level of gases and various form of Alkalinity. Due to change in the atmospheric temperature, the temperature of water also changes. According to Welch (1952) smaller water bodies react quickly with the change in the atmosphere as compare to arger water bodies. In summer due to bright sun shine and high temperature, the process of decay of organic matter resulting into the liberation of large quantities of CO2 and nutrients, on the other hand rise in temperature of water leads to the speeding up of the chemical reaction in water, which reduces the solubility of gases and amplifies the taste and odour.

Colour of water bodies also effect various activities as it prevents penetration of light through water and affects the photosynthesis of phyto planktons.

Algal growth takes place in water bodies imparts light green or dark green colour to it. Colour in natural water may occur due to presence of ions such as iron or manganese, suspended matter, weeds and industrial waste, highly coloured water are rejected for drinking purposes.

Conductivity shows the amount of total soluble salts in water. It reflects the nutrients status of the water. Through this study and experiment done above the electrical conductivity of the samples fall in the range of -003 mV to -065 mV. The value below 250mV is normal. By analyzing the result of various samples of village ponds of Gohana Block, they all have permissible value of electrical conductivity.

pH is a scale to specify how much acidic or basic a water sample is? The decrease in the pH during winter may be due to decrease in the process of photo synthesis. Maximum values during summer may be due to increase photo synthesis of algal bloom. The pH of value ranges from 6.60 to 8.5. The value of pH was found to be in normal range when compared with Indian Standards.

TDS represents the ‘Total Dissolve Solids’ present in water. The TDS value of 25ponds ranged from 106mg /L to 984 mg/L. The value of TDS was found to be fall in permissible range.

CONCLUSION:

After analyzing the various water samples collected from the villages of Gohana Block, District Sonepat, it was reported that Algae was present in most of the ponds due to which it

imparts green colour to the water. In some villages like Barota, Busana, Chichhrana, Farmana, Lath and Sikanderpur Majra, high Algae is reported, giving an unpleasant smell to the water. Pond temperature of most of the villages was in the range of 17.3oC to 17.7oC. Lowest temperature was recorded in Barota (16oC). Total dissolved solids (TDS) range from 106ml/L to 984 mg/L. Gangana had minimum value of TDS i.e. 106 mg/L and Barota had maximum value of TDS i.e. 984 mg/L. Electrical conductivity of the samples range from -003 mV to -065 mV. Minimum value of Electrical conductivity was measured in Gumana (-003mV). A maximum value was reported in Barota. When pH was analyzed it was found that most of the samples were slightly basic except Bilbilan village which had acidic pH of value 6.60. After doing all studies it was found that Barota had the most polluted water in the Gohana Block of Sonepat District (Haryana).

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