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PRE- AND POST- MONSOON VARIATION IN PHYSICOCHEMICAL CHARACTERISTICS OF WATER QUALITY OF SITTAUNG RIVER IN TAUNGOO AREA

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Abstract

This paper is concerned with investigation of the water quality of Sittaung River in Taungoo area during 2011 to 2015.Water samples were collected at the periods of post-monsoon and pre-monsoon. Higher total alkalinity values of 130 ±15 ppm was observed in pre-monsoon periods compared to post-monsoon periods(100± 10)ppm. No significant difference of total hardness was observed between two collection periods. Total dissolved solids values in pre-monsoon periods were higher than the post monsoon periods. Positive correlation between total dissolved solids and temperature (r = 0.608) and also total suspended solids and temperature (r =0.766) were regarded as strong. Electrical conductivity values were less than 250 µS/ cm and it was classified as excellent for irrigation purpose. Higher dissolved oxygen values (4.8±1.0 ppm) were found in post-monsoon periods compared to those in pre-monsoon periods (3.4±0.9ppm).Both biochemical oxygen demand and chemical oxygen demand were far below the permissible limit. Nitrite nitrogen, nitrate nitrogen and ammonia nitrogen in river water for both collection periods were below the permissible limit. However, phosphate contents were slightly higher than the permissible level of 0.01 ppm. Lower sodium hazard of Sittaung river water was found so that river water did not pose problem on plant cultivation. Most of the chemical properties of the Sittaung River water in post-monsoon periods and pre-monsoon periods were different significantly. Data analysis were performed using Statistical Package for Social Science (SPSS) version 22.0.Correlation analysis among variables was performed by using Pearson correlation coefficient to measure the strength of the relationship between some variables.

Keywords: Sittaung River, water quality, sodium hazard, SPSS,correlation analysis

Introduction

The Sittaung River is a river in south central Myanmar in Bago Region. The river originates at the edge of the Shan Plateau and South East of

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Mandalay and flows south-ward to the Gulf of Mottama. River flows connect different habitats for water- dependent animals and plants. The alluvial plain occupies the central part of Sittaung River basin. The area of that basin is about 31944.4 sq-km. Sittaung River basin connect wetlands, floodplains, upstream and downstream habitats. Its length is of 420 km.The width of the river in monsoon period is (30.8-45.72) meters at upper Paunglong, about 91.44 meters near Pyinmana, 106.88 meters in the area of Taungoo, and (152.4-182.88 meters) in the area of mouth (TunKo, 2005). River regulation has reduced the size and frequency of the river flows that connect river with floodplains and sea. There are small scale farmlands along Sittaung river bank in Taungoo area. These are irrigated by Sittaung River during dry season (from November to May). In Monsoon, these are also used as rain-fed. Rivers are complex systems of flowing waters drawing specific land surfaces which are defined as river basins or watersheds. The characteristics of the river or rivers within the total basin system are related to a number of features. These features include the size, form and geological characteristics of basin and climatic conditions which determine the quantities of water to be drained by the river network (Chapman,1996). Water quality variability depends on the hydrological regime of the river. Agricultural water quality monitoring is particularly interested in five categories of water contaminants: sediments, nutrients, bacteria, pesticides and dissolved solids that rapidly deplete oxygen from stream. The impact of river maintains on drainage and agriculture performance can deliver standard of drainage and provides service to agriculture land use (Dunderdale and Morris, 1997).

The main aim of this research is to investigate the quality of Sittaung River Water during pre- and post- monsoon periods for domestic and irrigation purposes.

Materials and Methods

Sample Collection

Sittaung River water samples from six sampling sites were collected at the pre-monsoon periods (late May) of years 2012, 2013, 2014 and 2015 and post-monsoon periods (early November) of years 2011, 2012, 2013 and 2014.Locations of sampling sites for river water are shown in Table 1 and

Figure 1. Exact coordinate of sampling locations were recorded by using a Global Positioning System (GPS) device.

Table 1: Sampling Sites of Irrigated River Water Samples

No	Sampling site	Position	
		Longitude	Latitude
1	W_1 Near Myogyiharbour	96°28' 22.83" E	18°55' 3.69" N
2	W_2 East part of Do Thaung	96°27' 54.02" E	18°55' 27.34" N
3	W_3 Middle part of Do Thaung	96°27' 39.12" E	18°55' 44.89" N
4	W_4 West part of Do Thaung	96°27' 39.76" E	18°55' 13.40" N
5	W_5 Edge of ThaPhanpin	96°27' 14.61" E	18°55' 13.67" N
6	W_6 East part of ThaPhanpin	96°26' 50.70" E	18°55' 32.13" N

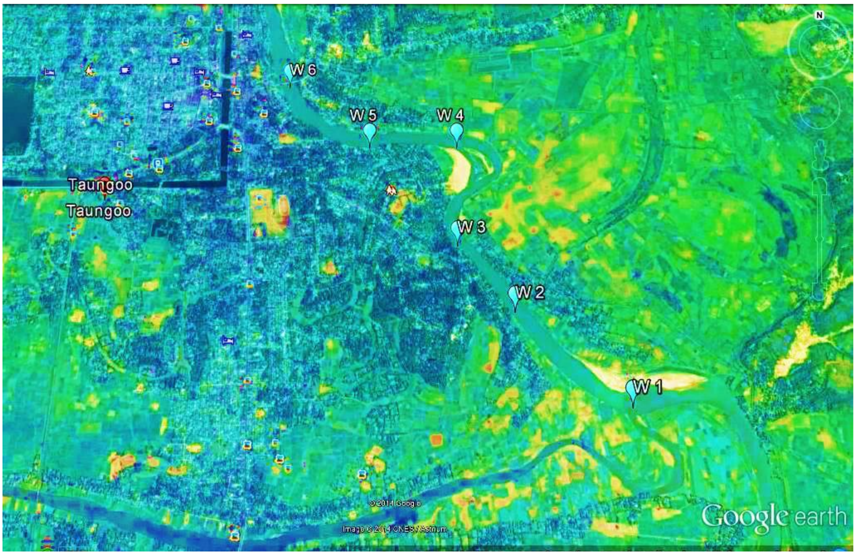

Figure 1: Google earth map of locations of river water sampling sites

Determination of Some Physicochemical Properties of the Sittaung River Water

pH and temperature were determined by pH meter (Model EIL-7020, ABB England) and total alkalinity, total hardness and chemical oxygen demand by titration methods, biochemical oxygen demand by incubation method, electrical conductivity by electrical conductivity meter(Model 1152, US), nitrite nitrogen, ammonia nitrogen, nitrate nitrogen, phosphate values by spectrophotometric method using spectrophotometer (PD-303, APEL, Japan) were determined. Sodium adsorption ratios of river water samples were calculated.

Results and Discussion

Sittaung River water samples from six selected irrigated sources were collected and then properties of River water were determined during the study period.

pH

pH values of river water samples in post- and pre-monsoon periods are shown in Figure 2. It was found that the pH values were found to be nearly neutral in post-monsoon period and the mean was 6.6 ± 0.1. In pre- monsoon periods, the pH values were found to be neutral as well as slightly alkaline and the mean value was 7.3 ± 0.2. pH values in post-monsoon periods and pre-monsoon periods were found to be significantly different ($p < 0.01$). Sittaung River water was found to possess no threat of drinking and irrigation because pH values obtained were within the permissible limit (6.5-8.5) (FAO/WHO, 1994).

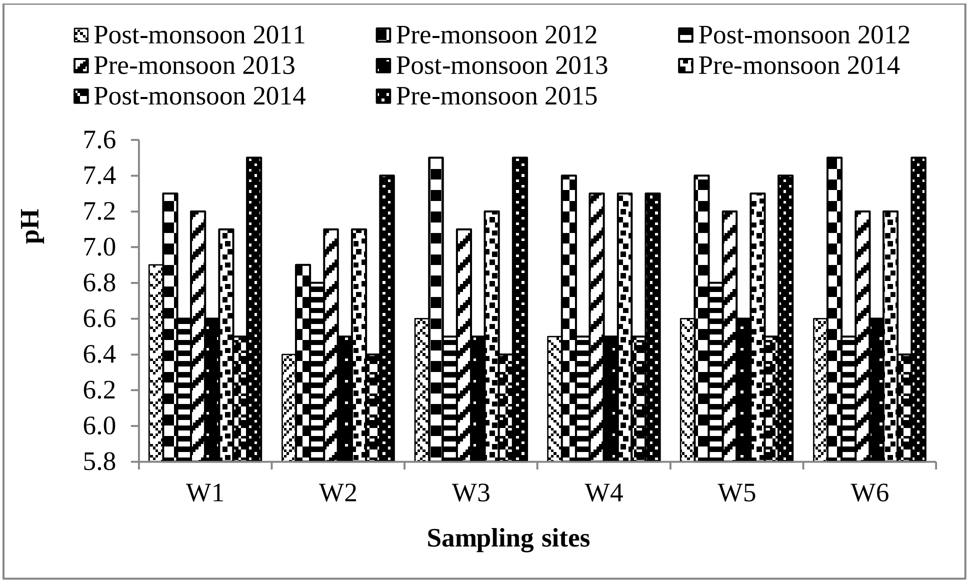

Figure 2: pH values of Sittaung river water samples at different sampling sites in post-monsoon and pre-monsoon periods

Temperature and Total alkalinity

During the study periods the mean temperature in post-monsoon periods was 25.4 ± 2.2˚ C and the mean value in pre-monsoon period was 30.7 ± 2.0°C. Significant differences in temperature were observed between post-monsoon periods and pre-monsoon periods ($p < 0.01$).Total alkalinity values of river water sample were found with the mean value of 100 ± 14 ppm in post-monsoon periods (Figure 3). In pre-monsoon periods, the total alkalinity values were higher than those in pre-monsoon periods with mean value of 130 ± 15 ppm. The higher values of total alkalinity during pre-monsoon periods ($p < 0.05$) may be due to the fact that the river water becomes concentrated during the period having high temperature. All of the total alkalinity values in this study were below the permissible limit of 200-600 ppm recommended by (USEPA, 1997).In this study a positive correlation was observed between total alkalinity and temperature (r = 0.656).

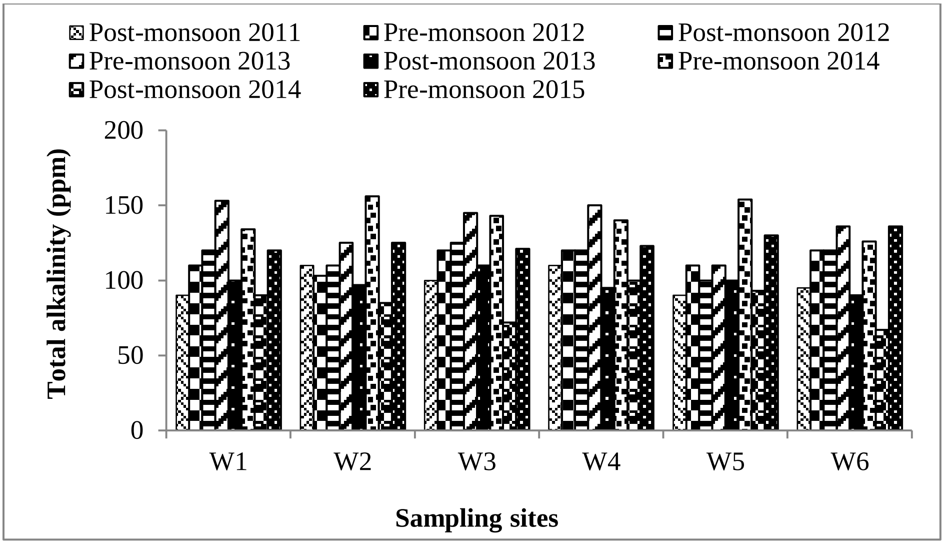

Figure 3: Total alkalinity values of Sittaung river water samples at different sampling sites in post-monsoon and pre-monsoon periods

Total Hardness

Total hardness values of river water samples in both periods are shown in Figure 4. Total hardness values ranged between 110 to 150 ppm in post-monsoon periods with the mean value of 126 ± 11 ppm and in pre-monsoon periods ranged between 100 to 146 ppm with the mean value of 127 ± 11 ppm. No significant difference in total hardness was observed between the two periods ($p > 0.05$).Water that has a hardness less than 61 mg/L is considered soft; 61-120 mg/L, moderately hard; 121-180 mg/L, hard; and more than 180 mg/L, very hard (Heath, 1983). Thus, total hardness values of river water were found to be soft and these values were within the permissible range of 110-150 ppm (USEPA, 1997).

Total Dissolved Solid

In post-monsoon periods, mean value of total dissolved solid was 158 ± 25 ppm and in pre-monsoon it was 188 ± 23 ppm (Figure 5).Total dissolved solids values of river water of the most sampling sites in pre-monsoon periods were higher than those in post-monsoon periods ($p < 0.05$).This is due to higher temperature in pre-monsoon period which cause the evaporation of water. In this study total dissolved solid and temperature were positively correlated (r = 0.608).It was noted that total dissolved solid values in both seasons were far below the permissible limit for 500 ppm (USEPA, 1997; WHO,2006).

Total Suspended Solids

Total suspended solids values of river water samples are shown in Figure 6.In post-monsoon periods total suspended solids were in the range of 75 to 140 ppm with the mean value of 105 ± 18 ppm and in the pre-monsoon periods the values were in the range of 110 to 170 ppm with the mean value of 144 ± 17 ppm. The differences in total suspended solid in post-monsoon periods and pre-monsoon periods were not significant (p>0.05) in the study period. Strong positive correlation was observed between total suspended solids and temperature (r =0.766).However, total suspended solid values of Sittaung river water were lower than the permissible level of irrigation purpose of 200 ppm (ISI, 1985).

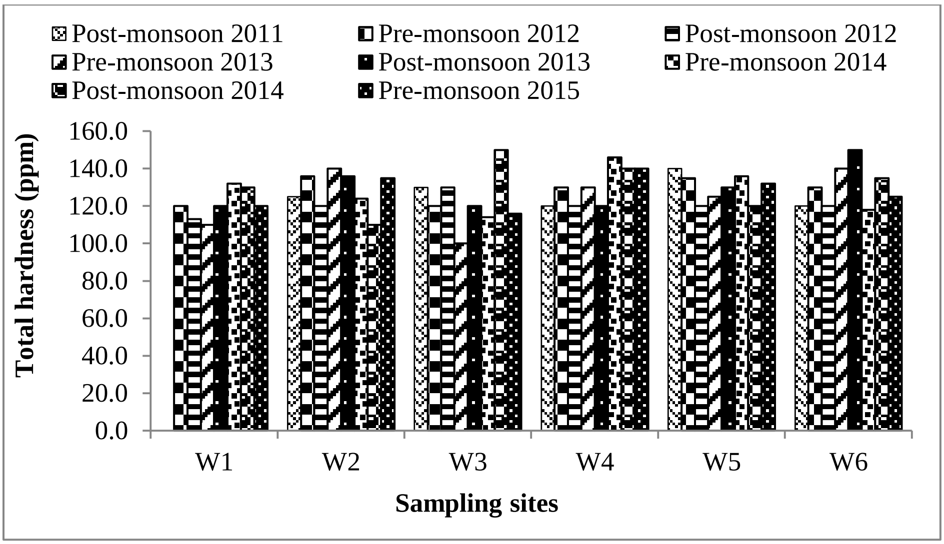

Figure 4: Total hardness values of Sittaung river water samples at different sampling sites in post-monsoon and pre-monsoon periods

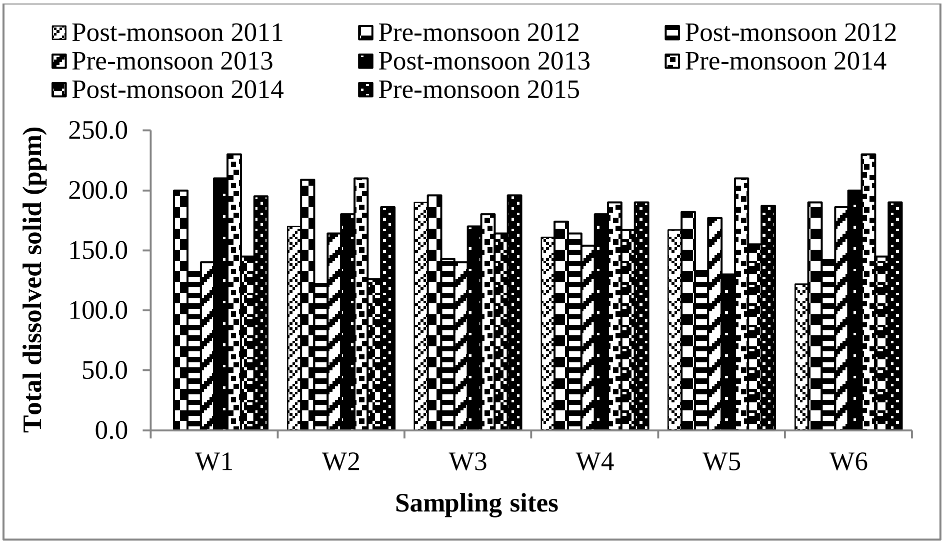

Figure 5: Total dissolved solid values of Sittaung river water samples at different sampling sites in post-monsoon and pre-monsoon periods

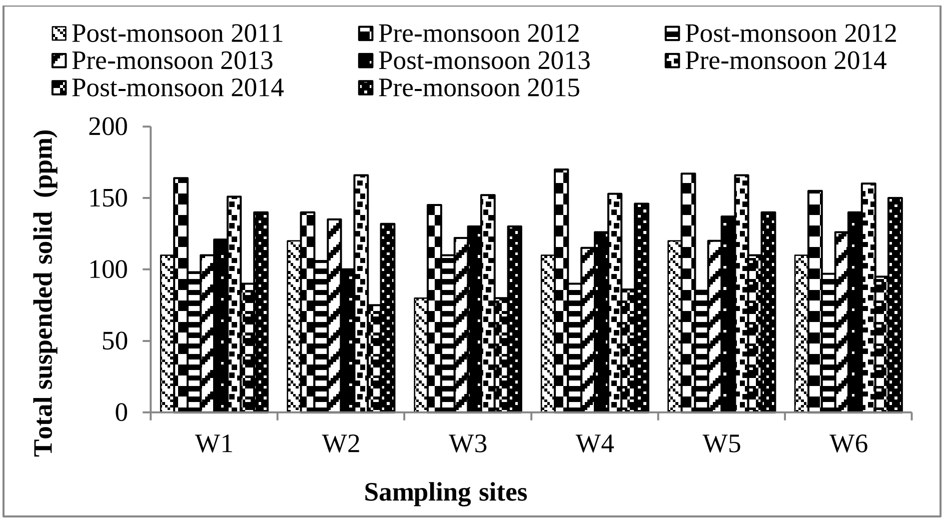

Figure 6: Total suspended solid values of Sittaung river water samples at different sampling sites in post-monsoon and pre-monsoon periods

Electrical Conductivity

Electrical conductivity values of river water samples in pre- and post-monsoon periods are shown in Figure 7. It was found that the electrical conductivity values were in the range of 80.7 to 167.4 µS/cm with mean value of 119.3 ± 22.2 µS/cm in post-monsoon periods and in the range of 80.7 to 167.4 µS/cm with the mean value of 144.0 ± 29.0 µS/cm in pre- monsoon periods. Electrical conductivity values in post-monsoon periods were lower than those in pre-monsoon periods ($p>0.05$).A positive and strong significant relationship ($r = 0.608$) between electrical conductivity and total dissolved solids was observed because conductance of electric current depends upon the dissolved ionic species. Hence high electrical conductivity values corresponds to high total dissolved solids (Siosemarde *et al*., 2010). Since the electrical conductivity values were < 250 µS/cm the Sittaung river water was regarded as excellent one for irrigation purpose (Ayers and Wescot 1997) .

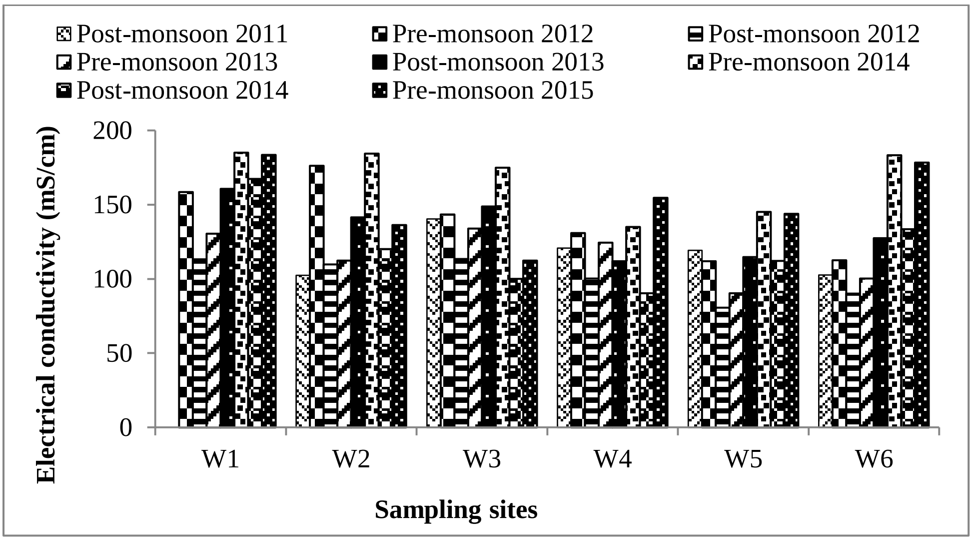

Figure 7: Electrical conductivity values of Sittaung river water samples at different sampling sites in post-monsoon and pre-monsoon periods

Dissolved Oxygen

Table 2 shows dissolved oxygen values of river water samples. In this study dissolved oxygen values were in the range of 2.9 to 6.8 ppm with the mean value of 4.8±1.0 ppm in post-monsoon periods and those in pre-monsoon periods were in the range of 2.2 to 4.8 ppm with the mean value of 3.4±0.9 ppm. In the course of study period, dissolved oxygen values of river water in post-monsoon periods were higher than those of water in pre-monsoon periods ($p < 0.01$). This is because high temperature favours the growth of microbes and algae which are main source of oxygen consumption (Naseema *et al*., 2013).In this study a weak negative correlation (r = - 0.1840) was observed between temperature and dissolved oxygen. Dissolved oxygen values of almost every sampling sites falls within the permissible limit of 4 to 6 ppm (BSI, 2012) which ensure better aquatic life in water body (Gupta *et al*., 2017).

Table 2: Dissolved Oxygen Values of Sittaung River Water Samples at Different Sampling Sites in Post-monsoon and Pre-monsoon Periods

Sample	Dissolved oxygen (ppm)							
	Post-monsoon 2011	Pre-monsoon 2012	Post-monsoon 2012	Pre-monsoon 2013	Post-monsoon 2013	Pre-monsoon 2014	Post-monsoon 2014	Pre-monsoon 2015
W_1	5.4	4.5	3.9	2.2	6.4	4.6	4.2	3.5
W_2	3.8	2.4	4.1	3.4	5.8	4.0	3.9	2.2
W_3	4.2	3.8	3.2	2.8	6.3	4.6	4.5	3.9
W_4	4.8	3.3	2.9	2.5	5.6	3.5	3.2	2.2
W_5	5.8	4.8	5.1	4.8	5.8	3.6	4.2	3.1
W_6	4.8	2.2	4.9	3.4	6.8	4.7	4.8	2.8
(Mean ±SD)	Post-monsoon(4.8 ± 1.0 ppm)			Pre-monsoon (3.4 ± 0.9 ppm)				
Permissible limit	(2.0-6.0) ppm (BSI, 2012)							

Biochemical Oxygen Demand

Biochemical oxygen demand is a measure of how much dissolved oxygen is being consumed as microbe break down organic matter.The biodegradation of the organic materials exerts oxygen tension in the water and increases the biochemical oxygen demand (Abida and Harikrishna, 2008).Biochemical oxygen demand of river water samples are shown in Table 3. It was found that the mean values of biochemical oxygen demand in the post-monsoon periodswas3.0±0.7 ppm and that in pre-monsoon periods was 4.9±1.5 ppm. No significant difference in biochemical oxygen demand values of river water in post-monsoon periods and in pre- monsoon period was observed ($p>0.05$). All of the values in both periods were far below the permissible values for irrigation, 100 ppm (ISI, 1985). In this study a negative correlation ($r = - 0.541$) was observed between biochemical oxygen demand and dissolved oxygen.This is because the oxygen available in the water is being consumed by the bacteria (Sawyer *et al*., 2003).

Table 3: Biochemical Oxygen Demand Values of Sittaung River Water Samples at Different Sampling Sites in Post-monsoon and Pre-monsoon Periods

Sample	Biochemical oxygen demand (ppm)							
	Post-monsoon 2011	Pre-monsoon 2012	Post-monsoon 2012	Pre-monsoon 2013	Post-monsoon 2013	Pre-monsoon 2014	Post-monsoon 2014	Pre-monsoon 2015
W_1	1.8	4.8	4.3	5.8	2.0	2.9	2.7	2.1
W_2	2.5	3.7	3.6	4.3	2.0	2.9	2.4	5.6
W_3	2.7	6.2	4.3	6.7	3.0	3.5	2.8	5.3
W_4	1.9	4.6	3.9	8.3	3.3	3.8	3.1	5.7
W_5	3.5	3.4	3.2	7.3	2.5	3.2	4.3	6.8
W_6	2.8	3.1	3.7	4.9	3.1	4.2	3.1	4.4
(Mean ±SD)	Post-monsoon(3.0±0.7 ppm)			Pre-monsoon (4.9 ± 1.5 ppm)				
Permissible limit	100 ppm (ISI, 1985)							

Chemical Oxygen Demand

Chemical oxygen demand indicates the presence of all forms of organic matters, both biodegradable and non-biodegradable and hence the degree of pollution in water.Table 4 shows the chemical oxygen demand values of river water samples in post-monsoon and pre- monsoon periods were 4.7±1.4 ppm and 9.5± 1.8 ppm respectively. Chemical oxygen demand values between two seasons were significantly different ($p< 0.05$). Chemical oxygen demand values of pre- monsoon periods were higher than those of samples in post-monsoon periods. This is due to more farming activities throughout the dry seasons. All of the values in both periods were far below the permissible values of 200 ppm for irrigation purpose (ISI, 1985).

Table 4: Chemical Oxygen Demand Values of Sittaung River Water Samples at Different Sampling Sitesin Post- monsoon and Pre-monsoon Periods

Sample	Chemical oxygen demand (ppm)							
	Post-monsoon 2011	Pre-monsoon 2012	Post-monsoon 2012	Pre-monsoon 2013	Post-monsoon 2013	Pre-monsoon 2014	Post-monsoon 2014	Pre-monsoon 2015
W_1	3.7	8.5	4.3	8.6	4.7	9.2	3.9	11.7
W_2	3.9	9.5	6.3	7.8	2.6	12.8	4.7	9.8
W_3	6.8	11.2	5.8	9.4	3.3	7.3	5.9	8.5
W_4	5.9	13.5	4.7	6.5	2.5	11.0	6.8	9.4
W_5	6.4	9.4	3.8	8.6	3.1	8.1	5.2	7.9
W_6	4.8	7.6	2.9	10.4	4.1	12.8	7.5	10.5
(Mean ±SD)	Post-monsoon(4.7 ±1.4ppm)			Pre-monsoon (9.5± 1.8 ppm)				
Permissible limit 200 ppm (ISI, 1985)								

Nitrite Nitrogen, Nitrate Nitrogen and Ammonia Nitrogen

Inorganic nitrogen exists in free state or nitrite, nitrate and ammonia forms.Nitrite nitrogen values of river water samples were found to be 0.010 to 0.060 ppm with the mean values of (0.030±0.015ppm) in post-monsoon and 0.001 to 0.004 ppm with the mean values of (0.002 ± 0.001 ppm) in pre-monsoon periods respectively(Table 5). Nitrite nitrogen values between the two periods were significantly different ($p< 0.01$). The major source of nitrate and nitrite concentration in some rivers come from urban wastewater and some industrial wastewater.Therefore , nitrite values of some sampling sites were slightly higher than permissible limit of 0.01 ppm (ISI,1985).

Table 5: Nitrite Nitrogen Values of Sittaung River Water Samples at Different Sampling Sites in Post-monsoon and Pre-monsoon Periods

Sample	Nitrite nitrogen (ppm)							
	Post-monsoon 2011	Pre-monsoon 2012	Post-monsoon 2012	Pre-monsoon 2013	Post-monsoon 2013	Pre-monsoon 2014	Post-monsoon 2014	Pre-monsoon 2015
W_1	0.010	0.001	0.050	0.001	0.010	0.001	0.020	0.002
W_2	0.020	0.002	0.060	0.001	0.020	0.001	0.020	0.003
W_3	0.030	0.001	0.040	0.002	0.010	0.002	0.010	0.004
W_4	0.040	0.001	0.020	0.001	0.020	0.003	0.020	0.003
W_5	0.050	0.001	0.030	0.003	0.010	0.003	0.020	0.003
W_6	0.040	0.001	0.010	0.004	0.010	0.004	0.020	0.004
(Mean ±SD) Post-monsoon(0.030±0.015 ppm) Pre-monsoon (0.002 ± 0.001 ppm)								
Permissible limit 0.01 ppm (USEPA, 1997)								

Table 6 shows the nitrate nitrogen values of Sittaung River Water during pre-monsoon and post-monsoon periods.Nitrate nitrogen values were in the range of 0.01 to 0.02 ppm in the years of 2012,2013 and 2014 but found to be below detectable limit in 2011 indicating inhibition of nitrification by microorganism.The mean values of nitrate nitrogen was 0.01±0.01 ppm in pre- monsoon periods. These were below the permissible limit of 50 ppm (FAO/WHO, 1994).Lower nitrates were due to decrease in degradation of organic matter by microbial activities.

Table 6: Nitrate Nitrogen Values of Sittaung River Water Samples at Different Sampling Sites in Post-monsoon and Pre-monsoon Periods

Sample	Nitrate nitrogen (ppm)							
	Post-monsoon 2011	Pre-monsoon 2012	Post-monsoon 2012	Pre-monsoon 2013	Post-monsoon 2013	Pre-monsoon 2014	Post-monsoon 2014	Pre-monsoon 2015
W_1	ND	0.02	0.01	0.03	0.01	0.05	0.02	0.01
W_2	ND	0.03	0.01	0.06	0.02	0.03	0.01	0.03
W_3	ND	0.01	0.02	0.05	0.01	0.01	0.01	0.01
W_4	ND	0.02	0.01	0.06	0.01	0.02	0.01	0.01
W_5	ND	0.01	0.01	0.04	0.01	0.01	0.02	0.02
W_6	ND	0.03	0.01	0.02	0.01	0.03	0.02	0.02
(Mean ±SD)					Pre-monsoon (0.01 ± 0.01 ppm)			

Permissible limit 50 ppm (FAO/WHO, 1994)
ND= not detected

Table 7 shows the ammonia nitrogen contents in Sittaung River water during pre-monsoon and post-monsoon periods. In post-monsoon periods of of the years 2012, 2013 and 2014 the ammonia nitrogen contents were in the range of 0.01 to 0.02 ppm. However, in 2011 ammnonia nitrogen contents were not detected. In pre- monsoon periods ammnonia nitrogen contents were in the range of 0.01 to 0.06 ppm with the mean value of 0.03±0.01 ppm. Water samples of all sampling sites were found to have lower values than the permissible upper limit of 0.1 ppm (FAO/WHO, 1994).

Table 7: Ammonia Nitrogen Values of River Water Samples at Different Sampling Sites in Post-monsoon and Pre-monsoon Periods

Sample	Ammonia nitrogen (ppm)							
	Post-monsoon 2011	Pre-monsoon 2012	Post-monsoon 2012	Pre-monsoon 2013	Post-monsoon 2013	Pre-monsoon 2014	Post-monsoon 2014	Pre-monsoon 2015
W_1	ND	0.02	0.01	0.03	0.01	0.05	0.02	0.01
W_2	ND	0.03	0.01	0.06	0.02	0.03	0.01	0.03
W_3	ND	0.01	0.02	0.05	0.01	0.01	0.01	0.01
W_4	ND	0.02	0.01	0.06	0.01	0.02	0.01	0.01
W_5	ND	0.01	0.01	0.04	0.01	0.01	0.02	0.02
W_6	ND	0.03	0.01	0.02	0.01	0.03	0.02	0.02
(Mean ±SD)					Pre-monsoon (0.03 ± 0.01 ppm)			
Permissible limit 0.015-0.100 ppm (FAO/WHO, 1994)								

Phosphate

Table 8 shows the phosphate contents of Sittaung River water during the study periods.The mean values of phosphate in post-monsoon and pre-monsoon periods were found to be 0.020±0.008 ppm and 0.011±0.007 ppm, respectively. Higher phosphates values were observed in post-monsoon periods than in pre-monsoon periods indicating more anthropogenic activities. Phosphate values of the water samples were slightly higher than the permissible value of 0.01 ppm (USEPA, 1997)due to perennial trees along the river sides and high rate of biodegradation of biomass in windy weather.

Sodium Adsorption Ratio

Sodium adsorption ratio (SAR) is the ratio of sodium concentration to the concentration of square root of the average concentration of calcium and magnesium in water or the soil solution (Miller and Gardiner, 2007).SAR of Sittaung River water during post- and pre- monsoon periods are shown in Table 9.In post- monsoon periods the mean SAR value was 0.70±0.23 and that in pre-monsoon periods was 0.51± 0.12 .According to the classification of sodium hazard of water based on SAR values, SAR values of 1-2 cause low sodium hazard of water (Mass, 1990). Thus, the Sittaung River water does not pose any problem on growth of plants.

Table 8: Phosphate Values of Sittaung River Water Samples at Different Sampling Sites in Post-monsoon and Pre-monsoon Periods

Sample	Phosphate (ppm)							
	Post-monsoon 2011	Pre-monsoon 2012	Post-monsoon 2012	Pre-monsoon 2013	Post-monsoon 2013	Pre-monsoon 2014	Post-monsoon 2014	Pre-monsoon 2015
W_1	0.021	0.011	0.031	0.030	0.012	0.010	0.025	0.010
W_2	0.032	0.012	0.022	0.020	0.011	0.010	0.015	0.010
W_3	0.032	0.012	0.025	0.020	0.012	0.011	0.016	0.020
W_4	0.031	0.014	0.034	0.010	0.012	0.011	0.014	0.010
W_5	0.023	0.013	0.023	0.010	0.013	0.011	0.015	0.010
W_6	0.021	0.011	0.035	0.020	0.012	0.010	0.014	0.010
(Mean±SD)	Post-monsoon (0.020 ± 0.008 ppm)				Pre-monsoon (0.011 ± 0.007 ppm)			
Permissible limit 0.01 ppm (USEPA, 1997)								

Table 9: Sodium Adsorption Ratios of River Water Samples from Different Sampling Sites

Sample	Sodium adsorption ratios(SAR)							
	Post-monsoon 2011	Pre-monsoon 2012	Post-monsoon 2012	Pre-monsoon 2013	Post-monsoon 2013	Pre-monsoon 2014	Post-monsoon 2014	Pre-monsoon 2015
W_1	0.83	0.69	1.05	0.66	0.85	0.54	0.34	0.45
W_2	0.79	0.78	1.02	0.52	0.90	0.46	0.49	0.41
W_3	0.63	0.50	0.83	0.38	0.71	0.37	0.37	0.63
W_4	0.57	0.43	0.98	0.59	0.86	0.35	0.32	0.38
W_5	0.48	0.49	0.96	0.47	0.80	0.54	0.37	0.47
W_6	0.49	0.60	0.90	0.51	0.84	0.56	0.39	0.45
(Mean ±SD)	Post-monsoon(0.70±0.23)				Pre-monsoon (0.51± 0.12)			

Conclusion

The physicochemical parameters of surface water samples collected from Sittaung River were investigated in this study. Most of the chemical properties were found to have higher values in pre-monsoon periods compared to post-monsoon and below the permissible limit. Dissolved oxygen values in some sampling sites in post-monsoon periods were slightly higher than the permissible limit.Nitrite contents of some sampling sites and phosphate contents of most sampling sites were higher than the permissible limit.Excessive presence of nitrogen and phosphorus will made the river prone to eutrophication, which ultimately results into degradation of water quality as well as the aquatic environment. Nutrients from induced fertilizers, human activities and other animal wastes are the main causes of this problem. It is vital to monitor nutrient level- especially phosphorus –nitrates in rivers that exhibit an over abundance or lack of algae. Practicing the climate smart agriculture and green agriculture may facilitate the healthy riverine system. The results reveal that Sittaung River is not polluted and can be used for domestic and irrigation purposes in Taungoo area.

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