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Study on soil analysis in ponds in the Sabang block areas, West Bengal, India

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Abstract- Bacteria live in fresh water, soil, air and sea water. Bacteria have different nature in different zone. Thus periphyton bacteria has different characteristic in different zone. But I discussed in my topic soil analysis in fresh water ponds in Sabang block areas. I have done the experiment about one year in Sabang block areas. Soil collected by the bucket. This collected soil is collected from five ponds (Ghat pond, Dhara pond, Majari pond, Nandan pond & Masanta pond) in Sabang block areas. There were two types of pond present Control pond and Experimental pond. In this pond was added the semidried cow dank. In this experiment we are followed the some methods. The pond bottom soil was analyzed for nitrogen, available phosphorus and available potassium following the standard methods of AOAC (1980). In all the experimental ponds before treatment however, after treatment the nitrogen level increased considerable. Phosphorus plays significant role in enhancing the productivity of pond. Potassium is not limiting factor and is not necessary to increase production.

Keywords: *Soil analysis, nitrogen, phosphorus, potassium, ponds.*

I. INTRODUCTION

This physic-chemical is changed in soil by the variable factors. Plankton develops by the physic-chemical changes in pond soil significantly. This change involves the low and high temperature in the water body. Low and high level of pH is changed by the physic-chemical process. Dissolved oxygen decides the fresh water quality in the ponds. Its' maintain the water health. Free carbon dioxide in the pond is changed in the water by every factor. Physic-chemical change the conductivity of water after and before use of bacterial suspension. Fish growth and fish quality depends on the before and after use of bacterial suspension, physic-chemical quality and planktonic composition of the ponds. In Sabang block areas there are five ponds like Ghat pond (CP), Dhara pond (EP1), Majari pond (EP2), Nandan pond (EP3) and Masanta pond (EP4). All ponds are filled by the rainy water. In these ponds cultured the Indian major carps like catla, rohita, mrigala.

II. RELATED WORK

Living organism and nonliving organism are dissolved in fresh water. How many aliments and dissolved in fresh water recorded in this pond publication of Sarwar and Wazir, (1991) the physic chemical changes is in fresh water pond. There are main points is eutropications of the water body because the alkaline nature of the water and higher concentration of phosphorus and nitrate.

III. METHODOLOGY

Soil analysis:
The pond bottom soil was analyzed for nitrogen, available phosphorus and available potassium following the standard methods of AOAC (1980).
Total Nitrogen (mg 100gm^{-1}):

Procedure:
10gm soil was taken in a distilled flask. Added 100 ml 0.32% $KMnO_4$ and 120 ml distilled water. Then added small amount of paraffin and 6 -8 glass beads and 80 ml 2.5% NaOH. Distil the solution and collect two distillate in 10 ml 0.02 (N) H_2SO_4 is using mixed indicator in a 500 ml conical flask. The distillate (approx. 200ml) titrated with 0.02 (N) NaOH solutions. The colour of the solution was radish violet to green end point light green. Simultaneously blank is trated 10ml 0.02 (N) H_2SO_4 and mixed indicator taken in a 500 ml conical flask and titrate with 0.02 (N) NaOH – end point light green. 10 ml 0.02 (N) oxlic acid and phenolphthalein indicator taken in 500 ml conical flask and titrate with 0.02 (N) NaOH – end point light pink.

Calculation: Nitrogen in soil = $\frac{(S-T)\times 1.4\times N}{G}$

S = Blank liter value of NaOH in ml
T = Sample titer value of NaOH solution
N = Normality of NaOH solution
G = Sample weight in gram.

Available Phosphorus (mg 100 gm^{-1}):

Procedure:
25 ml of Bray's extract was added with 10gm. Soil in a 100 ml. conical flask. After shaking for 2 minutes it was filtered. 10 ml. of the extract was taken in a 50 ml. volumetric flask and adjusted the pH of the solution by 4(N) HCl and 4(N) NH_3 solution using 2: 4 dinitrophenol as indicator. 2 ml. of chloromolibodic acid, 20 ml of distilled water was added. By adding 1 ml of staneous chloride chloride solution in the solution and then blue colour developed. Then from the colorimeter at 660 μm wave length, the reading was taken.

Calculation: Content of phosphorus in soil = 12.5 × X ppm.
X = ppm of phosphorus in the colour solution.

Available Potassium (mg 100gm^{-1}):

Procedure: 10 gm soil sample taken in 250 ml beaker added 25 ml distilled water. Then added 1 ml conc. H_2SO_4 and shaker by glass rods for 3 – 4 minutes. 100 ml filtrate was taken in 100 ml volumetric flask total soil was washed by 0.1 (N) H_2SO_4. Then potassium was measured by Flame photometer. The meter was standardized with 20 ppm K solution to 100 Galvanometer reading.

Calculation: Content of available potassium (K) in soil = 10 × X ppm.
X = ppm of K in the soil extract or filtrated i.e. 20/ 100 × Galvanometer reading for filtrate.

Location of ponds:

Ghat pond (Control pond)

Image 1. Google earth map of Ghat pond in Sabang.

Talda is a village in Sabang Block, Paschim Medinipur District, West Bengal State. Talda is 70 km far from its district main city Medinipur. Nearest town is Kharagpur 45 km far from Talda village. Nearest railway station of this village is Balichak. Talda is 25 km far from its nearest station Balichak. Ghat pond (CP) is lying on estern side of the village. It is natural pond. Rain water enters from the surroundings into the pond. A canal is present estern side of the pond. People from the surround area discharge their kitchen waste directly into its water. Bamboo covers about 25% area of the land of the pond. Ghat pond covers an area of 1418 m^2, peripheral area if the pond is 134 m. and depth is 8 feet. Its exat geographical location is **22°9'32.4468"** N Latitude and **87°32'29.5008"** E Longitude and 13.5m (Approx) above sea level.

Image 2. Ghat pond.

Dhara pond (Experimental pond 1)

Image 3. Google earth map of Dhara pond in Sabang.

In district Paschim Medinipur, West Bengal the Talda village is situated in Sabang block area. Talda is present from Medinipur 70 km far. It is 45 km far from the Kharagpur. Dhara pond is lying on north-estern side of this pond. This pond is filled by rain water. Houses are present north and south side of the pond. People from the surround area discharge their kitchen waste directly into its water. Bamboo covers about 45% area of the land of the pond. Dhara pond (EP1) covers an area of 2674 m^2, peripheral area if the pond is 184 m. and depth is 10 feet. Its exat geographical location is **22°9'36.1656"**N Latitude and **87°32'29.3532"**E Longitude and 13.6m (Approx) above sea level.

Image 4. Dhara pond.

Majari pond (Experimental pond 2)

Image 5. Google earth map of Majari pond in Sabang.

Talda village is present in the Sabang, Paschim Medinipur, West Bengal. Nearest district town is Medinipur. Kharagpur is the nearest city. Majari pond (EP2) is situated middle position of the village. This pond filled by the rain water. Houses are present east, west and north side of the pond. People from the surround area discharge their kitchen waste directly into its water. Bamboo covers about 35% area of the land of the pond. Majari pond covers an area of 3605 m^2, peripheral area if the pond is 213 m. and depth is 10 feet. Its exat geographical location is **22°9'35.0028"**N Latitude and **87°32'23.2728"**E Longitude and 13.6m (Approx) above sea level.

Image 6. Majari pond.

Nandan pond (Experimental pond 3)

Image 7. Google earth map of Nandan pond in Sabang.

In West Bengal state Talda village is psesent. Talda village is present 70 km far from the district town. This natural pond filled by rainy water. Village persons' language is Bengali. Occupation is fishing of this village. Wetland field is present in this village. Beautification and flowering plant is present surrounding this pond. Pedy fields are present east, west and south side of the pond. Bamboo covers about 5% area of the land of the pond. Nandan pond (EP3) covers an area of 4496 m^2, peripheral area if the pond is 238 m. and depth is 8 feet. Its exact geographical location is **22°9'27.0504"**N Latitude and **87°32'20.9328"**E Longitude and 13.7m (Approx) above sea level.

Image 8. Nandan pond.

Masanta pond (Experimental pond 4)

Image 9. Google earth pond of Masanta pond in Sabang.

In Sabang block area Masanta pond (EP4) is present. District town is Medinipur 70 km far from this village. Nearest town is Kharagpur and it is the rail way city. Sunlight is falled allover the pond. Pedy fields are present east, west, north

and south side of the pond. Tree covers about 90% area of the land of the pond. Masanta pond (EP4) covers an area of 4577 m^2, peripheral area if the pond is 240 m. and depth is 20 feet. Its exact geographical location is **22°9'4.4928"**N Latitude and **87°32'14.9352"**E Longitude and 13.8m (Approx) above sea level.

Image 10. Masanta pond.

V. RESULTS AND DISCUSSION

Results of Total Nitrogen (mg 100 gm^{-1}) season 2015-2016:

In the month of July 2015 the total nitrogen was in CP pond 0.22, EP1 pond 0.42, EP2 pond 0.43, EP3 pond 0.32 & EP4 pond 0.34. The total nitrogen in the month of August was in CP pond 0.22, EP1 pond 0.42, EP2 pond 0.42, EP3 pond 0.32 & EP4 pond 0.34. In the month of September the total nitrogen was in CP pond 0.19, EP1 pond 0.41, EP2 pond 0.44, EP3 pond 0.33 & EP4 pond 0.33. The total nitrogen in the month of October was in CP pond 0.19, EP1 pond 0.32, EP2 pond 0.33, EP3 pond 0.31 & EP4 pond 0.25. In the month of November the total nitrogen was in CP pond 0.17, EP1 pond 0.37, EP2 pond 0.34, EP3 pond 0.21 & EP4 pond 0.21. In the month of December 2015 the total nitrogen was in CP pond 0.18, EP1 pond 0.37, EP2 pond 0.37, EP3 pond 0.19 & EP4 pond 0.23. The total nitrogen in the month of January 2016 was in CP pond 0.26, EP1 pond 0.35, EP2 pond 0.44, EP3 pond 0.27 & EP4 pond 0.33. In the month of February the total nitrogen was in CP pond 0.21, EP1 pond 0.40, EP2 pond 0.42, EP3 pond 0.33 & EP4 pond 0.33. The total nitrogen in the month of March was in CP pond 0.29, EP1 pond 0.42, EP2 pond 0.41, EP3 pond 0.33 & EP4 pond 0.34. In the month of April the total nitrogen was in CP pond 0.29, EP1 pond 0.35, EP2 pond 0.32, EP3 pond 0.37 & EP4 pond 0.30. The total nitrogen in the month of May 2016 was in CP pond 0.30, EP1 pond 0.36, EP2 pond 0.42, EP3 pond 0.31 & EP4 pond 0.41. The average nitrogen in soil was 0.346 mg 100gm-1 in the month of July, 2015. In the month of August, 2015 the average nitrogen was 0.344. The average nitrogen was 0.34 in the month of September. In the month of October the average nitrogen was 0.28. In the month of November the average nitrogen was 0.26. The average nitrogen was 0.268 in the month of December, 2015. In the month of January, 2016 the average nitrogen was 0.33. The average nitrogen was 0.338 in the month of February. In the month of March the average nitrogen was 0.358. The average nitrogen was 0.326 in the month of April. In the month of May, 2016 the average nitrogen was 0.36. The maximum average nitrogen was 0.36 in the month of May, 2016. In the month of November, 2015 the minimum average nitrogen was 0.26. In Ghat pond (CP) the highest total nitrogen in soil was 0.30 in the month of May, 2016 and lowest total nitrogen was 0.17 in the month of November, 2015. In Dhara pond (EP1) the maximum total nitrogen in soil was 0.42 in the month of March, 2016 and minimum total nitrogen was 0.32 in the month of October, 2015. In Majari pond (EP2) the highest total nitrogen was 0.49 in the month of September and January and lowest number of total nitrogen was 0.32 in the month of April, 2016. In Nandan pond (EP3) maximum total nitrogen was 0.37 in the month of April and minimum total nitrogen was 0.19 in the month of December, 2015. In Masanta pond (EP4) the highest number of total nitrogen was 0.41 in the month of May and lowest number of total nitrogen was 0.21 in the month of November.

Table 1. Total Nitrogen (mg 100 gm^{-1}) (mean ± S.E.)

Season (2015 – 2016)

Months	CP	EP1	EP2	EP3	EP4
July	0.22 ±0.0011	0.42 ±0.0011	0.43 ±0.0004	0.32 ±0.0011	0.34 ±0.0011
August	0.22 ±0.0011	0.42 ±0.0005	0.42 ±0.0005	0.32 ±0.0011	0.34 ±0.0016
September	0.19 ±0.0011	0.41 ±0.002	0.44 ±0.0004	0.33 ±0.0004	0.33 ±0.0011
October	0.19 ±0.002	0.32 ±0.0011	0.33 ±0.02	0.31 ±0.004	0.25 ±0.0011
November	0.17 ±0.0011	0.37 ±0.0011	0.34 ±0.02	0.21 ±0.0011	0.21 ±0.0005

December	0.18 ±0.0005	0.37 ±0.005	0.37 ±0.005	0.19 ±0.027	0.23 ±0.003
January	0.26 ±0.023	0.35 ±0.0011	0.44 ±0.002	0.27 ±0.0004	0.33 ±0.017
February	0.21 ±0.0004	0.40 ±0.0004	0.42 ±0.0005	0.33 ±0.0011	0.33 ±0.017
March	0.29 ±0.0011	0.42 ±0.0011	0.41 ±0.0011	0.33 ±0.0011	0.34 ±0.0011
April	0.29 ±0.0011	0.35 ±0.005	0.32 ±0.012	0.37 ±0.0011	0.30 ±0.0011
May	0.30 ±0.0111	0.36 ±0.0011	0.42 ±0.0011	0.31 ±0.0004	0.41 ±0.003

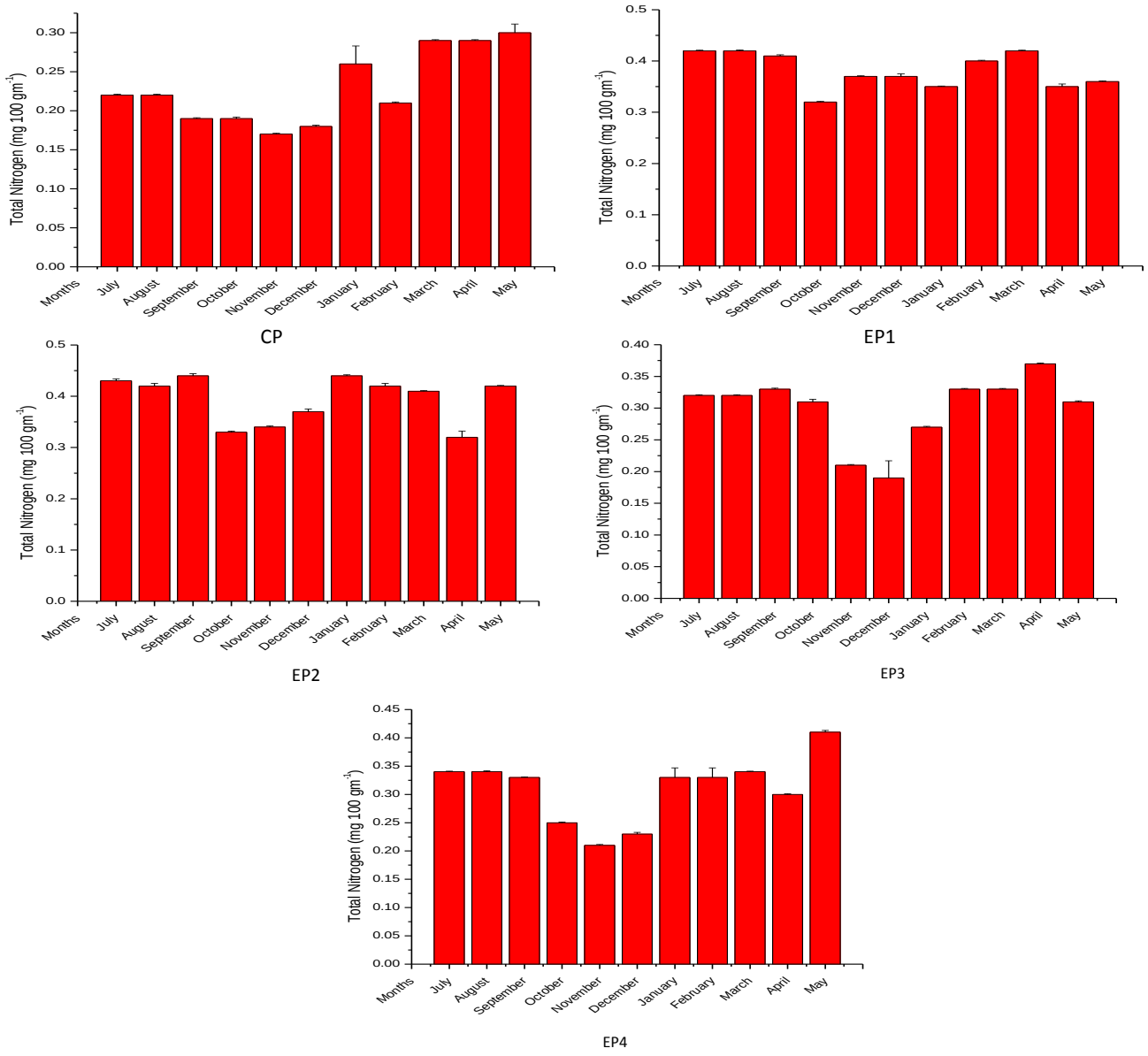

Figure 1. Total Nitrogen

Results of Available Phosphorus (mg 100 gm^{-1}) season 2015- 2016:

In the month of July 2015 the available phosphorus was in CP pond 4.89, EP1 pond 6.28, EP2 pond 5.29, EP3 pond 4.94 & EP4 pond 5.02. The available phosphorus in the month of August was in CP pond 4.06, EP1 pond 5.33, EP2 pond 5.32, EP3 pond 4.94 & EP4 pond 5.07. In the month of September the available phosphorus was in CP pond 4.01, EP1 pond 5.24, EP2 pond 5.24, EP3 pond 5.17 & EP4 pond 5.02. The available phosphorus in the month of October was in CP pond 4.02, EP1 pond 5.13, EP2 pond 5.17, EP3 pond 4.93 & EP4 pond 5.06. In the month of November the available phosphorus was in CP pond 4.69, EP1 pond 5.93, EP2 pond 5.84, EP3 pond 4.92 & EP4 pond 4.92. The available phosphorus in the month of December was in CP pond 4.65, EP1 pond 4.92, EP2 pond 4.91, EP3 pond 4.88 & EP4 pond 4.88. In the month of January 2016 the available phosphorus was in CP pond 4.65, EP1 pond 5.92, EP2 pond 5.94, EP3 pond 5.00 & EP4 pond 4.94. In the month of March the available phosphorus was in CP pond 4.02, EP1 pond 5.17, EP2 pond 5.76, EP3 pond 5.03 & EP4 pond 4.83. The available phosphorus in the month of April was in CP pond 4.82 EP1 pond 6.07, EP2 pond 5.03, EP3 pond 4.96 & EP4 pond 4.99. In the month of May 2016 the available phosphorus was in CP pond 4.09, EP1 pond 4.94, EP2 pond 6.97, EP3 pond 5.02 & EP4 pond 4.98. In the month of July, 2015 the average available phosphorus was 5.284 mg. The average available phosphorus was 4.944 mg in the month of August. In the month of September the average available phosphorus was4.936 mg. the average available phosphorus was 4.862 mg in the month of October. In the month of November the average available phosphorus was 5.26 mg. The average available phosphorus was 5.29 mg in the month of January, 2016. In the month of February the available phosphorus was 5.326 mg. The average available phosphorus was 4.962 in the month of March. In the month of April the average available phosphorus was 5.174 mg. The average available phosphorus was 5.2 mg in the month of May, 2016. The highest average available phosphorus was 5.326 mg in the month of February, 2016 and the lowest average available phosphorus was 4.862 mg in the month of October, 2015. In Ghat pond (CP) the highest available phosphorus was 4.89 mg in the month of July and lowest available phosphorus was 4.01 in the month of September. In Dhara pond (EP1) maximum available phosphorus was 6.97 mg in the month of February, 2015 and minimum available phosphorus was 4.92 mg in the month of December. In Majari pond (EP2) highest number of available phosphorus was 6.97 in the month of May and lowest number of available phosphorus was 4.78 mg in the month of February. In Nandan pond (EP3) maximum number of available phosphorus was 5.17 mg in the month of September and minimum available phosphorus was 4.88mg in the month of December, 2015. In Masanta pond (EP4) the highest number of available phosphorus was 5.08 mg in the month of February and lowest number of available phosphorus was 4.83 mg in the month of March, 2016.

Table 2. available phosphorus (mg 100gm^{-1}).

Season (2015 – 2016):

Months	CP	EP1	EP2	EP3	EP4
July	4.89 ±1.013	6.28 ±0.008	5.29 ±0.009	4.94 ±0.015	5.02 ±0.026
August	4.06 ±0.018	5.33 ±0.014	5.32 ±0.006	4.94 ±0.016	5.07 ±0.011
September	4.01 ±0.0012	5.24 ±0.02	5.24 ±0.018	5.17 ±0.007	5.02 ±0.022
October	4.02 ±0.006	5.13 ±0.022	5.17 ±0.014	4.93 ±0.009	5.06 ±0.0253
November	4.69 ±0.007	5.93 ±0.018	5.84 ±0.011	4.92 ±0.007	4.92 ±0.013
December	4.65 ±0.009	4.92 ±0.017	4.91 ±0.012	4.88 ±0.025	4.88 ±0.004
January	4.65 ±0.011	5.92 ±0.012	5.94 ±0.012	5.00 ±0.004	4.94 ±0.011
February	4.72 ±0.014	6.97 ±0.016	4.78 ±0.012	5.08 ±0.033	5.08 ±0.025
March	4.02 ±0.023	5.17 ±0.036	5.76 ±0.023	5.03 ±0.02	4.83 ±0.021
April	4.82 ±0.021	6.07 ±0.036	5.03 ±0.018	4.96 ±0.0092	4.99 ±0.012
May	4.09 ±0.004	4.94 ±0.016	6.97 ±0.013	5.02 ±0.0123	4.98 ±0.004

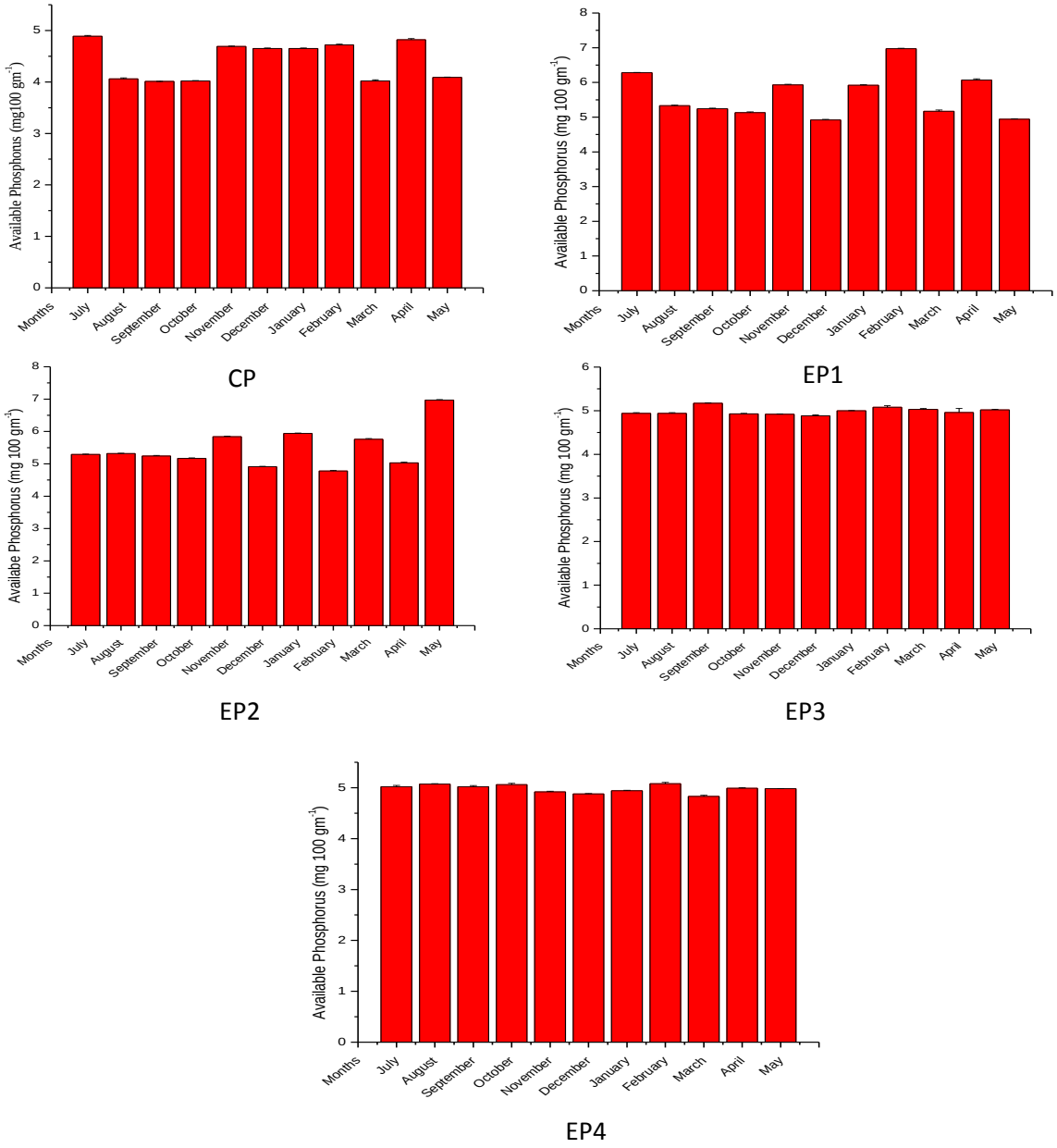

Figure 2. available phosphorus.

Results of Available Potassium (mg100gm^{-1}) season 2015- 2016:

In the month of July 2015 the available potassium was in CP pond 1.85, EP1 pond 3.12, EP2 pond 3.03, EP3 pond 2.97 & EP4 pond 2.83. The available potassium in the month of August was in CP pond 1.75, EP1 pond 2.97, EP2 pond 2.96, EP3 pond 3.03 & EP4 pond 2.91. In the month of September the available potassium was in CP pond 1.76, EP1 pond 2.60, EP2 pond 2.63, EP3 pond 2.55 & EP4 pond 2.56. The available potassium in the month of October was in CP pond 1.92, EP1 pond 3.11, EP2 pond 3.11, EP3 pond 3.05 & EP4 pond 3.06. In the month of November the available potassium was in CP pond 2.15, EP1 pond 3.10, EP2 pond 3.42, EP3 pond 2.83 & EP4 pond 2.83. The available potassium in the month of December 2015 was in CP pond 1.87, EP1 pond 2.33, EP2 pond 2.83, EP3 pond 2.28 & EP4 pond 2.31. In the month of January 2016 the available potassium was in CP pond 1.82, EP1 pond 2.73, EP2 pond 2.80, EP3 pond 2.62 & EP4 pond 2.66. The available potassium in the month of February was in CP pond 2.02, EP1 pond 3.94, EP2 pond 4.01, EP3 pond 3.53 & EP4 pond 3.44. In the month of March the available potassium was in CP pond 2.13, EP1 pond 3.83, EP2 pond 4.09, EP3 pond 3.78 & EP4 pond 3.73. The

available potassium in the month of April was in CP pond 2.16, EP1 pond 3.34, EP2 pond 3.53, EP3 pond 3.03 & EP4 pond 2.96. In the month of May 2016 the available potassium was in CP pond 2.07, EP1 pond 2.61, EP2 pond 2.86, EP3 pond 2.86 & EP4 pond 2.73. In the month of July, 2015 the average available potassium was 2.76 mg. The average available potassium was 2.724 mg in the month of August. In the month of September the average available potassium was 2.42 mg. The average available potassium was 2.82 mg in the month of October. In the month of November the average available potassium was 2.866 mg. The average available potassium was 2.324 mg in the month of December. In the month of January, 2016 the average potassium was 2.526 mg. In the month of February the average available potassium was 3.388 mg. The average available potassium was 3.502 mg in the month of March. In the month of April the average available potassium was 3.004 mg. The average available potassium was 2.626 mg in the month of May. In the year (2015-16) the highest average available potassium was 3.502 mg in the month of March and lowest average available potassium was2.324 mg in the month of December, 2015 (table no-5.9.A.). In Ghat pond (CP) the maximum available potassium was 2.15 mg in the month of November, 2015 and minimum available potassium was 1.75 mg in the month of August, 2015. In Dhara pond (EP1) the highest available potassium was 3.94 mg in the month of February and lowest available potassium was 2.66 mg in the month of September, 2016. In Majari pond (EP2) the maximum available potassium was 4.09 mg and SE ± 0.016 in the month of March, and minimum available potassium was 2.63 mg and SE ± 0.009 in the month of September. In Nandan pond (EP3) the highest available potassium was 3.78 mg & SE ± 0.066 in the month of March and lowest available potassium was 2.28 mg & SE ± 0.008 in the month of December. In Masanta pond (EP4) the maximum available potassium was 3.73 mg & SE ± 0.012 in the month of March and minimum available potassium was 2.31 mg & SE ± 0.029 in the month of December.

Table 3. avaliable potassium (mg100gm^{-1})

Season (2015 – 2016):

Months	CP	EP1	EP2	EP3	EP4
July	1.85 ±0.010	3.12 ±0.011	3.03 ±0.012	2.97 ±0.010	2.83 ±0.012
August	1.75 ±0.012	2.97 ±0.008	2.96 ±0.03	3.03 ±0.012	2.91 ±0.005
September	1.76 ±0.007	2.60 ±0.005	2.63 ±0.009	2.55 ±0.013	2.56 ±0.0189
October	1.92 ±0.010	3.11 ±0.007	3.11 ±0.017	3.05 ±0.022	3.06 ±0.014
November	2.15 ±0.010	3.10 ±0.009	3.42 ±0.011	2.83 ±0.012	2.83 ±0.013
December	1.87 ±0.013	2.33 ±0.011	2.83 ±0.087	2.28 ±0.008	2.31 ±0.029
January	1.82 ±0.012	2.73 ±0.016	2.80 ±0.006	2.62 ±0.013	2.66 ±0.007
February	2.02 ±0.011	3.94 ±0.015	4.01 ±0.012	3.53 ±0.015	3.44 ±0.013
March	2.13 ±0.011	3.83 ±0.012	4.09 ±0.016	3.78 ±0.066	3.73 ±0.012
April	2.16 ±0.01	3.34 ±0.0222	3.53 ±0.010	3.03 ±0.018	2.96 ±0.008
May	2.07 ±0.019	2.61 ±0.012	2.86 ±0.067	2.86 ±0.116	2.73 ±0.011

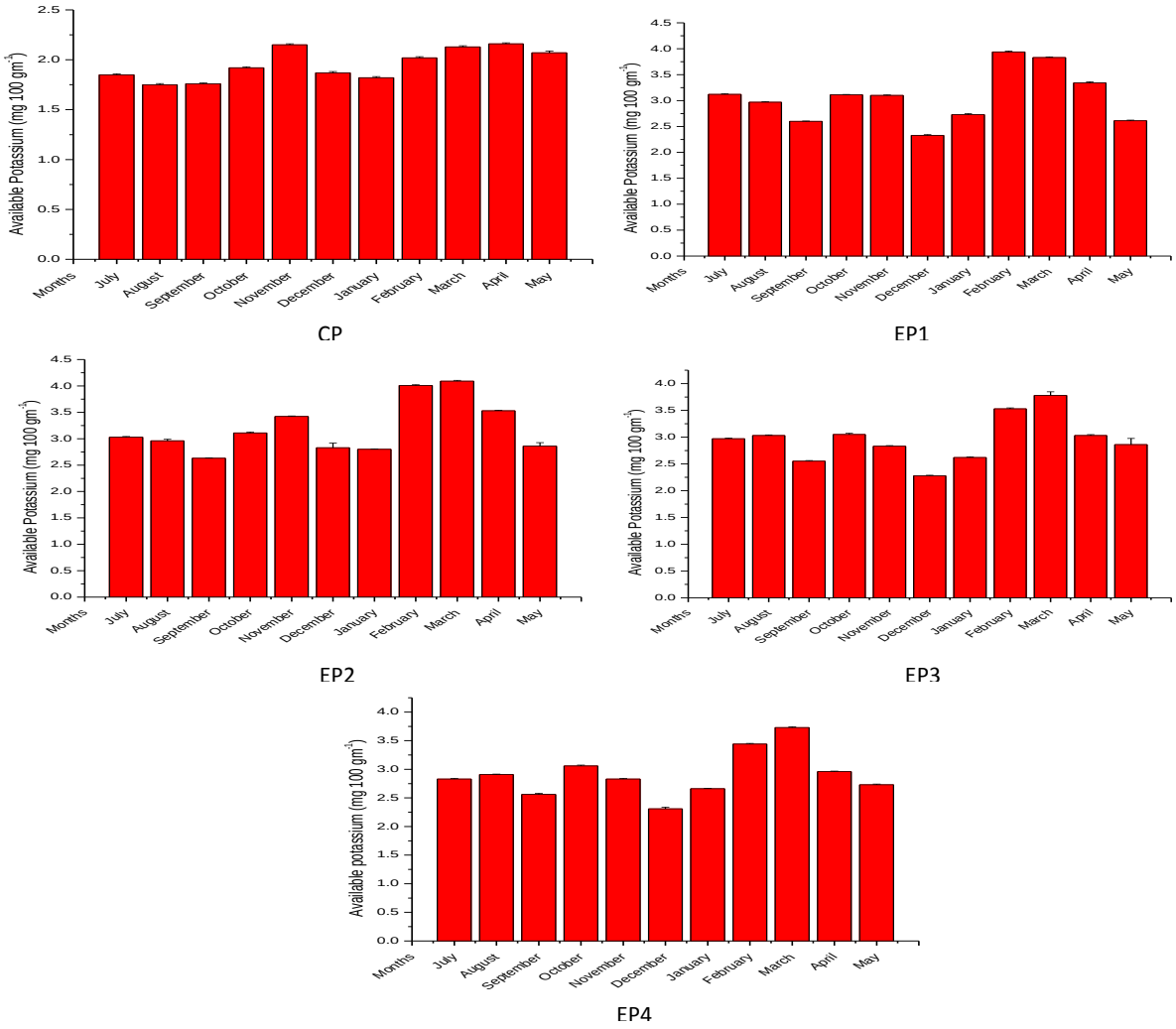

Figure 3. available potassium.

Overall discussion on soil analysis in the Sabang block areas, West Bengal, India:

It is known that in chemical characteristics of soil analysis affect the pond productivity. The nature soil reflects the nature of water (Dutta & Kar, 1947). The characteristics of soil have been already dealt. The chemical characteristics which are involved in point productivity as well as fish production is reflecting in the discussion below.

Soil plays a key role in determining the productivity of pond. The chemical features of pond soil (mainly bottom soil) like N.P.K. act as important factors in influencing fertility and productivity of a fish pond (Wrobel, 1967; Patra & Roy, 1988a; Patra, 1933). In order to find out the effectiveness of bacterial suspension (periphyton and denitrifying) in improving soil fertility. During the experimental period emphasis was given on N.P.K. as these are the important factors influencing the production of plankton (phytoplankton and zooplankton).

It has been observed that the level of nitrogen was 0.33 mg 100 gm^{-1} in EP1, 0.03 in EP2, 0.22 in EP3, 0.22 in EP4. In all the experimental ponds before treatment however, after treatment the nitrogen level increased considerable. After treatment higher value was 0.42 in EP1, 0.45 in EP2, 0.36 in EP3, 0.41 in EP4 and 0.29 in CP in the first year and in the second year it was 0.41 in EP1, 0.42 in EP2, 0.40 in EP3, 0.40 in EP4 and 0.28 in CP. The table indicates that the level of nitrogen is comparatively higher in periphyton treated ponds than that is denitrifying bacterial population treated ponds but the nitrogen in all of these experimental ponds is higher than that is control pond. This indicates that the bacterial suspension have the capacity in raising the level of nitr5ogen in soil which plays a part in improving the

productivity of fish pond which effects the production of fish.

Phosphorus plays significant role in enhancing the productivity of pond. It is the most critical single element which limits productivity and there exist a correlation between the available soil phosphorus and fish production. In a productive pond the soil phosphorus according to Saha *et al*; (1979) should be above 4-6 mg p^{205} $100mg^{-1}$ but in unproductive it is below 3mg p^{205} $100mg^{-1}$ of soil. Dennid McIntosh *et al*; (2000) stated that the level of phosphorus in pond soil is increased during the time of bacterial suspension. In this work it has been found that in the entire experimental pond phosphorus level move up considerably after treatment. In the first year of experimental trial the phosphorus level highest 6.91 in EP1 & EP2, 5.17 in EP3, 5.08 in EP4, 4.91 in CP and in the second year highest value was 6.91 in EP2, 6.81 in EP1, 5.14 in EP3, 5.11 in EP4 & 4.89 in CP. The results indicate that the efficiency of the used bacterial population along with semidried cow dung is raising the level of available phosphorous of the soil. However, periphyton bacterial population proved to be relatively more powerful in raising the phosphorus level and consequently enhancing the production of fish. Denitrifying bacterial population also avowed better than result obtained from (CP) only treated with semi-died cow dung. Although the phosphorus level was lower in all the experimental ponds as has been by Dennis McIntosh et al; (2000).

Potassium is not limiting factor and is not necessary to increase production. Though it ranks as major nutrient element along with nitrogen and phosphorus it importance is observed (Banerjee, 1972; Ghosh, 1978).

Water quality is an important indicator in appraising the eutrophic situation; primary productivity and fish yield potential. The relationship between bacteria and he water environment has received the attention of researchers, but the studies undertaken have been mostly limited to the relationship between the aerobic heterotrophic bacteria and the water environment Guo *et al*; 1988; Fang et al; 1989; Liu *et al*; 1992a. There is not much information on the major physic-chemical factors and growth in fish particularly periphyton bacteria affecting population.

VI. CONCLUSION AND FUTURE SCOPE

Study on soil analysis in ponds in the Sabang block areas, West Bengal, India is scanty. But it has to be tremendous economic significance and relevance aquaculture practice which is likely to open new vistas pertaining to the sustainable development. So the objective of the study was too evaluated of the routine use of a commercially and naturally improvement of soil quality of ponds. So, nitrogen, phosphorus, potassium in the year of experiments was in no way unfavorable for the growth of the carps.

Future scope is free hygienic fishes production in ponds.

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