

Assessing the Impact of Physico- Chemical and Bacteriological Analysis of Mullaiperiyar River Water in Theni District, Tamilnadu, India.

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Abstract: *Water is the spirit of all existence. The present study was focused to analysis the physico chemical and bacterial investigation of Mullaiperiyar River in Theni district. River water samples were collected from nine stations such as Lower camp (S1), Kullapagoundanpatty (S2), KarunakkaMuthan Patti (S3), Surlipatti (S4), Uthamapalayam (S5), Chinnamanur (S6), Veerapandi(S7), Theni Aranmanaipudur (S8)and Vaigai dam(S9) during the period of July 2015 to December 2015 using standard procedures. The river samples were investigated with different types of physico-chemical parameters like Temperature, pH, Electrical Conductivity (EC),Total Dissolved Solids (TDS), Total Hardness (TH), Total Alkalinity(TA),Calcium Hardness (CH), Magnesium Hardness(MH), Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Dissolved Oxygen (DO), Nitrate, Nitrite, Chloride and Iron. The bacteriological analyses were done by assessing the Total heterotrophic, Total Coliform, and Fecal Coliform bacteria. In this study, the following pathogenic bacteria such as Escherichia coli, Pseudomonas aeruginosa, Enterobacter aerogenes, Vibrio cholerae, Klebsiella pneumoniae, Proteus vulgaris, Shigella dysentery, Salmonella typhi, Staphylococcus aureus and Streptococcus faecalis have been investigated and reported here. The finding result Mullaiperiyar river water is mostly polluted by various anthropogenic activities due to discharges of domestic waste, industrial and agricultural waste. In this study, the Mullaiperiyar river water was unhealthy for utilization purpose and this scenario alarms the required for proper sanitation and drainage systems.*

1. Introduction

Water is one of the plentifully accessible substances. River water is the important sources of transportation, domestic, agricultural, industrial and hydroelectric power uses and maintain in all life for human beings (Ravi et al, 2012). Rivers play an important part of integrated with pollution sources from urban, domestic waste water, agricultural and

industrial runoff. Unfortunately, river water is impure in randomly removal of sewage, industrialized waste and excess of human activities (Koshy & Nayar, 1999).The river water effluence among the physical, chemical and biological pollutions is incidentally of anthropogenic activity and in huge ecological awareness of the humankind (May A.M et al, 2006; Xiaoyun Fan et al, 2010). The large scale of hydrologic alteration has harmful consequences to river surrounding and human fitness (Naiman & Dudgeon, 2011). World Health Organization (WHO) is most important of parameters of drinking water quality like pH, temperature, Dissolved Oxygen, BOD, COD, Total Hardness, Total alkalinity, E.coli, Total Coliform, and Fecal coliform. The aim of the present study was to investigate the physico chemical and bacteriological analysis of Mullaiperiyar river water sample collected from July 2015 to December 2015.

The Mullaiperiyar river dam is located in latitude 9°31'43 north and longitudes 77°8'39 east by the rivers flowing west during Kerala state and consequently the name is Mullaiperiyar river. The Mullaiperiyar River is one of the most important water systems in Theni district populace. Theni district is the southwestern district of Tamilnadu states and specifically located within latitudes 9° 53'and -10°22' north and longitudes 77° 17'and 77° 67' east (Sivamanikandan & Ahmed john, 2015). Theni is an intensity area of inhabitation, agricultural and industrial. It has assist large rural and towns like Surlipatti, Uthamapalayam, Chinnamanur, Veerapandi and Theni aranmanai pudur and others ,in the place of the total population of Theni district 1,246 million people. Sivamanikandan & Ahmed john, 2016)In this district one of the most contributing to the development of agriculture and industrial area like Uthamapalayam and Theni Aranmanaipudur.The accumulation of sewage discharge increased in this district, particularly the release of domestic and agricultural runoff almost increased year by year (Ramakrishnan et al,2012). In accumulation of untreated waste materials from public source to the river water stimulate huge

quantity of biological pollutants. These biological contaminants are produced severe ecological problems to the concerned water bodies (Ejaz Mahmood Ahmad Qureshi et al, 2011). Changes in the physicochemical and bacteriological quality due to river water pollution involve the quality of the river environment resulting to condensed life existence support purpose to this environment supply (Venkatesharaju et al, 2010). The microorganisms are infected by various factors such as Temperature, sedimentation, osmotic resources and food supply. Pollution of river water with harmful microorganisms by bacteria, viruses and parasites, has been raised in the earlier period (Abraham et al, 2007).

A bacterial inhabitant is frequently measured as a major indicator of contamination and eutrophication in the river environment. The most important bacterial strain in Total coliforms and fecal coliforms is *E.coli*. The micro organisms develop into the modified to heavy metal trained environments by the attainment of specific resistance systems (Mathiyazhagan et al, 2013). Randomly discarding of sewage and solid wastes into streams changes the physico chemical properties of river water production is not fitting for human utilization (Islam et al, 2012). This study assessed the river water quality of Theni district by performed the physicochemical and bacteriological of Mullaiperiyar river water.

2. Material and Methods

2.1. Study area

The study area was separated mainly into three regions included nine locations. River water samples were collected from upstream region- near dam like Lower camp (S1), Kullapagoundanpatty (S2), Karunakkamathan Patty (S3), Urban stretch region like Surlipatti (S4), Uthamapalayam (S5), Chinnamanur (S6), Veerapandi (S7) and Downstream region as Theni Aranmanaipudur (S8) and Vaigai dam. (Sivamanikandan & Ahmed john, 2016)

2.2. Collection of Sample

Collection of water samples were collected the period of six month from July 2015 to December 2015 as of the lower camp to Vaigai dam for the analysis of physico chemical and bacterial parameters. pH and Temperature of the river water samples were measured at the location using digital thermometer and pH meter correspondingly. The river water samples were collected in sterile polyethene containers. Containers were rinsed two to three times with river water. The container was immersed into the river water. After sample collection, the water container were kept in ice box

and transferred to laboratory for further investigation. (Sunitha et al, 2013)

2.3. Analysis of river water

The study of physico chemical parameters of Mullaiperiyar river water samples such as Temperature, pH, Electrical Conductivity (EC), Total Dissolved Solids (TDS), Total Hardness (TH), Total Alkalinity(TA), Calcium Hardness (CH), Magnesium Hardness(MH), Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Dissolved Oxygen (DO), Nitrate, Nitrite, Chloride and Iron were performed according to the standard method for American Public Health Association (APHA, 2005) and World Health Organization (WHO 2004).

2.4. Bacteriological method

The purpose of the bacterial populace from Mullaiperiyar river water was investigated by regular microbiological methods of the Bureau of Indian Standards (BIS 1998) and World Health Organization (WHO 2004). Bacteriological analysis of Mullaiperiyar river water samples were performed to confirm the excellence of river water by using standard plate count method. The river water samples were serially diluted method from 10^{-1} to 10^{-9} dilutions. The isolation and enumeration of Total Heterotrophic Bacteria colonies were performed by pour plate method in nutrient agar medium and incubated at 37°C for 24 hours. After incubation the bacterial colonies were confirmed by Quebec Colony Counter and noted as Colony Forming Units (CFU) per milliliter. Quantitative analyses of Total Coliform bacteria were performed by Standard Plate Count (SPC) method and the fecal coliform bacteria were enumerated by Fecal Coliform membrane filter (m-FC) agar plate technique. (Sivamanikandan & Ahmed john, 2015; Olatunji et al, 2011).

Additional, the Mullaiperiyar river water sample were inoculated in various types of media such as Mac-Conkey agar, Blood Agar, Mannitol Salt agar, Eosin methylene blue agar (EMB), Salmonella Shigella Agar, and m-FC agar. All the inoculated plates were incubated at 37°C for 24 hours except for the m-FC agar plates are incubated only at 45°C (APHA). After the incubation, all the plates were examined to difference size, shape, motility of bacteria. At present, the isolated colonies were progress for standard biochemical test such as IMViC, (Indole, Methyl Red, Vogus proskayer, and Citrate Utilization Test), Triple Sugar Iron (TSI) Test, Oxidase, Urease Catalase, Coagulase, Hydrogen sulphide and ONPG (ortho-nitrophenyl beta-D- galactopyranoside) investigation method were used for the detection of isolated bacteria.

3. Result and Discussion

The Mullaiperiyar river water quality was studied by assess the impact of physico chemical and

bacteriological analysis in nine different stations during the period of July 2015 to December 2015. The investigation of physico-chemical parameters confirmed significant variation from standard values indicating the occurrence of invariable pollution load in the river. The physico-chemical and bacteriological parameters are higher than the acceptable confines such as BIS, (1998), APHA, (2005) and WHO, (2004). The complete results of the different physico-chemical parameters of Mullaiperiyar River water samples were investigated in the present analysis in table 1.

3.1. pH

pH is the power of hydrogen ion concentration of acidity and alkalinity of water and determine hydrogen ion concentration. High decomposition sources like photosynthesis, Respiratory movements, temperature exposure to air, dumping of industries wastes are transport to change in the pH (Saxena, 1987). pH of river water was determined by pH meter and were examined with difference of 7.0 to 7.6 in nine stations respectively. The normal range of pH may cause nutritional variation and contain toxic ion can harmfully affect the augmentation of river existence (Bolawa & Gbenle, 2012).

3.2. Temperature

Temperature is vital parameters that influence of river water altering ecological surrounding. Temperature value of the Mullaiperiyar river water samples were measured on the spot using digital thermometer. In the present study the mean of temperature of Mullaiperiyar River was record at 25.50°C to 30.20°C. Temperature is recognized to control of pH, Dissolved Oxygen and Alkalinity concentration in the river water (Gagan matta, 2014).

3.3. Electrical conductivity (EC)

EC was confirmed in the Mullaiperiyar river water sample with a minimum value of 850 $\mu\text{S}/\text{cm}$ at station 1 and maximum of 1540 $\mu\text{S}/\text{cm}$ at station 9. EC is a measure the ability of water to spread electric current and too implement to charge the purity of water and measured to be a fine marker for assess the total dissolved solid resources in the clarity of river water (Murugesan et al, 2006 & Khalid K. Al bayatti et al, 2012).

3.4. Total Dissolved Solids (TDS)

The frequently increased level of TDS might be forced by the higher concentration of Phosphates, chlorides, carbonates, bicarbonates, nitrates, calcium, potassium, sodium, magnesium and crude substance which effect as the discharge of solid waste, agricultural and industrial waste. The quality of Total Dissolved Solids was calculated in Mullaiperiyar river samples ranged from 1420 to 1550 mg/l was confirmed. The high concentration of TDS present in Mullaiperiyar River due to pollution of domestic waste water, trash, and compost in the

river water. The large amount of TDS augments the nutrient level of river were affected into eutrophication of river water environment (Singh, & Mathur, 2005). The large quantity of TDS in river water can cause to the loss of many river life forms and change in flavor, excessive amount in water pipeline, water heaters and domestic device (Tihansky, 1974).

3.5. Dissolved Oxygen

DO is depending on the amount of physical, chemical and biological development in the river water samples. Dissolved oxygen is one of the most significance to all living organisms. The Dissolved Oxygen (DO) of Mullaiperiyar river water sample was calculated by Winkler's method. The presence of dissolved oxygen in river water samples vary from 24.0 to 52.0 mg/l. It can be present in river water due to through the dispersal from manner and photosynthetic action of autograph. It is vital for the bacterial crash of dissipate in the river water and for chemical response (Ashok et al, 2010).

3.6. Biological Oxygen Demand (BOD)

BOD is the amount of crude substances in the water and the assemblage of oxygen critical by the organisms to permanent the organically decomposable organic matter in wastes in aerobic surrounding. BOD was analyzed by Winkler methods. The measurement of BOD in nine stations of Mullai periyar river water ranged from minimum at 6.5mg/l and maximum at 35.0 mg/l. Sources of BOD contains dead plants, leaves and animals; sewage from different industries, waste water treatment plants, deteriorating septic systems and wastewater excess (Firozia et al, 2013).

3.7. Chemical Oxygen Demand (COD)

COD was measured by Reflux technique. The quantity of COD in the Mullaiperiyar river water samples ranged from 9.5 mg/l to 170 mg/l respectively. The waste resources discharged into this river water bodies are higher level of oxygen demanding and causes reduction of dissolved oxygen in river water. The huge amount of COD level is indicated by extremely polluted in the river water (Reddy & Baghel, 2010).

3.8. Total Alkalinity

The value of alkalinity in river water is incidence of natural saline in river. The source of alkalinity is the mineral deposits such as bicarbonate, phosphate, borate, hydroxide and organic acids to dissolve in the river water from soil (Shyamala et al, 2008). The amount of Total alkalinity was measured in Mullai periyar river water ranged from 230mg/l to 750mg/l. The different small level of industry present in Theni aranmanai pudur area does not have appropriate drainage system. The discharge of the dissipate water into the soil to increase the alkalinity of surface water in these region. The ideal values of alkalinity may be increase in free CO_2 in the river

water due to effect in the augment in alkalinity. The high value of alkalinity may cause harms in river water is used for irrigation as high alkalinity direct to increase in relative quantity of sodium in soil by precipitate of magnesium and calcium (Rhythm Aggarwal & Shakti arora, 2012).

3.9. Total Hardness

Total Hardness in Mullaiperiyar river water samples were determined by Ethylene Diamine Tetra Acidic acid (EDTA) titration method. The value of Total Hardness was measured in river water sample ranged from 210 to 620 mg/l respectively. The maximum level of hardness was recorded at located at 8, and exceed the highest permissible limit and may be created to the addition of sewage waste into the river water (Sivamanikandan & Ahmed John, 2015; Radha Krishnan et al, 2007). Total hardness of river water frequently indicates the concentration of calcium and magnesium ions in the river water. The main source of hardness is incrustation in supply systems and extreme soap utilization.

3.9.1. Calcium hardness

Calcium in the Mullaiperiyar River water samples were calculated by EDTA titration method. The value of calcium was analyzed in the river water sample ranged from minimum value 130 at station 1mg/l and maximum value 210 mg/l station 9 correspondingly. The river water contain large amount calcium is not fit for drinking, bathing, and washing. It may cause the intestinal disease and formation of stones. The huge amount of calcium may be permit by discharge of the rock into the river water (Sivakumar et al, 2011).

3.9.2. Magnesium hardness

Magnesium in the Mullaiperiyar River water samples were measured by EDTA titration method. The value of magnesium was examined in the river water sample ranged from 115 at station 1 mg/l and 155 mg/l station 9 respectively. The high concentration of magnesium can cause severity of river and increasing the amount of urination in human beings (APHA, 2005).

3.9.3. Chloride

High chloride may infect the human beings such as irritate the eyes, carcinogenic, nasal passages and lungs to human health. Chloride was analyzed by Argentometric method and the value was observed in the ranged from minimum 240 mg/l to maximum 280 mg/l.

3.9.4. Nitrate and Nitrite

Nitrate is extremely soluble in river water and can travel effortlessly through soil. Nitrate is a frequent contamination in river water. (Meyer et al, 2009). Nitrite is the one of the most significance source of organic oxidation of natural nitrogenous resources. (Lalitha et al, 2003). The mean value of nitrate and nitrite in river water sample were

analyzed at ranged from 4.50 to 7.35mg/l and 0.50 to 0.55 mg/l respectively. Nitrates are added to river water during the sewage discharge and industrial waste and agricultural runoff. The nitrate has increased in most importance as of its inference in newborn methaemoglobinaemia sickness distinguished by bluish colouration of skin (Goel, 2009).

3.9.5. Iron

Iron was recognized by Atomic absorption spectrophotometer. Iron was measured by phenanthroline spectrophotometric technique. Iron in the Mullaiperiyar river water sample ranged from 5.50mg/l to 6.75mg/l. The large amount of iron is formed through sewage materials on the river biota (Peuranen et al, 1994).

3.9.6. Bacteriological parameters

Bacteriological analysis of the Mullaiperiyar river water is shown in table. Total Heterotrophic bacteria, Total Coliform and Fecal Coliform bacteria were highly present in all nine stations of these river water samples. The mean value of the Total heterotrophic, Total coliform and fecal coliform bacterial colonies of Mullaiperiyar river water was tabulated in 2, 3, and 4. The Total Heterotrophic Bacteria (THB) is present in minimum value of 7.40×10^4 CFU/ml at lower camp and maximum value of 22.25×10^4 CFU/ml at Vaigai dam. In addition, the total coliform and fecal coliform bacteria are present minimum in lower camp and maximum at Vaigai dam with the value of 6.30×10^4 to 18.20×10^4 CFU/ml and 7.15×10^4 to 18.20×10^4 in the period of July 2015 to December 2015. Fecal indicator bacteria such as Total coliform, fecal coliform and fecal streptococci is excreted by human and animals exceed throughout the sewage waste and live in the river surrounding (Gerardi, & Zimmerman, 2005). The isolated bacterial colony were identified by biochemical test and to confirm the bacteria from the Mullaiperiyar river water samples of the nine location with the indication to the Bergey's Manual of Determinative Bacteriology (Buchanan et al, 1974). The finding of biochemical test is tabulated 5.

The bacteriological investigation in Mullaiperiyar river water were identified to ten different types of bacterial colonies like *E.coli*, *Klebsiella pneumoniae*, *Proteus vulgaris*, *Pseudomonas aeruginosa*, *Enterobacter aerogenes*, *Salmonella typhi*, *Shigella dysentery*, *Vibrio cholera*, *staphylococcus aureus*, and *streptococcus faecalis* were found. *E.coli* and *Klebsiella pneumonia* is a gram negative rod shape bacteria. It is identified in MacConkey agar, in the form of small pink colonies (*E.coli*), and form pink with mucoid colonies (*Klebsiella pneumoniae*) was produced. *E.coli* was identified on EMB agar and it was produced in green metallic sheen. *E.coli* is one of the definite markers

of fecal pollution in river area. The study of bacterial density of river water can present an approach to

evaluate the dependability of observed information (Bayaumi Hamuda & Patko, 2012). *Salmonella typhi*

Parameters	S1	S2	S3	S4	S5	S6	S7	S8	S9
pH	7.0	7.0	7.0	7.2	7.3	7.3	7.4	7.5	7.6
Temperature	25.50	26.30	26.50	27.20	27.30	27.50	28.30	29.50	30.20
Electrical Conductivity (µS/cm)	850	910	940	975	1035	1150	1200	1325	1540
TDS mg/L	1420	1350	1275	1100	985	950	975	1470	1550
Dissolved Oxygen	24.0	22.0	22.0	19.5	18.0	17.0	20.0	35.0	52.0
Biochemical Oxygen Demand (mg/L)	6.5	7.0	8.5	10.5	12.5	14.0	16.5	28.0	35.0
Chemical Oxygen Demand (mg/L)	9.5	11.5	14.5	19.0	30.5	45.0	70	120	170
Total Alkalinity (mg/L)	230	250	270	285	310	350	375	520	750
Total Hardness (mg/L)	210	225	240	255	280	310	355	475	620
Calcium Hardness (mg/L)	130	125	115	90	75	85	110	150	210
Magnesium Hardness (mg/L)	115	110	95	75	60	55	90	120	155
Chloride (mg/L)	240	210	190	170	155	160	185	230	280
Nitrate (mg/L)	4.50	4.55	4.70	5.0	5.50	5.75	6.25	7.0	7.35
Nitrite (mg/L)	0.50	0.50	0.52	0.55	0.40	0.42	0.45	0.52	0.55
Iron (mg/L)	5.50	5.50	4.10	3.75	3.50	3.95	4.50	5.72	6.75

Table 1. Physical and chemical Analysis of Mullaiperiyar River in Theni district

Mean value of Physical and chemical parameters of Mullaiperiyar river water in Lower camp to Vaigai dam (values are in mg/L, excluding pH, Temperature and EC). Here S1- Lower camp, S2- KullapaGoundan Patty, S3- Karunakkamuthan Patti, S4- Surlipatti, S5- Uthamapalayam, S6- Chinnamanur, S7- Veerapandi, S8- Theni Aranmanaipudur, S9- Vaigai dam.

Station	Total Heterotrophic Bacteria (Total colony count x10 ⁴ CFU/ml)					
	Jul 2015	Aug 2015	Sep 2015	Oct 2015	Nov 2015	Dec 2015
S1	7.40 ± 0.28	7.25 ± 0.35	6.15 ± 0.21	7.10 ± 0.21	7.35 ± 0.21	6.40 ± 0.28
S2	8.15 ± 0.21	8.15 ± 0.28	6.40 ± 0.28	7.40 ± 0.14	8.10 ± 0.14	7.25 ± 0.35
S3	9.25 ± 0.35	9.25 ± 0.28	7.20 ± 0.28	8.25 ± 0.35	9.20 ± 0.28	8.20 ± 0.28
S4	11.40 ± 0.28	10.25 ± 0.35	8.35 ± 0.21	10.30 ± 0.28	11.30 ± 0.28	10.30 ± 0.28
S5	13.20 ± 0.28	12.35 ± 0.21	10.40 ± 0.28	13.25 ± 0.35	14.25 ± 0.35	12.30 ± 0.28
S6	15.35 ± 0.21	14.25 ± 0.35	13.35 ± 0.21	15.30 ± 0.28	16.40 ± 0.28	14.40 ± 0.28
S7	17.15 ± 0.21	16.40 ± 0.28	15.15 ± 0.21	17.35 ± 0.21	18.20 ± 0.28	16.25 ± 0.35
S8	20.35 ± 0.21	19.25 ± 0.35	18.40 ± 0.28	20.35 ± 0.21	22.25 ± 0.35	19.40 ± 0.28
S9	23.40 ± 0.14	22.20 ± 0.28	21.30 ± 0.28	23.40 ± 0.28	24.30 ± 0.28	22.25 ± 0.35

Table 2. Total Heterotrophic Bacteria (THB) analysis of Mullaiperiyar river water. Mean and Standard Deviation of THB colony counting from Lowercamp to Vaigai dam in Theni district.

Table 3. Total Coliform Bacteria (TCB) analysis of Mullaiperiyar river water.

Station	Total Coliform Bacteria (Total colony count x10 ⁴ CFU/ml)					
	Jul 2015	Aug 2015	Sep 2015	Oct 2015	Nov 2015	Dec 2015
S1	6.30 ± 0.28	6.20 ± 0.28	6.10 ± 0.14	6.35 ± 0.21	5.20 ± 0.28	5.50 ± 0.28
S2	6.55 ± 0.21	7.25 ± 0.28	6.45 ± 0.21	7.20 ± 0.28	5.40 ± 0.28	6.20 ± 0.28
S3	7.30 ± 0.28	8.35 ± 0.21	7.20 ± 0.28	8.20 ± 0.28	6.25 ± 0.35	6.45 ± 0.21
S4	8.40 ± 0.28	9.25 ± 0.35	8.35 ± 0.21	10.30 ± 0.28	6.50 ± 0.14	7.40 ± 0.28
S5	11.20 ± 0.28	12.20 ± 0.28	10.40 ± 0.28	13.35 ± 0.21	8.20 ± 0.28	9.25 ± 0.35
S6	12.25 ± 0.35	13.35 ± 0.21	11.15 ± 0.21	15.40 ± 0.28	9.40 ± 0.28	11.35 ± 0.21
S7	14.35 ± 0.21	15.20 ± 0.28	13.35 ± 0.21	17.25 ± 0.35	12.25 ± 0.35	13.25 ± 0.35
S8	17.15 ± 0.21	18.40 ± 0.28	16.25 ± 0.35	20.25 ± 0.35	15.40 ± 0.14	16.35 ± 0.21
S9	18.40 ± 0.28	19.25 ± 0.35	18.35 ± 0.21	22.35 ± 0.21	17.20 ± 0.28	18.20 ± 0.28

Mean and Standard Deviation of TCB colony counting from Lowercamp to Vaigai dam in Theni district

Table 4. Fecal Coliform Bacteria (FCB) analysis of Mullaiperiyar river water.

Station	Fecal Coliform Bacteria (Total colony count x10 ³ CFU/ml)					
	Jul 2015	Aug 2015	Sep 2015	Oct 2015	Nov 2015	Dec 2015
S1	7.15 ± 0.21	6.35 ± 0.21	6.30 ± 0.42	6.15 ± 0.21	5.30 ± 0.42	5.25 ± 0.35
S2	7.45 ± 0.21	7.35 ± 0.21	7.20 ± 0.28	6.35 ± 0.21	6.25 ± 0.35	6.30 ± 0.14
S3	8.25 ± 0.35	8.35 ± 0.35	8.25 ± 0.35	7.20 ± 0.28	7.35 ± 0.21	6.50 ± 0.14
S4	9.35 ± 0.21	10.20 ± 0.28	9.30 ± 0.28	8.30 ± 0.28	9.25 ± 0.35	7.20 ± 0.28
S5	13.25 ± 0.35	12.25 ± 0.35	12.40 ± 0.28	10.35 ± 0.21	11.25 ± 0.35	9.45 ± 0.21
S6	15.35 ± 0.21	13.20 ± 0.28	14.25 ± 0.35	11.40 ± 0.28	13.35 ± 0.21	11.20 ± 0.28
S7	17.25 ± 0.35	15.40 ± 0.28	16.30 ± 0.28	13.20 ± 0.28	14.45 ± 0.21	13.35 ± 0.21
S8	19.30 ± 0.14	18.25 ± 0.35	19.20 ± 0.28	16.15 ± 0.21	17.35 ± 0.21	16.30 ± 0.28
S9	21.35 ± 0.21	21.25 ± 0.21	20.30 ± 0.28	18.45 ± 0.21	20.40 ± 0.28	18.20 ± 0.28

Mean and Standard Deviation of FCB colony counting from Lowercamp to Vaigai dam in Theni district

was identifying by *Salmonella shigella* agar; it produced in black centre, smooth colonies. *Salmonella spp* is one of the most frequently related with unhygienic foods and nourish by river water. *Salmonella spp* is commonly originated from sewage, industrial wastes and in river that obtain a mixture of industrial and sewage wastes (Martinez-urtaza et al, 2004). *Shigella dysentery* was identified by *Salmonella shigella* agar; it produced in colourless smooth colonies. The presence of staphylococci and streptococci were identified in blood agar plates produced by β - haemolytic and α -haemolytic colonies. The presence of undergrowth and scrub may indicate around the water bodies create probable and likely that various individuals may have been transient out of feces into the river water (Edama, 2001). As a finding result, we confirmed the effluence of the Mullaiperiyar river water with human and animal waste, domestic sewage in addition with septic tank discharge can be caused for different types of water borne illness.

4. Conclusion

The current study concluded that the Mullaiperiyar river water was awfully polluted due to the discharge of solid squander such as municipal and domestic waste, addition of animal and human feces, industrial and agricultural dissipate such as pesticide and fertilizer added into river water. Although the physico chemical and bacteriological assessment of Mullaiperiyar River water quality was not recommended directly utilization purpose for drinking. The health and hygienic organization to monitor and manage Mullaiperiyar River water effluence. Public consciousness programmed on hygiene, its significance, easy and inexpensive river water treatment technique such as boiling and filtration of water would confirm to avoid the waterborne disease in the Theni district.

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