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To Evaluate the Effect of Non Treated Sewage Discharge Containing Fecal Matter and Some Chemicals in Ponds

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Abstract: This is to Evaluate the adverse effects of sewage discharge containing chemicals like detergents, fecal matter, domestic substances and chemical salts etc. in ponds.
Purpose of this research is to detect the development of microbs and increase in the concentration of chemical salts,, if any, in pond water due to sewage discharge in ponds, which may be pathogenic in nature and are responsible for the cause of diseases like cholera, disentary, tuberculosis, toxicity etc in man and domestic animals.

Keywords: Abundant, contaminates, crisis, critical, detergent, environment, ecological, global, industrial, infrastructure, management, mankind, negligence, percolate, population, pollution, sewage, turbulence.

INTRODUCTION:

India faces a turbulent water future. Unless water management practices are changed – and changed soon – India will face a severe water crisis within the next two decades and will have neither the cash to build new infrastructure nor the water needed by its growing economy and rising population. Water is one of the critical inputs for the sustenance of mankind. It is used both terrestrial and aquatic environment for various activities, balancing the ecological system of global environment. Water is the important natural source, which is abundant in nature and cover about 2/3ds of earth surface.
In most cases wastewater is let out untreated and it either percolates into the ground and in turn contaminates the groundwater or is discharged into the natural drainage system causing pollution in downstream areas. Sewage and not the industrial pollution accounts for more than 75 per cent of the surface water contamination in India. Due to negligence, groundwater is also increasingly getting contaminated. In India less than 50% of the urban population has access to sewage disposal system. Most of the existing collecting systems discharge directly to the receiving water without treatment. Garbage, domestic and otherwise, is directly dumped into water bodies or roadside, which can often be washed into streams and lakes.

1.1- PONDS: Constructed by man by making walls surrounding an appropriate size of land or by digging land to some depth for storing rain water or river water for further use.

All the ponds selected for research work are man made and are highly polluted by feacal matter, detergents, and, some other chemicals, which increases amount of some salts, pH, and number of bacterias in ponds which is dangerouse to human as well as animal health.
Thes are situated in a village of Narsinghpur district named as Baraheta which is popular for the number of ponds in it.These are used for the purpose of fish culture. The four ponds selected for research purpose are named as Rani talaab, Jogan talaab, Bada talaab,and Imlaha talaab.These all were used for singhada(water nuts) farming as well as for fish farming.Some times pesticides and weedicides are used in these farms to control insects and weeds.

1.2- DETERGENTS: These are the salts of sodium and potassium which are alkaline in nature and are used for cleaning cloths, and many many domestic and non domestic substances. These are also used for bathing purpose in the form of soaps.

1.3- SEWAGE: This is generally the domestic discharge containing substances like parts of vegetables, food substances, and feacal matter etc in it. This contaminates water in many ways like, by increasing amount of organic and inorganic compounds and by introducing species of pathogenic bacterias.

MATERIAL AND METHOD:

Application of Water Field Test Kit:

Water field test kit is used for the detection of various salt concentrations.

A- Fluoride test:

1-Take 4 ml of sample water in a test tube.
2-Add 1 ml of fluoride reagent -A and mix well.
3-Weight for about 15 minuts.
4-Colour of water sample changes from colourless to red,brown,yellow or in between them.
5-Match the colour of sample with the colours given in chart.
6-Note the number of related colour of the sample.

B-Nitrate test:

1-Take 5 ml of water sample in a test tube.
2-Add tow drops of hydrochloric acid.
3-Add a little spoon full of nitrate reagent-A and stire to dissolve it.
4-After four minuts add four drops of nitrate reagent-Band stire itto mix well the solution.
5-Colour of sample water changes from colourless to dark red or light red.
6-Match the colour of sample with the colours at colour chart.
7-Note the number of matching colour.

C:Iron test:

1-Take 5 ml of water sample in a test tube.
2-Add two drops of iron reagent-A and weight for five minuts.
3-Then add two drops of iron reagent-B and weight for some times.
4-Colour of sample changes from colourless to dark or light red or brown.
5-Match it with the colours at chart.

Result:In all four samples iron is absent.

D:Residual chlorine test:

1-Take 5 ml of water in a test tube.
2-Add chlorine reagent-A in it and stire.
3-Colour of water changes to light yellow if chlorine is present.
4-Match the colour of sample with the colour shown in the chart.

Result:In all four water samples colour of water does not changes which indicates
that chlorine is absent in taken samples.

E:Chloride test:

1-Take 5 ml of water sample in a test tube.
2-Add two drops of chloride reagent-A and stire.
3-Colour of water turned colourless to light yellow.Add drops of chloride reagent-B
till brick red colour appears.
4-Calculate the amount of chloride by using following formula:
number of drops of chlorine reagent-B*10 = amount of chloride in PPM

F:Total hardness test (caco3)

1-Take 5 ml of water sample in a test tube.
2-Add 5 drops of hardness reagent-A in it and weight for a minute.
3-Then add hardness reagent-B(some particles).Stire to dissolve .
4-If the colour of water is blue then hardness is absent and if it turnes
wine red then hardness is present.
5-Add hardness reagent-C dropwise in the solutiontill its colour turned blue.
6-Calculate the hardness as follows:-
Number of drops of hardness reagent-C*10=PPM of caco3

G:PH Test of water samples with the help of paper strips:
1-For testing PH of taken water sample take sample water in a plastic beaker.
2-take a ph paper strip of about 1 c.m. length and dip it in the sample water and
remove it from sample water within 5 seconds.
3-Paper may change its colour .Match this colour with the colour chart given on
PH paper book,and note its nmber.
4-Number given to that a particular colour indicates the value of PH of water sample.

H:Turbidity test of water samples:
1-To test the turbidity of sample of water ,add 20 ml of sample water in given turbidity
test bottle.corked the bottle and placed on table.
2-Shake well 10 NTU& 25 NTU bottles given within the kit and placed them at right and
left side of the bottle containing sample water.
3-Compare the turbidity of all the three bottles
4-Calculate the turbidity as follows:
a-Turbidity below 10 NTU.
b-Turbidity in between 10 to 25 NTU.
C-Turbidity above 25 NTU.

5-If in sample water turbidity is less than 10 NTU then water may be useful,and if
turbidity is more than 10 NTU then water will not be used for drinking purpose.

I-Bacteriological Test of Water Sample:
1-Add 20 ml of sample water in H2S bottle and corked the bottles.Wieght for 24 hours at room temperature(37 degree celcious).
2-Observe the changes in colour of water.If colour changes from colourless to brown thenthe presence of bacteria in water sample is confermed, weight for next 24 hours for development of bacteria in bottle water.
3-If colour changes from brown to black, then it is confirmed that bacterial growth is at its highest level and the water is not of potable quality.

1- Result and Discussion:-

From al the results obtained by applying field test kit and MPN test it is clear that the water of the ponds is highly polluted due to sewage and chemical discharge.Results of microbiological tests are also positive which confirms the presence of bacteria in pond waters and potable systems also. Presence of salts in nonacceptable limits make them dangerous to use.All the results obtained from present studies are shown in the table 2,and 3

3.1- Safety limits:

All the parameters whose limits are written in the table 1 are affected by the use of various chemical compounds such as insecticides,weedisides,pestisides
and, fertilizers which may be organic and inorganic compounds of various elements.These elements interfares with the safety limits of the parameters and affects aquatic life.
They mainly cause desturbances in aquatic ecosystems which results in destruction of fish culture and in this way they affects peoples commercially as well as they lowers the nutritional value of food.

Table-1:Showing safety limits of different parameters beyond which they can affect adversely environment and animals.

S.No.	Parameter	Safety limits
1	pH	6.5-8.5
2	Hardness	600ppm.
3	Fluoride	1.0ppm
4	Chloride	1000ppm
5	Nitrate	100ppm
6	Iron	1.0ppm
7	Residual chlorine	0.2ppm
8	Turbidity	10 NTU

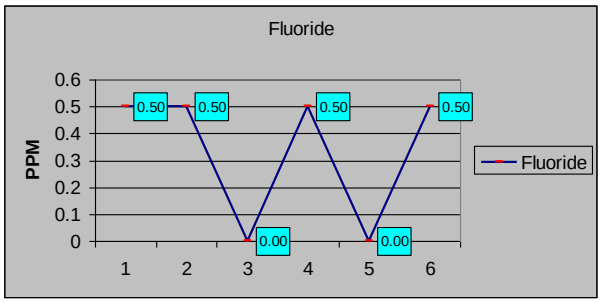
Table-2: Showing results of bacterial growth

- **Bacterial growth in 24 hours**
- **Bacterial growth in 48 hours.**

Time Period	1	2	3	4	5	6
24-Hour	+	+	+	+	-	-
48-Hour	+	+	+	+	+	+

Table- 3: Showing values of different parameters obtained by the application of field test kit.

S.N.	Fluo-ride	Nitr-ate	Iron	Residu-al Chlori-ne	Chlor-ide	Nitri-te	PH	Turbi-dity	Ca-CO3
01	0.5 PPM	100 PPM	0.0 PPM	0.0 PPM	190 PPM	0.4 PPM	9.0	+25 NTU	450 PPM
02	0.5 PPM	80 PPM	0.0	0.0 PPM	210 PPM	0.5 PPM	8.5	+25 NTU	640 PPM
03	0.0 PPM	61 PPM	0.0	0.0 PPM	180 PPM	0.4 PPM	6.0	+25 NTU	1000 PPM
04	0.5 PPM	55 PPM	0.0	0.0 PPM	170 PPM	0.3 PPM	6.5	+25 NTU	200 PPM
05	0.0 PPM	10 PPM	0.0	50 PPM	0.0 PPM	0.0 PPM	7.5	+10 NTU	700 PPM
06	0.5 PPM	15 PPM	0.0	70 PPM	0.0 PPM	0.0 PPM	7.0	+10 NTU	650 PPM



Graph-1: showing difference in values of Fluoride concentration in water samples.

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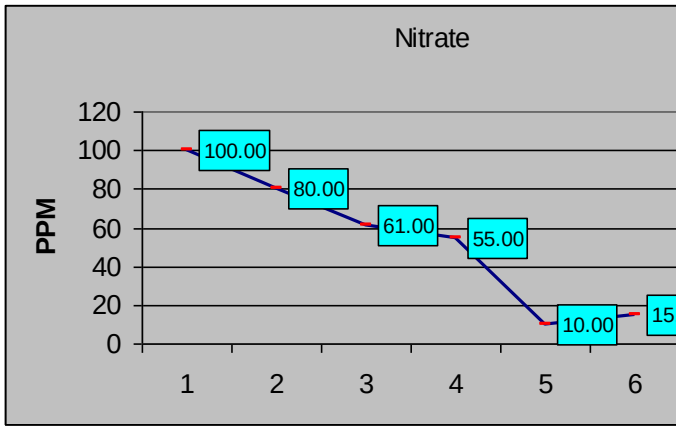
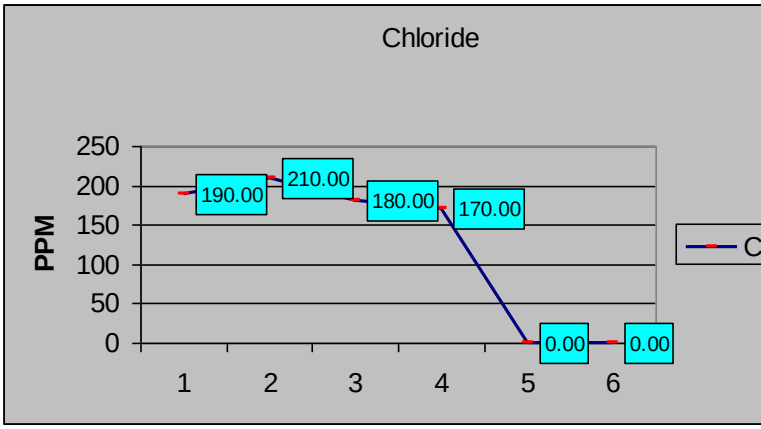
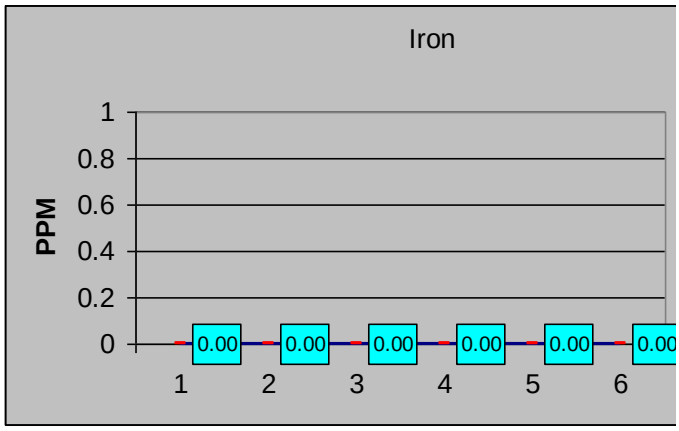


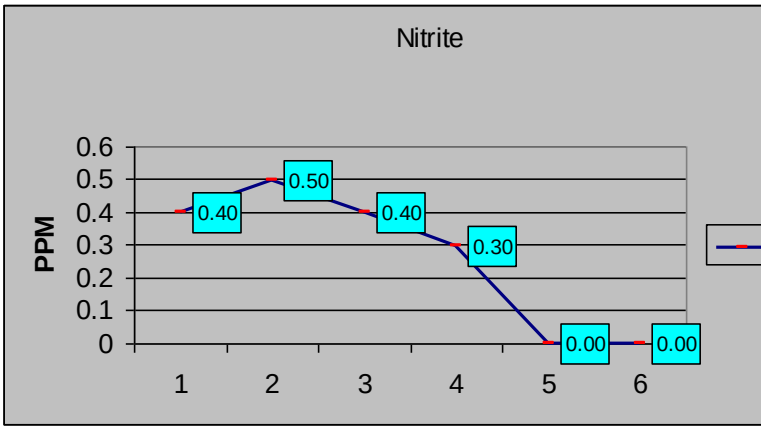
Graph-2: showing difference in values of Nitrate concentration in water samples.



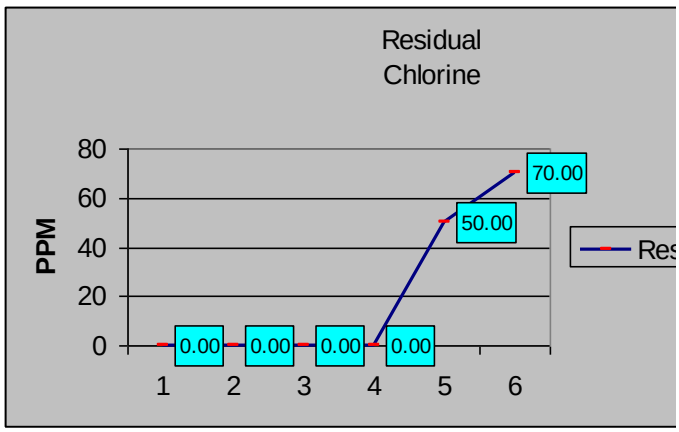
Graph-5: showing difference in values of Chloride concentration in water samples.



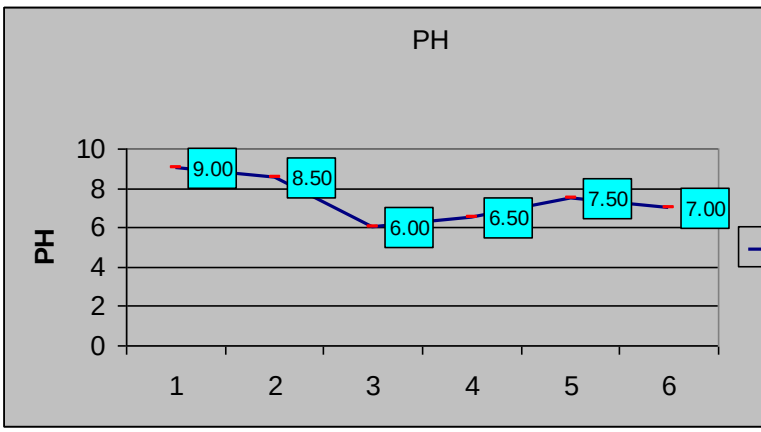
Graph-3: showing difference in values of Iron concentration in water samples.



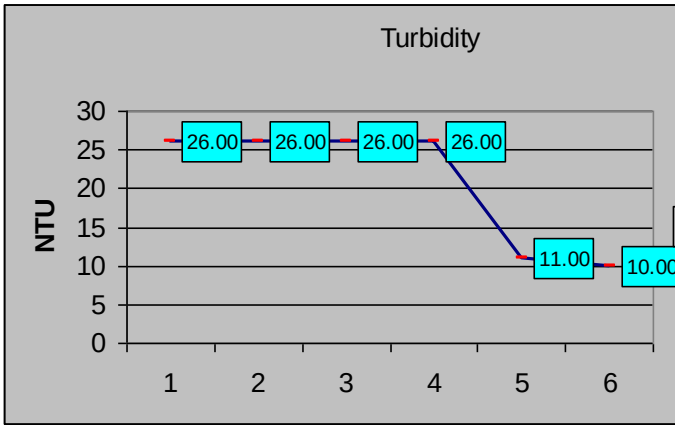
Graph-6: showing difference in values of Nitrite concentration in water samples.



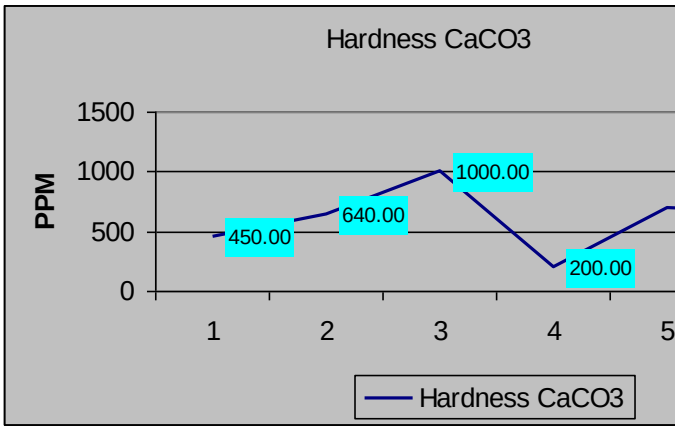
Graph-4: showing difference in values of Residual Chlorine concentration in water samples.



Graph-7: showing difference in values of PH concentration in water samples.



Graph-8: showing difference in values of Turbidity in water samples.



Graph-9: showing differences in the values of Hardness in the water samples.

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