Performance Evaluation of Textile Effluent Treatment Plant: Bangladesh Perspective

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ABSTRACT

The present study was undertaken to evaluate the performance efficiency of an Effluent Treatment Plant (ETP) of a Textile industry located at Tongi, Bangladesh with biological treatment (BT) and Membrane Bio-Reactor (MBR) with an average inflow of 300 m3/hr. The effluent samples were collected from the inlet and outlet of the ETP on a weekly basis for a 4 weeks' period and were analysed for key parameters such as colour, temperature, total suspended solids (TSS), Total Dissolved Solids (TDS), pH, Dissolved Oxygen (DO), Biological Oxygen Demand (BOD), and Chemical Oxygen Demand (COD). In this study, it was observed that the colour of the effluent in the inlet was dark blue and after multiple unit treatments of the colour's final outlet the discharge, water colour was very light purple. The temperature was varied from 32.2°C to 34.33°C. The TDS was varied from 1252.5 mg/l to 1087.5 mg/l and the percentage removal efficiency of TDS was varied from 21.47% to 42.7%. The TSS was varied from 4 mg/l to 4.5 mg/l and the percentage removal efficiency of TSS was varied from 98.48% to 98.21%. The pH value was varied from 6.48 to 7.63. The DO value in the inlet was varied from 6.47 mg/l to 6.775 mg/l. The BOD was recorded from 12.75 mg/l to 17.75 mg/l and the percentage removal efficiency of BOD was varied from 89.92% to 87.24%. The COD was varied from 33.75 mg/l to 34.25 mg/l and the percentage removal efficiency of COD was varied from 91.11% to 90.5%. It is conjectured that the values of the measured parameters are seen to be within the permissible limit as per the standard of the Department of Environment (DoE) of Bangladesh.

Keywords: Textile Industry, Effluent Treatment Plant, BOD, COD, TSS, TDS, Industrial Effluent, Water Quality.

NOMENCLATURE:

Abbreviation/Symbol	Meaning
TSS	Total Suspended Solids
TDS	Total Dissolved Solids
pH	Potential of Hydrogen
DO	Dissolve Oxygen
BOD	Biological Oxygen Demand
COD	Chemical Oxygen Demand
DS	Dissolved Solids
SS	Suspended Solids
DoE	Department of Environment
mg/L	Milligrams Per Litter
ETP	Effluent Treatment Plant
°C	Degree Celsius
ppm	Parts Per Million

1 INTRODUCTION

Bangladesh is one of the most important textiles and garment exporters countries within the world. The ready-made garment (RMG) sector has become the biggest manufacturing sectors in Bangladesh with approximately 4490 apparel manufacturing units registered under the Bangladesh Garment Manufacturers and Exporters Association (BGMEA) in 2008 [1]. Amidst differing types of industries, wet processing of textiles, steel, paper, fertilizers, cement, and pharmaceuticals produce an enormous quantity of effluents. But industrial effluent is the most important environmental concerns recently faced by the country. The untreated textile wastewater can cause rapid depletion

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of dissolved oxygen if it is directly discharged into the surface water sources because of its high BOD value. The effluents with high levels of BOD and COD values are highly toxic to the biological life. The high alkalinity and traces of chromium which is utilized in dyes adversely affect the aquatic life and also interfere with the biological treatment processes [2].

On average, approximately 200 litters of water are required to supply 1 kg of textiles. The chance factors are primarily related to the wet processes such as scouring, de-sizing, mercerizing, bleaching, dyeing and finishing. De-sizing, scouring and bleaching processes produce large quantities of wastewater. These chemicals aren't only poisonous to humans but also found toxic to aquatic life (WHO, 2002) and that they may lead to food contamination. Ammonia is harmful to fish or other aquatic organisms at free (un-ionized) concentration of 10-50 $\mu g/l$ or higher pH and also the sulphide within the effluent are of environmental concern because they will result in the poor air quality of a region if not properly taken care of; thus becoming threat to human, vegetation, and materials [3]. The large volumes of wastewater generated also contain a good sort of chemicals used throughout processing. These can cause damage if not properly treated before being discharged into the environment [4].

The effluent generated from different sections of a factory must be treated before it is discharged to the environment. Various chemicals and physicals means are introduced for this purpose. The untreated wastewater can cause rapid depletion of dissolved oxygen if it is directly discharged into the surface water sources thanks to its high BOD value. The effluents with high BOD and COD values are highly toxic to the biological life [5]. The effluent treatment plant may be a combination of physicochemical followed by aerobic biological treatment. The plant consisted of the subsequent primary and secondary treatment unit operations: sump well, equalization basin, chemical dosing tank, primary cloriflocculator, activated sludge basin, secondary clarifier and sludge drying bed [6].

The quality effluent treatment plants are often analysed by their physicochemical and biological analysis. Monitoring of the environmental parameters of the effluent would allow having, at any time, an exact idea on performance evaluation of ETP and if necessary, appropriate measures is also undertaken to stop adverse impact on the environment. The efficiency of individual units of effluent treatment plants determines the general performance of the plant and therefore the final effluent quality. The textile industry may be a water-intensive industry that consumes large quantities of water and thus produces an outsized volume of wastewater during its manufacturing steps like dyeing, mercerizing, bleaching, and finish process [7].

Characterization of the wastewater of the textile industry are evaluated in terms of temperature, DO, TSS, TDS, pH, BOD, COD, for the influent and effluent of the chosen plant. The performance of ETP also will be evaluated and the standard of reclaimed wastewater are compared with national standards to see its suitability for reuse and associated environmental impacts. The wastewater generates about 50% of total freshwater consumption. The untreated fibre industry wastewater can cause rapid depletion of DO if it is directly discharged into the surface water thanks to higher values of TS, SS, DS, BOD and COD [8].

The textile industry is additionally considered to be one in every of the largest threats to the environment. The fabrication operations not only utilize huge quantities of power and water, but they also generate considerable amounts of waste. The textile industry utilizes variety of dyes, chemicals, and other materials to impart the desired qualities to the fabrics. These operations produce a big number of effluents. The standard of effluents is specified they can't be put to other uses, and that they can create environmental problems if they are disposed of without appropriate treatment. This review paper discusses different textile processing stages, pollution problems related to these stages, and their eco-friendly alternatives [9]. Advanced wastewater treatment technologies such as advanced oxidation process, aerated lagoon, bioreactor, constructed wetland, membrane bioreactor, nano-technology, ion-exchange, desalination, and reverse osmosis etc. don't seem to be popular for industrial and municipal wastewater treatment in Bangladesh till now. However, the technologically ahead countries are recovering valuable nutrients, elements and metals from wastewater but Bangladesh lags behind yet [10].

The effluent generated from different sections of a mill must be treated before it is discharged to the environment. Various chemicals and physical means are introduced for this purpose. The effluent treatment plant within the dyeing industry could be a chemical-biological combination process developed [5]. The objective of the present research is to evaluate the performance analysis of textile Effluent Treatment Plant (ETP) of Tamishna group at Tongi, Dhaka, Bangladesh.

Figure 1: ETP Plant with MBR technology used in Tamishna group at Tongi, Dhaka, Bangladesh.

2 EXPERIMENT1AL METHOD

The study was applied within the Tamishna group at Tongi, Bangladesh. The information is analysed by comparing the concentration as per the quality method such as collection of primary data, sample collection, selection of sampling locations, determination of physical (colour, temperature, total dissolved solids, total suspended solids and chemical properties (pH, dissolved oxygen, biochemical oxygen demand, chemical oxygen demand).

The selection of sampling location is considered by taking inlet water, after mechanical treatment but before equalization tank and taken out let water at the discharge point. We consider sample collection for 4 weeks and 4 samples are from the inlet and outlet (n = 4) and taken 500 ml plastic bottle with throughout clean and washed with water. The physical parameters are colour, temperature, Total Dissolved Solids (TDS), Total Suspended Solids (TSS) and the chemical parameters are pH, Dissolve Oxygen (DO), Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD).

Table 1: Effluent characteristics from textile industry.

Process	Effluent Composition	Nature
Sizing	Starch, waxes, carboxymethyl cellulose (CMC), polyvinyl alcohol (PVA), wetting agent.	High in BOD, COD
De-sizing	Starch, CMC, PVA, fats, waxes, pectin's.	High in BOD, COD, SS, dissolved solids (DS)
Bleaching	Sodium hypochlorite, Cl_2, NaOH, H_2O_2, acids, surfactants, $NaSiO_3$, sodium phosphate, short cotton fibre.	High alkalinity, high SS
Mercerizing	Sodium hydroxide, cotton wax	High pH, low BOD, high DS
Dyeing	Dyestuff's urea, reducing agents, oxidizing agents, acetic acid, detergents, wetting agents.	Strongly coloured, high BOD, Ds, low SS, heavy metals
Printing	Pastes, urea, starches, gums, oils, binders, acids, thickeners, cross-linkers, reducing agents, alkali.	Highly coloured, high BOD, oily appearance, SS slightly alkaline, low BOD

Table 2: Instruments details with test methods.

Serial	Parameters	Unit	Test Instrument	Brand	Origin	Test Method	Instruments Picture
1	pH	-	HQ40D Multimeter	HACHA	U.S.A.	USEPA Electrode Method	
2	TDS/ Conductivity	mg/l	HQ40D Multimeter	HACHA	U.S.A.	USEPA Direct Measurement Method1, 2	
3	DO	mg/l	HQ40D Multimeter	HACHA	U.S.A.	Direct Measurement Method1	
4	Temperature	°C	Glass Thermo Meters	G H ZEAL LTD	ENGLAND	Direct Measurement	
5	TSS	mg/l	Spectro-photometer	HACHA	U.S.A.	Photometric Method1	
6	Colour	Pl-CO	Spectro-photometer	HACHA	U.S.A.	Platinum-Cobalt Standard Method1, 2, 3	
7	COD	mg/l	Spectro-photometer With COD Reactor	HACHA	U.S.A.	USEPA1 Reactor Digestion Method2	
8	BOD	mg/l	BOD Incubator	VELP SCIENTIFICA	ITALY	Respirometric Method	
		mg/l	BOD Track II	HACHA	U.S.A		

2.1 Physical Parameters

For determination of colour, we use the method of Platinum-Cobalt Standard Method-1, 2, 3 and the procedures are taken ETP inlet and outlet water sample, sample cell 2 pcs (1 No sample cell needs water 10 ml, 2 No sample cell needs sample water 10 ml), start program 120 Colour, 455 nm or program 125 colour, 465 nm whether 1 No Sample (distilled water cell) to program zero then 2 no sample to push read then result.

For determination temperature, we use the method of USEPA Direct Measurement Method-1, 2 and the temperature of both inlet and outlet water is measured by Multimeter at the quality temperature and ratio. For determination of Total Dissolved Solids (TDS), we use the method of USEPA Direct Measurement Method-1, 2. Dissolved solids consult with any minerals, salts, metals, cations or anions dissolved in water. Total dissolved solids (TDS) comprise inorganic salts (principally calcium, magnesium, potassium, sodium, bicarbonates, chlorides, and sulphates) and a few small amounts of organic matter that are dissolved in water. It's expressed in mg/L or parts per million (ppm). It's measured directly by Multimeter.

For determination of Total Suspended Solids (TSS), we use the method of Photometric Method-1 and Total Suspended Solids (TSS) are solids in water that may be trapped by a filter. TSS can include a good kind of materials, like silt, decaying plant and animal matter, industrial wastes, and sewage. High concentrations of suspended solids can cause many problems for stream health and aquatic life. The foremost accurate method of determining TSS is by filtering and weighing a water sample. We collect samples during a clean glass or plastic bottle, then we preserve those samples for later analysis and keep the samples at or below 6 °C (43 °F) for up to 7 days, then let the sample temperature increase to temperature before analysis. We also start program by 630 Suspended Solids, for information about sample cells, adapters or light shields and blend 500 mL of sample in an exceedingly blender at high speed for exactly two minutes, pour the blended sample into a 600-ml beaker. After that we prepare the sample by stirred the sample and immediately pour 10 mL of the blended sample into a sample cell, prepare the blank by filled a second sample cell with 10 mL of water or deionized water. And we also clean the blank sample cell, insert the blank into the cell holder, push ZERO. The display shows 0 mg/L TSS. Swirl the prepared sample to get rid of any gas bubbles and uniformly suspend any residue. After that clean the prepared sample cell and we insert the prepared sample into the cell holder. Finally, push READ and results show in mg/L TSS.

2.2 Chemical Parameters

For chemical parameters, the value of pH was determined. It is defined as the negative log of the proton concentration.

$$pH = -\log[H+] \tag{1}$$

The method of USEPA Electrode Procedure was used. At first, we analysed the samples immediately and the samples couldn't be preserved for later. After that we collected samples during a clean glass or plastic bottles, rinsed the probe with deionized water and lastly dried the probe with a lint-free cloth.

For the laboratory test, the probe was placed in a beaker that contained the sample. The probe was not allowed to touch the stir bar, bottom or sides of the container. Then the air bubbles were removed from under the probe tip, and the sample was stirred at a slow to moderate rate.

For the field test, the probe was placed within the sample and the probe moved up and all the way down to remove bubbles from the electrode, then it was guaranteed to put the temperature sensor fully within the sample. The probe was rinsed with deionized water and was dried with a lint-free cloth. For the calculation, pH meters read directly in pH units.

2.3 Determination of Dissolved Oxygen (DO)

Dissolved oxygen (DO) is one of the foremost important indicators of water quality and it is essential for the survival of fish and other aquatic organism and also, it is expressed in mg/L or parts per million (ppm). The main consideration with the sample collection is to stop contamination of the sample with atmospheric oxygen.

The samples were analysed at the gathering site. For the laboratory test, the probe was placed in a beaker that contained the sample. The probe was not allowed to touch the stir bar, bottom or sides of the container. Then the air bubbles were removed from under the probe tip, and the sample was stirred at a slow to moderate rate.

For the field test, the probe was put within the sample and moved up and right down to remove bubbles from the probe tip. When the measurement was seen to be stable, the lock icon was shown and when the worth was stable, the mV value was stored and recorded that indicated the temperature value.

2.4 Determination of Biochemical Oxygen Demand (BOD)

BOD is the amount of dissolved oxygen (DO) needed by aerobic biological organisms during a body of water to interrupt down organic material present in a very given water sample at a particular temperature over a particular fundamental measure. The sample was taken in a suitable bottle where the sample volume for inlet was as 160 ml, outlet as 355 ml. No pH adjustment was performed for inlet, rather for outlet, pH was adjusted at 6-8 by sulfuric acid 0.1N solution. Stir bar was taken for every bottle and BOD Buffer Pillow 6 drops were added into the water. Then, Potassium hydroxide 6 to 7 pcs was added into the bottle tube and set in BOD track and set Channel of all bottles both for inlet and outlet. The standard value was set as 350 mg/l for inlet and as 70 mg/l for outlet. After 5 days BOD was directly measured within the BOD track display.

2.5 Determination of Chemical Oxygen Demand (COD)

COD is the amount of oxygen required to chemically oxidize the biodegradable and non-biodegradable organic matter and COD often is employed as a measurement of pollutants in wastewater and natural water and also, it is expressed in milligrams per litre (mg/L) which indicates the mass of oxygen consumed per litre of solution. The test Method of USEPA1 Reactor Digestion Method-2 was used. The procedures are as follows: (APHA, 2005) COD vile HR (20-1500 ml) inlet and COD Vile LR (3-50 ml) outlet and add 2 ml Water sample, set the temperature at 150° and place the sample within the COD reactor. After that, Keep the duration at 2 hours and take out the vile and calm down at temperature. At last, the Vile was placed into the spectrophotometer and set the Black Vile Program at 0°, then click to read button for vile sample report.

3 RESULTS AND DISCUSSIONS

As this effluent treatment plant is shared with multiple wet processing units, there was an excellent possibility to urge the variation within the wastewater quality from time to time. Therefore, it had been not feasible to sampling the wastewater in a very single day and find accurate data. The industry has three shifts (8 hours per shift) in production operation. Weekly water sampling was performed at the inlet point (after mechanical screening) likewise as at the outlet point and it had been continued for four consecutive weeks. For evaluating the performance of ETP, the accurate idea of the composition of effluents is extremely important due to the industrial effluents contain various pollutants which will alter the standard of the receiving water and also the environment at large.

Industrial effluents contaminate surface water, soil and groundwater thanks to the presence of various pollutants (e.g., soluble solids, suspended solids, organic matter, heavy metals and toxic chemicals). Therefore, pre-treatment of discharged wastewater and determining the standard of the effluent is momentous. The study was conducted to characterize the standard of the effluent of inlet and outlet of ETP in terms of physical and chemical parameters analysis. The standard values for the waste from industrial units are provided in Table 3 according to the Environment Conservation Rules in 1997.

3.1 Physical Parameters

3.1.1 Colour Analysis

The physical parameters were inspected with various processes. In these parameters, it was seen that the colour of the inlet wastewater was blue and the colour of the outlet discharge water was light purple. The colour of the effluent in inlet was blue because the dye house unit used lot of dyestuffs and chemicals and after multiple unit treatments of the colour's final outlet the discharge water colour was flash purple.

3.1.2 Temperature Analysis

The normal range of temperature for the inlet is showed in the graph from 39.65±0.31 to 41.9±0.62 and the mean range is showed for the outlet is showed in the graph from 32.2±0.14 to 34.33±46 against the DoE standard of 40°C which are shown in Figure 2.

It is seen from the Figure 2 that the colour of inlet wastewater colour was navy blue because the dye house unit used lots of dyestuffs and chemicals and after multiple unit treatments of the colour's final outlet, the discharge watercolour was flash purple. Within the study, the utmost average of temperature within the inlet was recorded 41.9°C in week2 and minimum temperature 39.48°C in week4 and on the opposite hand, the utmost mean of temperature within the outlet was recorded 34.33°C in week 4 and minimum temperature was 32.2°C in week 2. Within the four weeks' data analysis in step with the observed values, the temperature is within the suitable limit of DoE standard of 40°C.

3.1.3 TDS Performance

The mean value range of inlet is showed in the graph from 1612.5±194 to 1940±146.97 and the mean value range of outlet is showed in the graph from 1087.5±35.94 to 1252.5±9.57 against the DoE standard of 2100 mg/l which are shown in Figure 3 and Figure 4.

Table 3: Standard for waste from industrial Units (The Environment Conservation Rules, 1997).

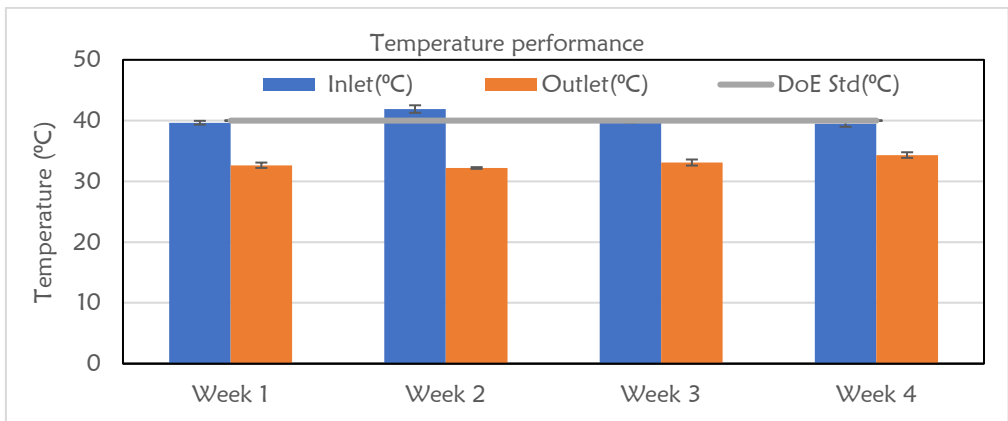| Parameters	Unit	Value found in this study	Standard limit Value
Temperature	°C	34.33	40
TSS	mg/l	4.5	150
TDS	mg/l	1252.5	2100
pH	mg/l	6.48 to 7.63	6 to 9
DO	mg/l	6.47 to 6.775	4.5 to 8
BOD	mg/l	17.75	50
COD	mg/l	34.25	200

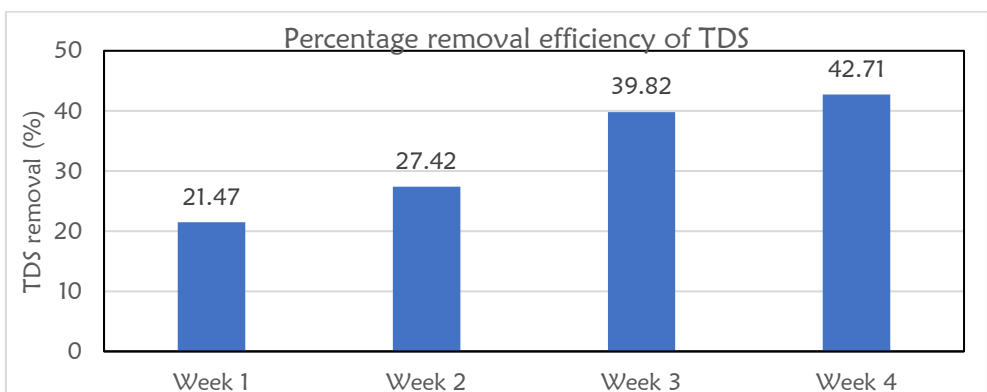**Figure 2:** Temperature performance.

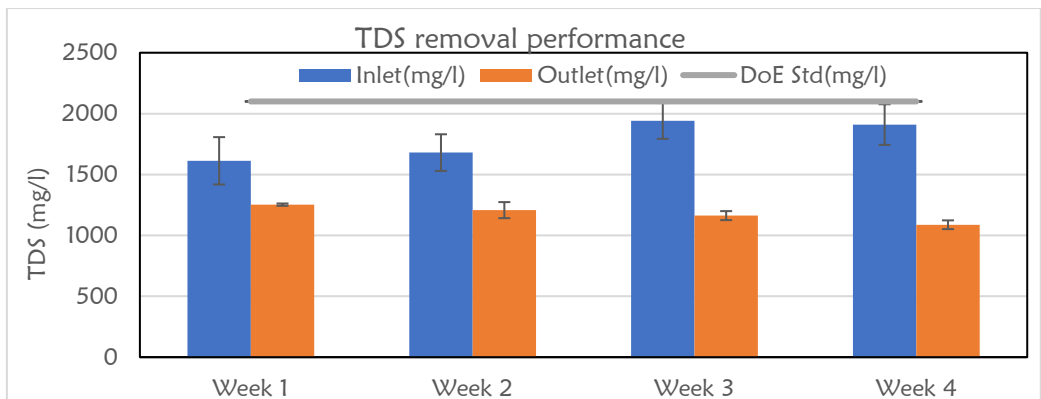**Figure 3:** Percentage removal efficiency of TDS analysis of 4 weeks.

Figure 4: TDS performance.

It is seen from the Figure 3 and Figure 4 that the maximum mean of TDS was recorded in inlet as 1940 mg/l in week 3 and the minimum value was 1612.5 mg/l in week 1. On the other hand, the utmost average of TDS in outlet was recorded as 1252.5 mg/l in week 1 and the minimum value is 1087.5 mg/l in week 4. Within four weeks' data analysis in step with the observed values, the TDS is within the suitable limit of DoE standard of 2100 mg/l. The bottom percentage removal efficiency was recorded as 21.47% in week 1 and the best percentage of removal efficiency was recorded as 42.7% in week 4.

3.1.4 TSS Analysis

The mean value range of inlet is showed in the graph from 243.75±4.79 to 257.5±11.93 and the mean value range of outlet is showed in the graph from 4±0.82 to 4.5±0.31 against the DoE standard of 150 mg/l which is shown Figure 5 and Figure 6. It can be seen from Figure 5 and Figure 6 that the maximum mean of TSS was recorded in inlet as 257 mg/l in week 2 and week 1 and the minimum value is 243.75 mg/l in week 4. On the other hand, the

utmost average of TSS in outlet was recorded as 4.5 mg/l in week 3 and the minimum value was 4 mg/l in an exceedingly week within four weeks' data analysis (Figure 6). In step with the observed values the TDS is within the suitable limit of DoE standard of 150 mg/l. The proportion removal efficiency of TSS was consistent throughout the week but the bottom percentage removal efficiency was recorded as 98.21% in week 3 and the very best percentage of removal efficiency was recorded as 98.48% in week 2 (Figure 5).

3.2 Chemical Parameters

3.2.1 pH Analysis

The mean value range of inlet is showed in the graph from 8.95±0.38 to 9.33 ±0.22 and the mean value range of outlet is showed in the graph from 6.48 ±0.1 to 7.63±0.1 against the DoE standard from 6 to 9 which is shown in Figure 7. It can be seen from Figure 7 that the pH of the raw effluent is incredibly high because the incoming wastewater is extremely alkaline in nature. The bleaching agents employed in the method are the reasons for top alkaline wastewater. The pH correction is finished with the assistance of HCL and brings all the way down to neutral which is favourable pH for biological treatment. The maximum normal value of pH in inlet was recorded as 9.33 in week 4 and the minimum value was 8.95 in week 3. On the other hand, in outlet, the utmost normal value was recorded as 7.63 in week 1 and the minimum value is 6.48 in week 2 within four weeks' data analysis which are within the suitable limit of DoE standard from 6 to 9. The pH correction is completed with the assistance of sulfuric acid and brings right down to neutral which is favourable pH for biological treatment.

3.2.2 DO Performance

The mean value range of inlet is showed in the graph from 0.1±0.08 to 0.58±1.01 and the mean value range of outlet is showed in the graph from 6.775±0.05 to 6.475±0.1 against the DoE standard value from 4.5 to 8 mg/l which is shown in Figure 8. It can be seen from Figure 8 that the maximum normal value of liquidate in the inlet was recorded as 0.2 mg/l in week 4 and the minimum value was 0.1 mg/l in week 2. On the other hand, the utmost average of liquidate in the outlet was recorded as 4, 6.775 mg/l in week 4 and the minimum value is 6.47 mg/l in week 2. Within four weeks' data analysis in line with the observed values, the DO value is within the suitable limit of DoE standard from 4.5 to 8.
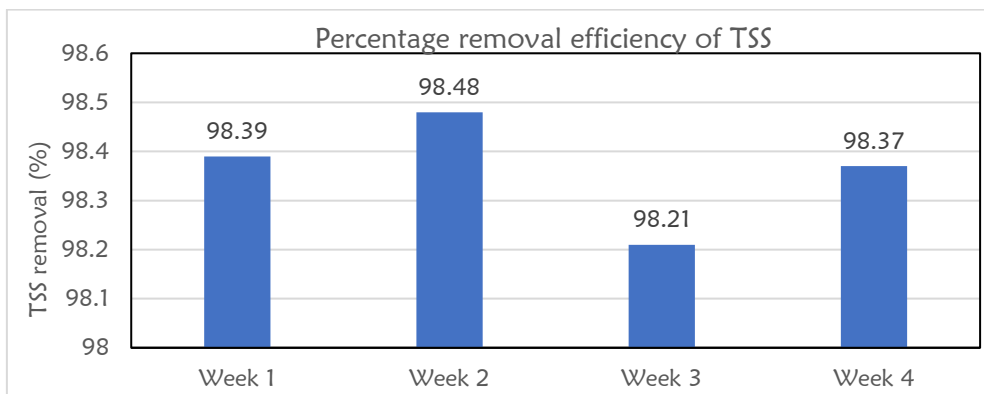

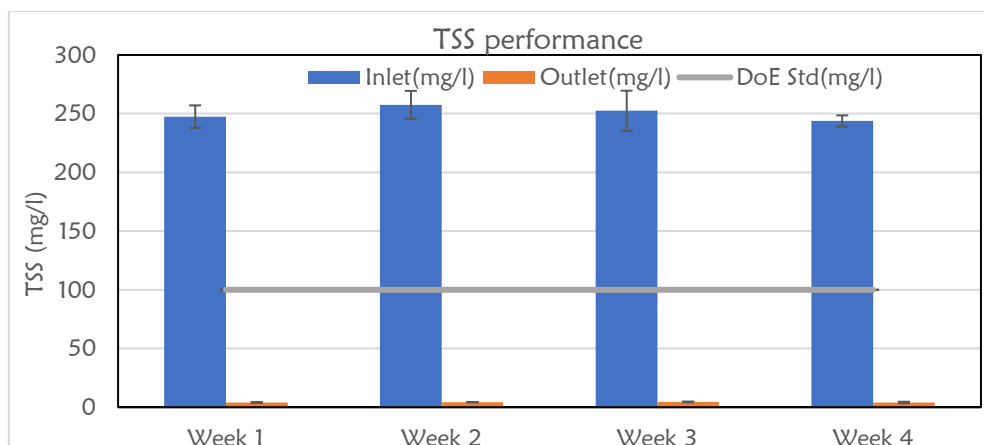**Figure 5:** Percentage removal efficiency of TSS analysis of 4 weeks.

Figure 6: TSS Performance.

3.2.3 BOD Performance

The mean value range of inlet is showed in the graph from 119±23.42 to 139.25±4.65 and the mean value range of outlet is showed in the graph from 12.75±0.96 to 17.75±4.43 against the DoE standard of 50 mg/l shown in Figure 9 and Figure 10.

It can be seen from Figure 9 and Figure 10 that the maximum mean value of BOD within the inlet was recorded as 139.25 mg/l in week 3 and the minimum value was 119 mg/l in week 1. On the other hand, the utmost mean of BOD within the outlet was recorded as 17.75 mg/l in week 3 and 12.75 mg/l in week 4 within four weeks' data analysis (Figure 10) which are consistent with the observed values of the BOD within the appropriate limit of DoE standard of 50 mg/l. The removal efficiency of BOD was consistent throughout the week but the bottom percentage removal efficiency of BOD was recorded as 87.24% in week 1 and also the highest percentage of removal efficiency was recorded as 89.92% in week 4 within four weeks of knowledge analysis (Figure 9).
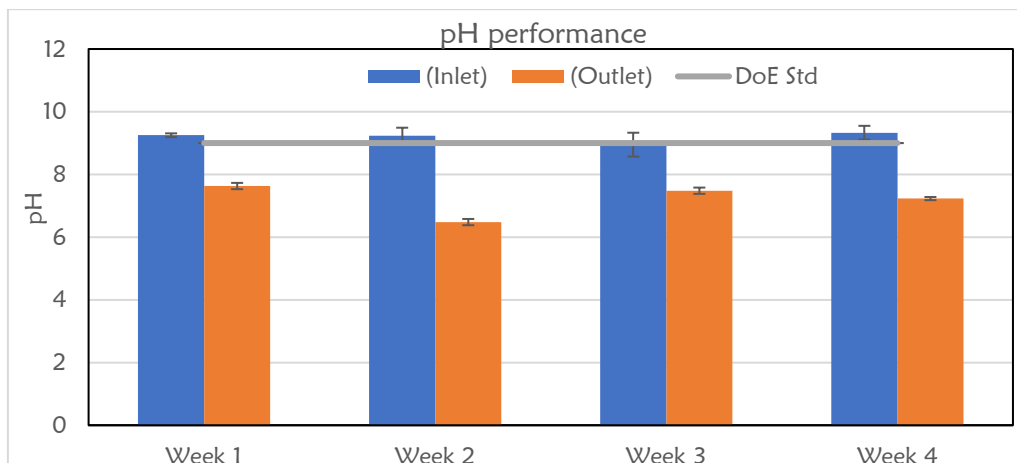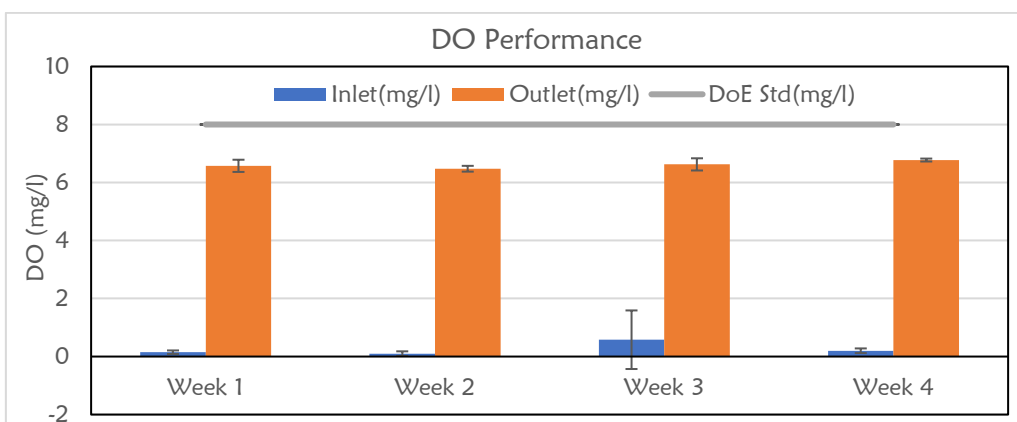

Figure 7: pH performance.
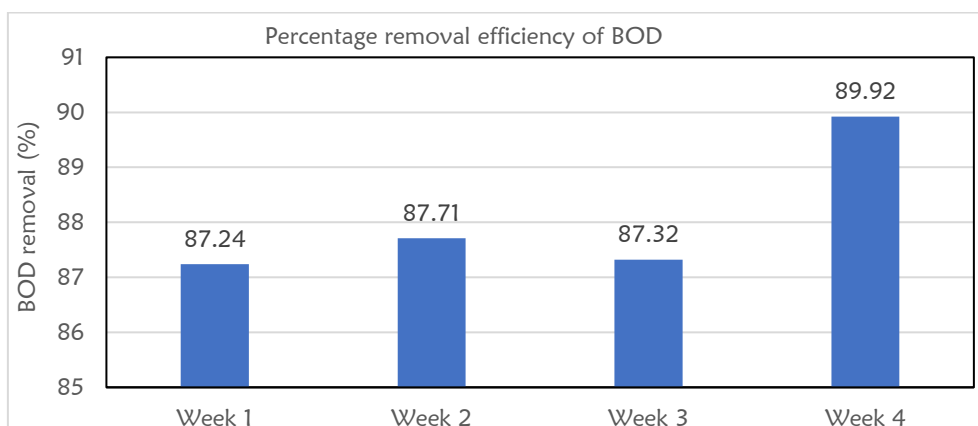

Figure 8: DO performance.

Figure 9: Percentage removal efficiency of TSS analysis of 4 weeks.

3.2.4 COD Performance

The mean value range of inlet is showed in the graph from 357.5±20.62 to 380 ±9.13 and the mean value range of outlet is showed in the graph from 75±3.86 to 34.75±4.0333 against the DoE standard 200 mg/l shown in Figure 11 and Figure 12. It can be seen from Figure 11 and Figure 12 that the mean maximum value of COD within the inlet was recorded as 380 mg/l in week 4 and the minimum value was 357 mg/l in week 3. On the other hand, the mean maximum value of COD within the outlet was recorded as 34.25 mg/l in week 1 and the minimum value was 33.75 mg/l in week 3 within four weeks' data analysis (Figure 12). In step with the observed values, the COD is within the suitable limit of DoE standard of 50 mg/l. The removal efficiency of TSS was consistent throughout the week but the bottom percentage removal efficiency of COD was recorded as 90.5% in week 1 and therefore the highest percentage of removal efficiency was recorded as 91.11% in week 4 within four weeks of information analysis (Figure 11).
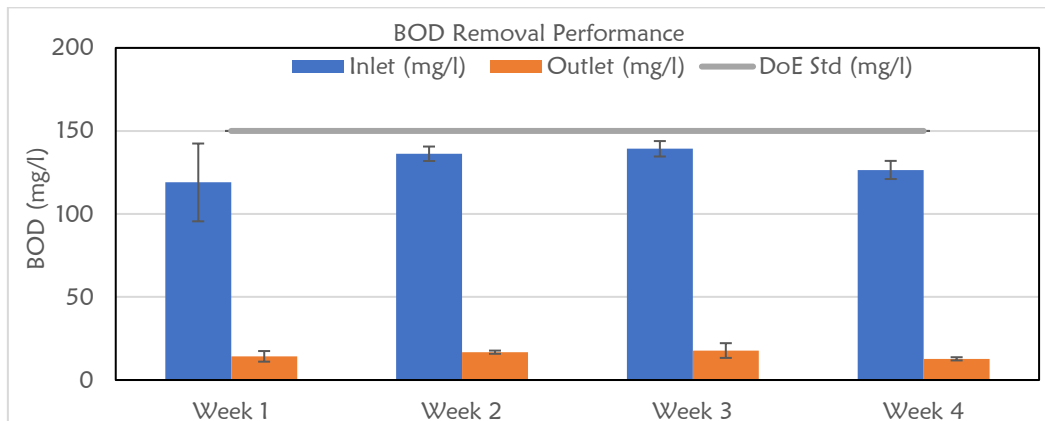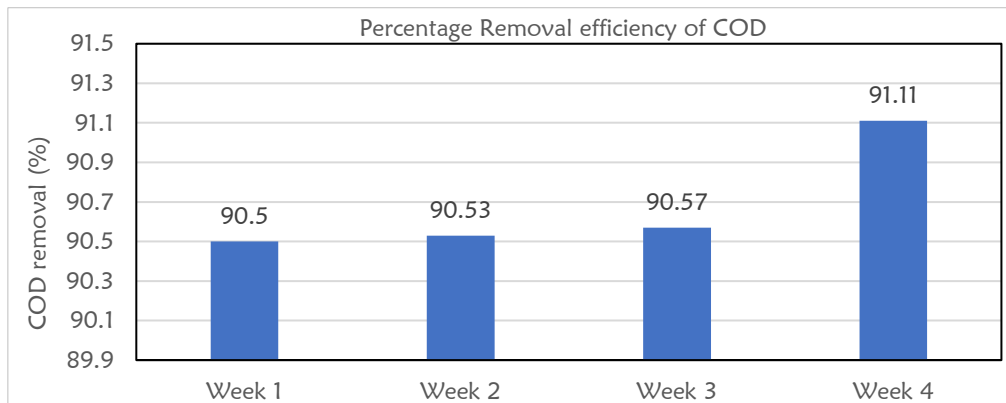

Figure 10: BOD Performance.

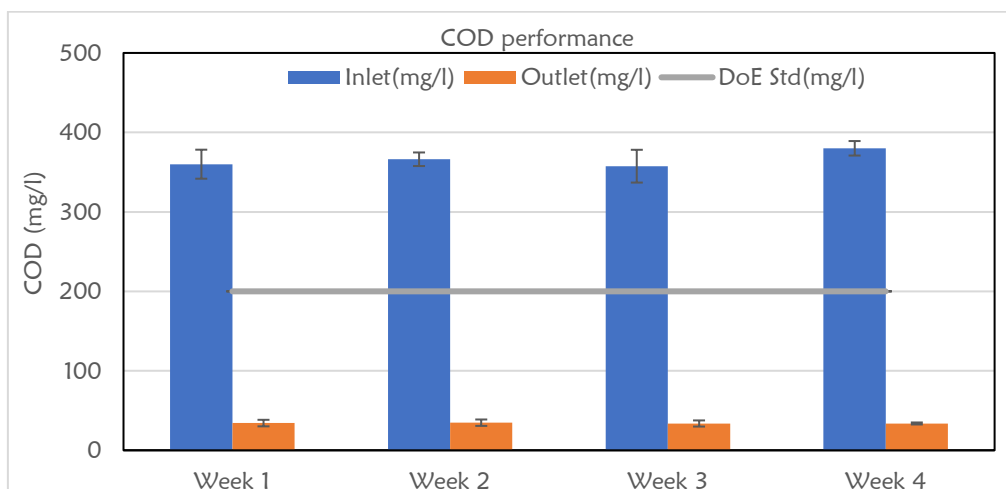**Figure 11:** Percentage removal efficiency of COD analysis of 4 weeks.

Figure 12: COD Performance.

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4 CONCLUSIONS

The performance analysis of textile Effluent Treatment Plant (ETP) of Tamishna group at Tongi, Dhaka, Bangladesh is carried out in the present study. The physical parameters of the plant such as colour, temperature, Total Dissolved Solids (TDS), Total Suspended Solids (TSS) and the chemical parameters such as pH, Dissolve Oxygen (DO), Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD) are measured and anlaysed which are compared with the standard values of DOE of Bangladesh. The major findings of the present analysis can be written in the following way.

1. The colour of the inlet wastewater is blue and the colour of the outlet discharge water is light purple. The temperature within the inlet was varied from 41.9°C to 39.48°C and the outlet was 32.2°C to 34.33°C due to dye used for the yarn.
2. The TDS in inlet water was varied from 1940 mg/l 1612.5 mg/l and outlet was 1252.5 mg/l to 1087.5 mg/l. The removal efficiency of TDS was varied from 21.47% to 42.7%. In addition, the TSS in inlet was varied from 257 mg/l to 243.75 mg/l and outlet was 4 mg/l to 4.5 mg/l and the removal efficiency of TSS was varied from 98.48% to 98.21%.
3. The pH of the effluent within the inlet was alkaline in nature (i.e., 9.33) due to the scoring and bleaching agents along with the huge hydrated oxide utilized in the method. The pH correction is completed with the assistance of sulfuric acid and brings right down to neutral which is favourable pH for biological treatment.
4. The DO value was varied from 6.47 mg/l to 6.775 mg/l. The BOD within the inlet was varied from 119 mg/l to 139.25 mg/l and also the outlet was recorded from 12.75 mg/l to 17.75 mg/l. The removal efficiency of BOD was varied from 89.92% to 87.24%. The COD in inlet was varied from 380 mg/l to 357 mg/l and outlet was from 33.75 mg/l to 34.25 mg/l. The percentage removal efficiency of COD was varied from 91.11% to 90.5%.

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