

## River Water and Soil Analysis in Noyyal River, Tirupur

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### Abstract

Tirupur is famous for its textile industries. Because of this, the rate of water pollution is also very high. The generation of waste water from the industries is the main reason for the waste water problems to the environment. Some industries are not adopting any proper treatment methods to avoid this pollution, because of the high treatment cost. Without giving proper treatment the waste water is dumping in to the river streams. By analyzing the present status of the river Noyyal, which is running through the urban centers of Tirupur city, it is clear that the river is little polluted. The rate of chemical oxygen demand (COD) and bio chemical oxygen demand (BOD) are higher than that of normal river water. This clearly indicates that the pollution is not yet controlled properly. To know the most polluted zone of river Noyyal, a case study is being processed as a project work. Both the organic and inorganic parameters are tested for each sampling point. All the parameters are varying from each sampling point to another. Here the study analyzed the heavy metals also but they are all within the WHO limits for the drinking water usage. But the color and odour of the river Noyyal is objectionable. Hence this study also aims to know the sources of pollutants.

**Keywords:** River Noyyal, COD, BOD, soil analysis, monitoring, surface water monitoring

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### INTRODUCTION

Urbanization and Industrialisation are the major sources of environmental pollution. Tirupur is facing environmental problem mainly because of the processing methods of dyeing. The most significant challenges for textile industries are water. Textile industry includes dyeing and bleaching consumes large amount of water and produces vast amount of effluent.

Noyyal River is a tributary of Cauvery River which rises from Vellingiri hills in Western Ghats, Tamilnadu South eastern India and drains in to Cauvery River. The river flows through four states, Coimbatore, Tirupur, Karur and Erode in western Tamilnadu. The river basin is 180 km in length wise and 25 km in width. And which covers an area of 3,500 km<sup>2</sup>. The area of cultivated land in the river basin is 1,800km<sup>2</sup>. The area is known by its meagre rainfall. The river contains water only in the monsoon season otherwise it will flow by containing the industrial effluents

from dyeing and bleaching industries. Till the river reaches Tirupur, the pollution concentration is considerably low.

The presence of Nitrogen and Phosphorus in river water clearly indicate the eutrophication. Much research has reported that the concentration of N and P in waters is closely related to eutrophication. In general, it is believed that waters are in a state of eutrophication when the concentrations of inorganic nitrogen and total phosphorus reach 0.3mg/L and 0.02mg/L respectively [1]. The National Research Institute of Disaster in Japan put forward a method to evaluate the degree of eutrophication, in which the degree of eutrophication is determined by a percentage based on the 9 values of components such as TN, TP, chlorophyll, transparency and oxygen demand [2–3]

Waste management studies are usually done using calibrated and verified water quality models. Ravi River located in Lahore,

Pakistan is receiving untreated wastewater from number of outfalls and surface drains and thus model calibration and verification are done using the data under the prevailing conditions. The water quality objectives can only be met with wastewater treatment wherein the model rate coefficients may change. The objective of this paper is to study the changes that may occur in these coefficients as a result of wastewater treatment. For this purpose, long-term BOD analyses have been carried out using river water and wastewater after different degrees of treatment [4]. The scientist and investigator are actively interested in study of water pollution problem in big rivers and urban regions of the country, ignoring the fact that small rivers covers a significant area and make a huge contribution to the pollution level.

The Noyyal is a seasonal river which has good flow only for short periods during the North-East and South-West monsoons. 6,000 acres of cultivable land in Coimbatore district are irrigated using the river water. The average width of the basin is 25 km. The basin is widest in the central part with a width of 35 km. The entire area of the basin is situated in the state of Tamilnadu, in parts of Coimbatore, Erode and Karur districts. The Noyyal confluences with the Cauvery River at Noyyal village. The upper reaches of the basin receive high rainfall of more than 3000 mm annually, while the eastern part receives only 600 mm.

The pre-monsoon season period produces about 100 mm to 300 mm of rain and most of it is received during the months of April and May. The River carries the effluents to downstream areas especially to the system tanks and the Orathapalayam reservoir. After reaching Tirupur town the Noyyal receives the town sewage and untreated effluents from dyeing and bleaching industries [5].

## MATERIALS AND METHODS

To know the present status of the Noyyal River, a case study has been done. For this 30 sampling points were selected and took the GPS coordinates. From each water sampling point we had collected the soil samples also. This was for the identification of heavy metals. Due to the flow of river, the self curing phenomenon will happen and the heavy metals in the water will get settle down in the soil. The heavy metal are immobilize when trapped inside soil. So the testing of the soil particles will give the presence of heavy metals appropriately.

In this present study we analyzed both the organic and inorganic parameters of the river water and tested the heavy metal concentration in the soil samples. From the areas where the heavy metals are identified from the soils, the bore water samples are collected and tested to know the contamination level of ground water.

## RESULTS AND DISCUSSION

*Table 1: Parameters Showing the Water Quality of Sampling Point 1.*

Sample : 1		GPS location: E :11°06.168 N :077°19.294
Slno:	Parameters	Value
1	pH	8
2	Turbidity	43 NTU
3	Transmittance	67 %
4	TDS	2.83 ppt
5	Absorbance	0.17
6	Conductivity	2.83
7	BOD	mg/lit
8	COD	800 mg/lit
9	Sulphate	221.52 mg/lit
10	Sulphide	2.67
11	Chloride	50 mg/lit
12	Iron	0.00 mg/lit
13	Chromium	2.04 mg/lit
14	Cadmium	NTL
15	Boron	0.25 mg/lit
16	Magnesium	Nil
17	Ammonia	6.072 mg/lit
18	D.O	4.6 mg/lit

**Table 2: Parameters Showing the Water Quality of Sampling Point 2.**

Sample : 2		GPS location: E :11 <sup>0</sup> 06.114 <sup>°</sup> N :077 <sup>0</sup> 19.508 <sup>°</sup>
Slno:	Parameters	Value
1	pH	9
2	Turbidity	10 NTU
3	Transmittance	95 %
4	TDS	3.14 ppt
5	Absorbance	0.02
6	Conductivity	4.52
7	BOD	mg/lit
8	COD	400 mg/lit
9	Sulphate	229.86 mg/lit
10	Sulphide	3.3
11	Chloride	5950 mg/lit
12	Iron	0.00 mg/lit
13	Chromium	1.02 mg/lit
14	Cadmium	NL
15	Boron	0.301 mg/lit
16	Magnesium	Nil
17	Ammonia	5.412 mg/lit
18	D.O	4.6 mg/lit

**Table 3: Parameters Showing the Water Quality of Sampling Point 3.**

Sample : 3		GPS location: E :11 <sup>0</sup> 06.04 <sup>°</sup> N :077 <sup>0</sup> 19.618 <sup>°</sup>
Slno:	Parameters	Value
1	pH	6
2	Turbidity	4 NTU
3	Transmittance	94 %
4	TDS	3.14 ppt
5	Absorbance	0.02
6	Conductivity	4.87
7	BOD	mg/lit
8	COD	600 mg/lit
9	Sulphate	254.8 mg/lit
10	Sulphide	3.1
11	Chloride	4100 mg/lit
12	Iron	0.22 mg/lit
13	Chromium	5.27 mg/lit
14	Cadmium	NL
15	Boron	0.084 mg/lit
16	Magnesium	Nil
17	Ammonia	3.74 mg/lit
18	D.O	4.6 mg/lit

**Table 4: Parameters Showing the Soil Quality of Sampling Point 1.**

Sample 1		GPS Coordinate: N: 11 <sup>0</sup> 06.168 <sup>°</sup> E: 077 <sup>0</sup> 19.294 <sup>°</sup>
Sl.no	Parameter	Value
1	Iron	37.6 mg/lit
2	Chromium	43.42 mg/lit
3	Cadmium	NL
4	Boron	0.925 mg/lit

**Table 5: Parameters Showing the Soil Quality of Sampling Point 2.**

Sample 2		GPS Coordinate: N: 11°06.114` E:077°19.687`
Sl.no	Parameter	Value
1	Iron	44.5 mg/lit
2	Chromium	136.94 mg/lit
3	Cadmium	NTL
4	Boron	1.25 mg/lit

**Table 6: Parameters Showing the Soil Quality of Sampling Point 3.**

Sample 3		GPS Coordinate: N: 11°06.04` E:077°19.618`
Sl.no	Parameter	Value
1	Iron	44.5 mg/lit
2	Chromium	53.44 mg/lit
3	Cadmium	NTL
4	Boron	1 mg/lit

From these results it is clear that the river is at a heavily polluted stage in the present status. The samplings are done in half Kilo meter distances. In this, from changing from one point to another, very high variations are occurred. From the first point to third point, the basic conditioned water became purely acidic, and in these zones the conductivity is very high. The conductivity is the main indicator of pollution, which clearly shows the pollution level in the water. And the content of iron is also very high. This indicates the contamination of river water by dye waste.

### CONCLUSION

From this study it is clear that the level of pollution in the Noyyal River is not yet controlled properly. It cannot be use for the any domestic or irrigation purpose. The character of this water is changing from place to place. In some areas the river under goes self purification phenomenon and due this the heavy metals is getting settled under the river water. Due to this the metals became immobile in the soil and it will contaminate the underground water.

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