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Determination of the water quality by fish "*Channa gachua*" from Son River Jharkhand State, India

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ABSTRACT

Water is the basic requirements that nature gives to support life to plants, creatures and people. It is the most plentiful and fundamental compound in nature. It fills dejections in the worlds outside layer to shape Rivers, Oceans and Seas. The complete amount of freshwater on earth could fulfill all needs of the human populace were it equally appropriated and open. Ecological conditions, for example, saltiness, oxygen, temperature and supplements impact the synthesis, conveyance and development of its biota. It contains polluting influences of different sorts disintegrated just as suspended. These incorporate broken down gases (H2S, CO2, NH3, and N2), disintegrated minerals (Ca, Mg, and Na salts), suspended issue (Clay, Silt and Sand) and organisms. These are common contaminants from the climate, catchment territories and the dirt. The main aim of the proposed research is to determine the water quality parameters during the rainy season, before the rainy season and after the rainy season. Beside this the impact of the water pollution on species of *Channa gachua*, was taken for the research work , objective of work is improve the quality of river water for drinking, domestic use, work and aesthetics, fish, other aquatic life and wildlife, agriculture and Industry. Further, the objective is to inform the public about the importance of safety and conservation of water and the need to restrain the human activities which lead to random release of pollutants into rivers, Son Rivers and other Rivers. In the process of investigation, the objective is also to find out which type of pollutants i.e. organic, inorganic, sediments, radioactive thermal are being discharged in the river at the specific sites. Objective is also to find out what steps have the government agencies taken to make the river water free from pollutants.

INTRODUCTION

The fundamental source of water in India is monsoon. The time-distribution of precipitation is very irregular subsequently there are floods in numerous parts of the nation during the June-September period; similar locales may encounter extreme water shortage during the January-May period. The yearly yield from precipitation is evaluated to be around 400 million hectares (MHM) and out of this, 70 MHM of water vanishes quickly, 115 MHM turns into the surface water and the rest of the permeates into the dirt. In light of precipitation records and runoff coefficients, the all out yearly course through waterways in India is assessed to be around 168 MHM. As we know, the fundamental wellspring of water is downpour in India. Be that as it may, the time-dissemination of precipitation is very irregular. Subsequently there are floods in numerous parts of the nation during the June-September period; similar locales may encounter intense water shortage during the January-May period. The yearly yield from precipitation is evaluated to be around 400 million hectares (MHM) and out of this, 70 MHM of water vanishes quickly, 115 MHM turns into the surface water and the rest of the permeates into the dirt. In light of precipitation records and runoff coefficients, the all out yearly course through waterways in India is assessed to be around 168 MHM.

The mass equalization of yearly precipitation shows that 70% is lost by direct vanishing and transpiration by plants, while the remaining 30% goes into the stream. The surmised separation of this stream, as devoured by human is 8% for water system, local use is 2%, ventures use is 4% and electrical uses is 12%. Water systems for horticultural purposes and electric force plants are the significant buyers of water. The total surface water assets were accounted for as around 100 MHM by "Water system Commission, Government of India" Report (1972). The all out progression of the considerable number of waterways of India is about 7% of the progression of all streams on the planet and around two and half times the runoff of the Mississippi waterway bowl. Regular contamination in natural sources like water, air, and soil is called Pollution.

MATERIAL AND METHODS

An experiment was conducted using *Channagachua* at two varying biomass 3 and 4 *gA.* They were introduced in experimental sets with 10, 20, 30, 40 and 50 mlwaste water 1 liter for a detention period of seven days. The physico-chemical bacteriology features of the water quality parameters studied are presented. Among the parameters, appreciable removal was recorded in TSS and coli forms followed by BOD and COD when compared to controls. Higher reductions were observed when 4gAof *Channagachua* were used for the experiments. Removal efficiencies in TSS up to 91.3 percent were recorded in experimental sets **(**10 mlwastewater A)with *Channagachua*at 4gA. 90.2 percent reduction was obtained in the same wastewater concentration when 3gA of fish was used, while control had only 1.77percent reduction inTSS. The reduction in TSS in this study was higher than that obtained. In higher wastewater concentrations, '89.5, 85.87, 83.5and 75.2 percent reduction in TSS was recorded with 3gAand slightly better removal was obtained with 4g/lfish for these experiments. 90.6, 87.5, 84.2and 77.3percent reduction for 20, 30,40,and 50 mlin water1 liter was obtained. Control for both biomasses had only 2.51,4.74, 3.57and 3.38percent reduction. Studies on selective grazing of fish juveniles on micro particles using maize starch by Matena and Simek (1997)revealed that *Channagachua was* able to consume grains > 4pm while silver carp consumed *grains* >8 **-1**0pm. The reduction in TSS may presumably be attributed to this reason. Coli form counts were substantially reduced during the treatment period in the 10 ml wastewater1 liter experimental set. 82.08percent reduction in 4g/land 80.83percent reduction in 3gA *Channagachua* treated experimental set was obtained, which is considerably greater than the reduction in control set (12.5percent).

RESULTS

Table: Experimental Sets Treated with *Channa gachua*

Parameters	10 ml Wastewater/l			20 ml Wastewater/l			30 ml Wastewater/l			40ml Wastewater/l			50 ml Wastewater/l		
	Before	After		Before	After		Before	After		Before	After		Before	After	
		E	C		E	C		E	C		E	C		E	C
Temp	30.20	30.30	30.10	30.10	30.00	30.10	30.50	30.40	30.40	30.40	30.40	30.60	29.80	29.70	29.80
pH	7.36	7.40	7.35	7.43	7.45	7.41	7.46	7.48	7.42	7.53	7.59	7.47	7.61	7.71	7.57
EC	112.30	119.30	109.10	119.60	128.30	121.60	133.20	139.60	144.50	147.50	158.20	150.20	159.40	167.30	161.20
TSS	118.30	10.29	116.20	123.40	11.60	120.30	139.20	17.40	132.60	145.60	23.00	140.40	162.30	36.84	156.80
DO	6.00	6.50	6.20	5.23	5.73	5.42	5.00	5.52	5.13	4.86	4.93	4.92	4.52	4.75	4.73
BOD	12.60	5.15	10.30	14.30	6.41	13.40	18.70	9.67	17.60	21.90	12.68	19.30	25.80	15.32	22.20
COD	26.25	11.23	24.70	34.05	16.27	32.60	40.65	19.75	38.40	54.75	32.19	51.90	66.15	44.51	63.10
NO_3- N	0.96	1.30	0.98	1.23	1.72	1.36	1.64	2.16	1.73	2.06	2.93	2.12	2.52	3.46	2.73
PO_4 -P	0.08	0.11	0.07	0.10	0.14	0.12	0.12	0.17	0.14	0.15	0.18	0.16	0.18	0.23	0.19
SO_4	0.80	0.12	0.90	2.20	2.70	2.20	3.60	4.00	3.70	4.80	5.20	4.90	5.20	5.90	5.30
TH	48.00	52.00	54.00	52.00	60.00	64.00	68.00	76.00	72.00	80.00	96.00	88.00	100.00	108.00	102.00
Ca	11.20	6.40	12.60	6.40	17.60	19.20	17.60	19.66	18.63	20.80	27.20	25.60	27.20	43.20	33.60
Mg	4.86	8.70	5.46	8.70	3.88	3.89	5.83	6.51	6.17	6.80	7.77	5.83	8.74	9.72	4.37
T.C	$24x10^4$	$43 x10^3$	$21 x10^4$	$39 x10^4$	$97 x10^3$	$23 x10^4$	$46 x10^4$	$13x10^4$	$43 x10^4$	$75 x10^4$	$24 x10^4$	$64 x10^4$	$90 x10^4$	$39 x10^4$	$75 x10^4$
F.C	+ ve	-ve	+ ve	+ ve	-ve	+ ve	+ ve	+ve	+ ve	+ ve	+ve	+ ve	+ ve	+ve	+ ve
E.Coli	+ve	-ve	+ve	+ve	-ve	+ve	+ve	-ve	+ve	+ve	-ve	+ve	+ve	+ve	+ve

Table: Experimental Sets Treated with *lllapia mossambica*

Parameters	10 ml Wastewater/l			20 ml Wastewater/l			30 ml Wastewater/l			40ml Wastewater/l			50 ml Wastewater/l		
	Before	After		Before	After		Before	After		Before	After		Before	After	
		E	C		E	C		E	C		E	C		E	C
Temp	30.20	30.30	30.10	30.10	30.00	30.10	30.50	30.40	30.40	30.40	30.40	30.60	29.80	29.70	29.80
pH	7.36	7.40	7.35	7.43	7.45	7.41	7.46	7.48	7.42	7.53	7.59	7.47	7.61	7.71	7.57
EC	112.30	119.30	109.10	119.60	128.30	121.60	133.20	139.60	144.50	147.50	158.20	150.20	159.40	167.30	161.20
TSS	118.30	10.29	116.20	123.40	11.60	120.30	139.20	17.40	132.60	145.60	23.00	140.40	162.30	36.84	156.80
DO	6.00	6.50	6.20	5.23	5.73	5.42	5.00	5.52	5.13	4.86	4.93	4.92	4.52	4.75	4.73
BOD	12.60	5.15	10.30	14.30	6.41	13.40	18.70	9.67	17.60	21.90	12.68	19.30	25.80	15.32	22.20
COD	26.25	11.23	24.70	34.05	16.27	32.60	40.65	19.75	38.40	54.75	32.19	51.90	66.15	44.51	63.10
NO_3- N	0.96	1.30	0.98	1.23	1.72	1.36	1.64	2.16	1.73	2.06	2.93	2.12	2.52	3.46	2.73
PO_4 -P	0.08	0.11	0.07	0.10	0.14	0.12	0.12	0.17	0.14	0.15	0.18	0.16	0.18	0.23	0.19
SO_4	0.80	0.12	0.90	2.20	2.70	2.20	3.60	4.00	3.70	4.80	5.20	4.90	5.20	5.90	5.30
TH	48.00	52.00	54.00	52.00	60.00	64.00	68.00	76.00	72.00	80.00	96.00	88.00	100.00	108.00	102.00
Ca	11.20	6.40	12.60	6.40	17.60	19.20	17.60	19.66	18.63	20.80	27.20	25.60	27.20	43.20	33.60
Mg	4.86	8.70	5.46	8.70	3.88	3.89	5.83	6.51	6.17	6.80	7.77	5.83	8.74	9.72	4.37
T.C	$24x10^4$	$43 x10^3$	$21 x10^4$	$39 x10^4$	$97 x10^3$	$23 x10^4$	$46 x10^4$	$13x10^4$	$43 x10^4$	$75 x10^4$	$24 x10^4$	$64 x10^4$	$90 x10^4$	$39 x10^4$	$75 x10^4$
F.C	+ ve	-ve	+ ve	+ ve	-ve	+ ve	+ ve	+ve	+ ve	+ ve	+ve	+ ve	+ ve	+ve	+ ve
E.Coli	+ve	-ve	+ve	+ve	-ve	+ve	+ve	-ve	+ve	+ve	-ve	+ve	+ve	+ve	+ve

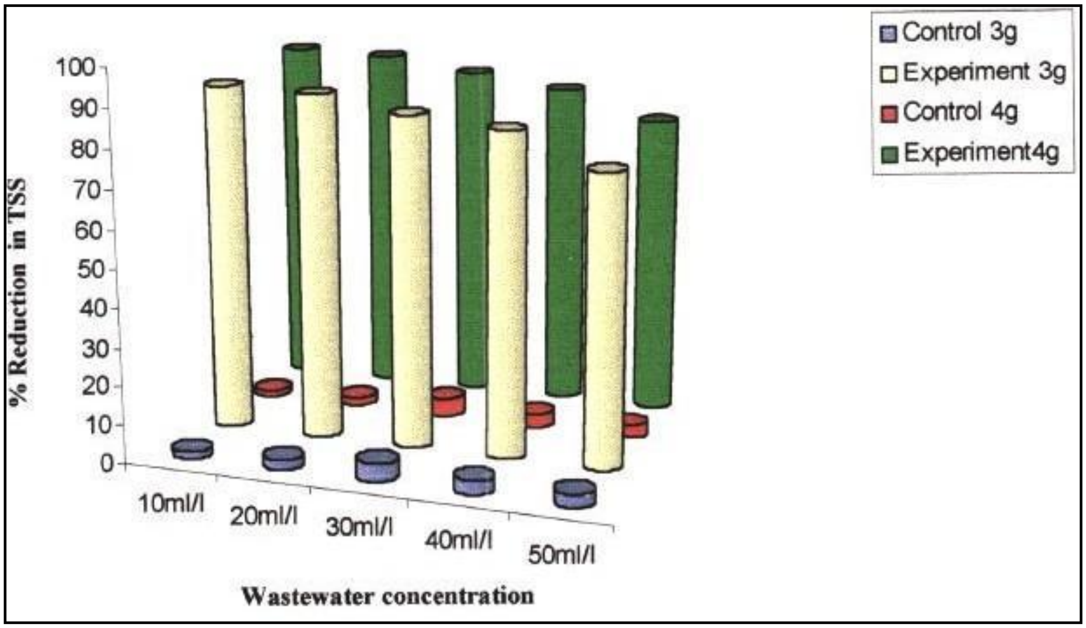

Fig: Percentage Reduction of TSS in Experimental Sets Treated with *Channa gachua*

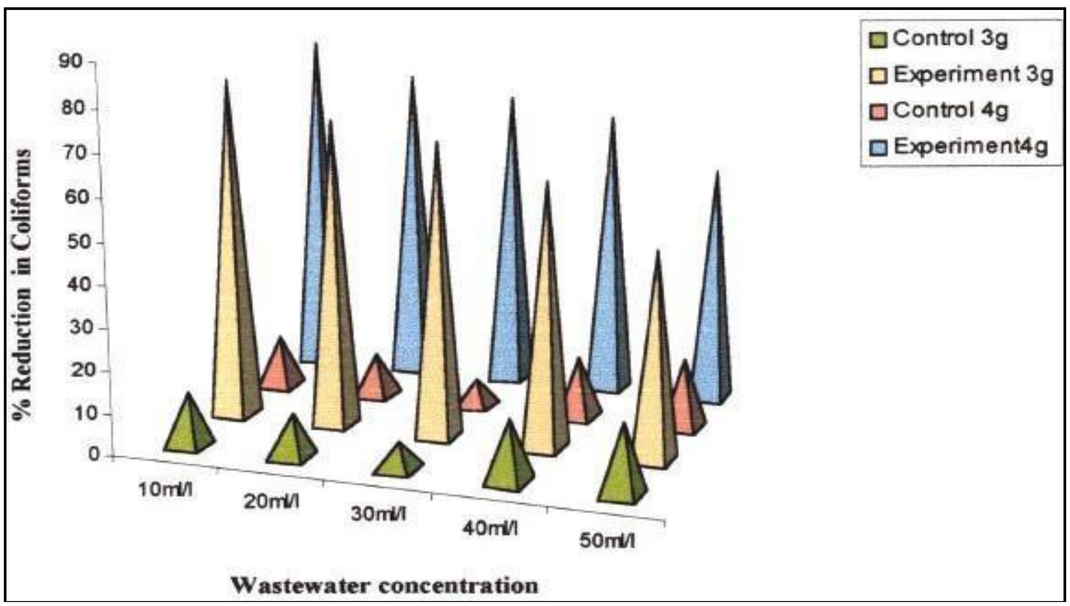

Fig: Percentage Reduction of Coli forms in Experimental Sets Treated with *Channa gachua*

In these experiments with concentrations (20-SW) there was a progressive decrease in removal of coli forms. This may be due to the greater coli form counts in higher wastewater concentrations. When 3gA *Channagachua was* introduced,73,69.56,62.6 and48.8 percent reduction in coli forms was observed in 20-50 ml wastewater experimental sets. Relatively higher reductions were obtained with 4g/l *Channagachua*, 75,71,68 and 56.66 percent while control had only 10.25,6.52,14.6, and16.66 percent removal. Previous studies was done by using fluorescently labeled bacteria to quantify the ingestion of bacteria by juvenile fish, revealed that *Channagachua* could ingest bacteria of size 3.92 * 1.55 x 1.53 0.34 *Channagachua* was efficient in reducing the BOD of experimental wastewaters. Removal up to 59.1 percent for 4gA and 56.2 percent for 3gA was obtained with 10 ml/l wastewater experimental *sets*. Control for this set had a maximum of only 18.25 percent reduction. In 20-50 ml wastewater fire experimental sets 55.2, 48.3,42.1 and 40.6 percent reduction in BOD was recorded with 4gA while slightly lower reduction 53.1,45.1, 39.4 and 37.2 percent was obtained with 3gA *Channagachua*. In the control, 6.29,5.88, 1 1.87 and 13.95 percent reduction in BOD was obtained. Some scientist reported BOD removal ranging from 23-63 percent in a sugar processing wastewater with *Channagachua* culture. Concentration of

COD showed a maximum of 57 percent removal with 4gA *Channagachua* treated wastewater (10ml wastewater A) and 55.3 percent reduction with 3gA *Channagachua*. Control for this set had only 5.90 percent reduction in higher wastewater concentrations (20-50 mV1) 51.6,49.3,36.2 and 30.1 percent reduction was noticed with 3gA and 52.2, 51.4, 41.2 and 32.7 percent reduction with 4Ga.

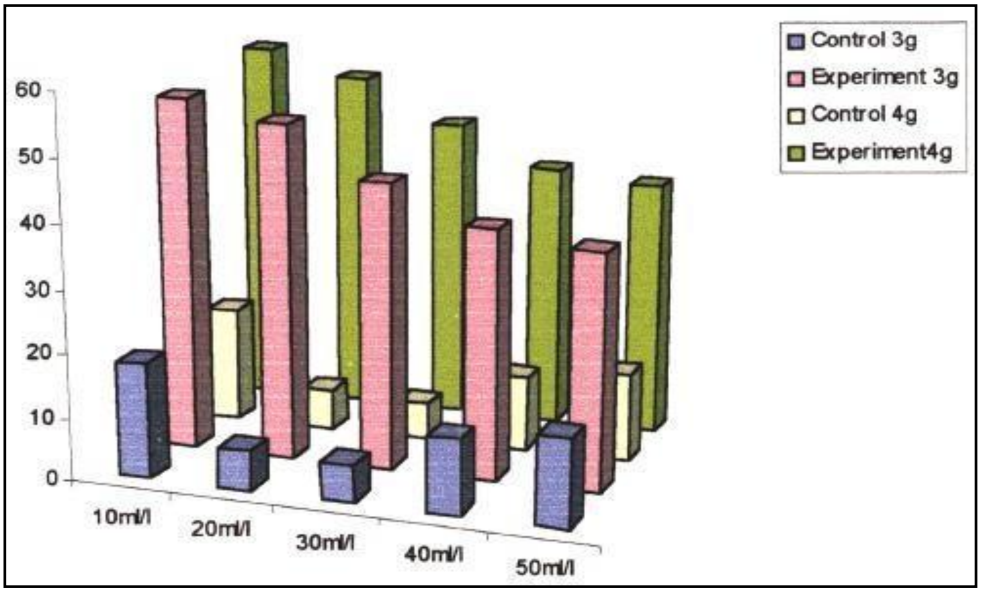

Fig: Percentage Reduction of BOD in Experimental Sets Treated with *Channa gachua*

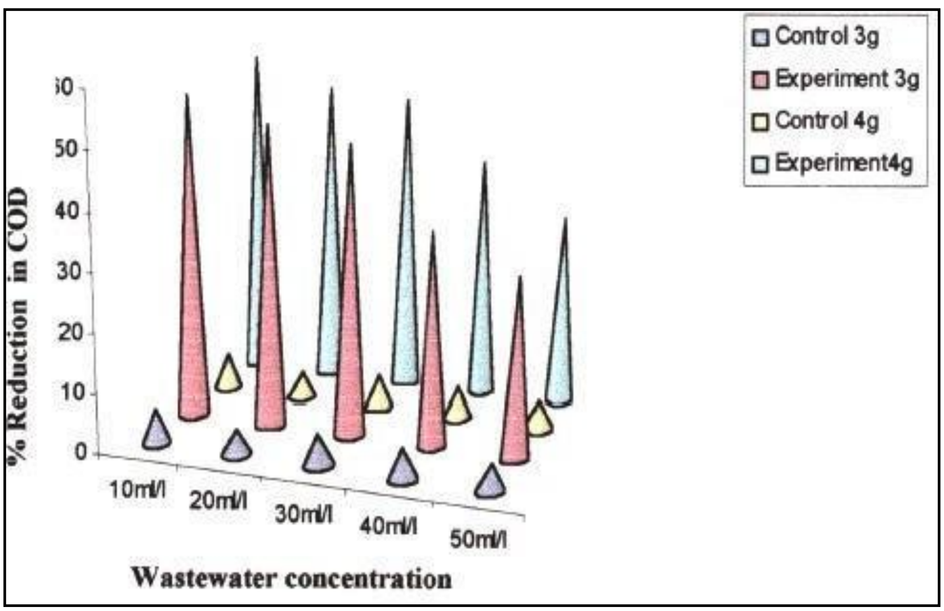

Fig: Percentage Reduction of COD in Experimental *SeCs* Treated with

Channa gachua

Result issignificantly greater thanthe controls 4.25,5.53, 5.20 and 4.61 percent. Among other physicochemical parameters, temperatureand pH did not show considerable variation. There wasa small increase in electrical conductivity, which maybe due to the fecal matter from fish. Dissolved oxygen showed a slight increase when compared to controls in both the biomass experiments. Nitrate nitrogen and phosphate in the experimental media increased slightly following detention of *Channagachua*for seven days.Phosphate increase couldbe due to the wastes dissolved in water. Fish excrete ammonia and a lesser amount of ureainto the water aswastes. Ammonia is converted tonitrates and then nitrates bacterial activity. Thelevels of nitrate therefore increased in the experimental sets when compared to control.

CONCLUSION

This experiment did in the River Son, Jharkhand, India. Fish species *Channa gachua* was taken for the experiment. We choose case and control for the research.

Examination of total annual catch statistics revealed that the younger size range i.e. between 30.0-39.0 mm was found to be insignificant at polluted stations (S-II). However, only 10.3% i.e. 31 individuals of size range between 40.0-49.0 mm were collected from this station. Comparatively at non-polluted site (S-I) about 20 no. of juveniles in the size range of 30.0-39.0 mm were collected followed by about 82 no. in between size range of 40.0-49.0 mm were caught.The data of length size and age-wise percentile catch composition of *Channas Sps.* from different stations clearly depicted significant difference in percentile catch composition in early length group and age group. However in higher length groups/age groups, the difference noted was comparatively insignificant. Thus the present findings revealed that there was drastic depletion of young stages/population at polluted stations (S-II) as compared to non-polluted one (S-I).

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