

INTERNSHIP REPORT

INTERNAL

J. Ken'ik  29/9/2023

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EXTERNAL
Ramusfeld

Certificate of Training

This is to certify that

Mr. D. Tamilselvan

Of

*Sathyabama Institute of Science and Technology (Deemed to
be University), Jeppiaar Nagar, Rajiv Gandhi Salai (OMR),
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*Successfully completed the "Internship" in the field of Water
and Wastewater analysis at Hiyoshi India Ecological
Services Pvt. Ltd., Chennai - 600 113, Tamilnadu, India
From 11th to 26th September 2023.*




Dr. M. MAVALASAMY
Director

ACKNOWLEDGEMENT

- I am grateful for the opportunity to have interned at hiyoshi India and to have learned so much from the people I have met there. during my internship, I gained valuable experience in total dissolved solids and total suspended solids, mixed liquid suspended solids, total solids, phosphorus, ammoniacal nitrogen, chemical oxygen demand, bio chemical oxygen demand, chlorides and sulphates. this internship has helped me to grow professionally and has prepared me for my future career.

ABOUT COMPANY

- Hiyoshi India Ecological Services Private Limited a 100% subsidiary company of Hiyoshi Corporation, Japan was established in the year 2011.
- To provide Hiyoshi's 70 years of acquired knowledge in the field of drinking water analysis, wastewater analysis, O&M of STP, solid waste etc. In Chennai.
- To be a place where the water test results provided are true and reliable which is extremely essential for environmental conservation.
- "Worldwide environmental problems are constantly changing. These problems have no borders and so it is important for all of us to come and work together irrespective of nationality, culture, race and collectively address the challenges that the entire world is facing so that we leave behind a cleaner environment ."

INTRODUCTION

The water treatment process is a series of steps that purify water to make it safe for drinking and other uses. It involves processes like coagulation, sedimentation, filtration, and disinfection. Each step helps remove impurities and harmful substances, ensuring clean and safe water for everyone. It's an important process to protect public health and the environment.

SL NO	SYLLABUS
1.	Laboratory tour (Equipment, Glasswares & Chemicals, etc.), pH at 25°C, Electrical
2.	Total Dissolved Solids & Total Suspended Solids
3.	MLSS & Total Solids
4.	Phosphorous
5.	Ammoniacal Nitrogen
6.	Chemical Oxygen Demand
7.	Biochemical Oxygen Demand
8.	Chloride
9.	Sulphate
10.	Biochemical Oxygen Demand

SL NO	Title	Date	Training type
1.	Laboratory tour	11.09.2023	Demo only
2.	Total Dissolved Solids & Total Suspended Solids	12.09.2023	Demo only
3.	MLSS & Total Solids	13.09.2023	Demo only
4.	Phosphorous	14.09.2023	Demo only
5.	Ammoniacal Nitrogen	15.09.2023	Demo only
6.	Chemical Oxygen Demand	18.09.2023	Demo only
7.	Biochemical Oxygen Demand- DO1	19.09.2023	Demo only
8.	Chloride	20.09.2023	Demo only
9.	Sulphate	21.09.2023	Demo only

Day 1(11-09-2023)

1.Ph

- Potential of Hydrogen .It is a measure of how acidic/basic water. The range goes from 0-14. pH value of 7 is neutral, less than 7 is acidic, and more than 7 is base.

=In the training Acidic value was taken as 4.01 and Base as 9.18.

=Temperature interference the Ph, So it should at 25.C as per IS 3025.

PROCEDURE FOR Ph testing of water

=We Calibrate the instrument using Certified reference Material(CRM)

= A sample of Ph was taken and test was conducted. .

=Note that electrode cleaning is must after every test using water and tissue.

2.Electrical conductivity(EC)

The reason that the conductivity of water is important is because **it can tell you how much dissolved substances, chemicals and minerals are present in the water.** Higher amounts of these impurities will lead to a higher conductivity.

Day 2(12-09-2023)

1.TDS(Total dissolved solids)

Total dissolved solids (TDS) is the term used to describe the inorganicsalts and small amounts of organic matter present in solution in water. The principal constituents are usually calcium, magnesium, sodium, and potassium cations and carbonate, hydrogen carbonate, chloride, sulfate, and nitrate anions.

PRINCIPLE: The sample is filtered and the filtrate evaporated in a tared dish on steam –bath. The residue after evaporation is dried to constant mass at 103-105.C or 179-181.C.

2.TSS(Total Suspended Solids)

Total suspended solids (TSS) is the dry-weight of suspended particles, that are not dissolved, in a sample of water that can be trapped by a filter that is analysed usinga filtration apparatus

PRINCIPLE: It measures a similar property to turbidity, but provides an actual weight of particulate matter for a given volume of sample (usually mg/l).

3.Desiccator: It is an apparatus for absorbing the moisture present in a chemical substance. An airtight, usually glass container containing dried silica crystals or some other drying agent for absorbing the moisture of another substance placed in the container.

Day 3(13-09-2023)

1.Total solids

- Total solids are dissolved solids plus suspended and settleable solids in water. In stream water, dissolved solids consist of calcium, chlorides, nitrate, phosphorus, iron, sulfur, and other ions particles that will pass through a filter with pores of around 2 microns (0.002 cm) in size.
- PRINCIPLE: The sample is evaporated in a weighed dish on a steam-bath and is dried to a constant mass in an oven either at 103-105°C or 179-181°C. Total residue is calculated from increase in mass.

2.Mixed liquid suspended solids

- Mixed Liquor Suspended Solids or MLSS in wastewater treatment is the measure of the total concentration of solids in an aeration tank. It includes non-biodegradable suspended matter, organic solids and microorganisms.

Day 4(14-09-2023)

- Phosphorus
- Phosphorus is a chemical element with the symbol P and atomic number 15. Elemental phosphorus exists in two major forms, white phosphorus and red phosphorus, but because it is highly reactive, phosphorus is never found as a free element on Earth.
- PRINCIPLE:It is determined by adding ammonium molybdate and stannous chloride forming blue coloured complex, the absorbance of which is measured spectrophotometrically at 690 nm in UV/Vis spectrophotometer. First series of known concentration is run known a standard solutions and from there unknown concentration is calculated by comparing its absorbance with that of standard.

Day 5(15-09-2023)

1.Uv-Visible spectroscopy

It works on the principal of beer lambert's law which says amount of light passed or absorbed is directly proportional to path length and concentration of absorbent.

$$L \propto bc$$

Here **b** is path length and **c** is the concentration

2.Ammoniacal nitrogen

PRINCIPLE:Ammonia reacts with the Nessler reagent (K_2HgI_4) to form a yellow colored complex which can be detected spectrophotometrically at 410 nm and is directly proportional to the ammonia concentration. Stabilizer solution (potassium sodium tartrate) is added to prevent cloudiness of the Nessler reagent which may occur in some waters due to calcium and magnesium concentrations.This method is suitable for the concentration range of 0 – 7.00 mg/L ammonia in surface, drinking and nitrified waste waters allowing its concentration to be determined without the use of a calibration curve by incorporating the measured absorbance at 410 nm into a known equation.

Day 6(19-09-2023)

1.Digestion:

- To remove or oxidise a the unwanted wastes to its simplest form.In other words, removal of all organic and other wastes in the sample (not organic ions).

2.Chemical oxygen demand(COD)

PRINCIPLE: Potassium dichromate added to the sample which will digest or oxidise all the organic or other industrial wastes with mercuric sulphate and silver sulphate in the presence of sulphuric acid.the left amount of potassium dichromate will be estimated against titration by ferrous ammonium sulphate.

Day 7(20-09-2023)

1. Biochemical oxygen demand(BOD)-DO1

- Biochemical Oxygen Demand is applied to determine the aerobic destructibility of organic substances. BOD is the biological method used for the measurement of the total amount of dissolved oxygen (DO) used by microbes in the biological process of metabolizing organic molecules present in water.
- PRINCIPLE: The biochemical oxygen demand (BOD) test is based on mainly bio-assay procedure which measures the dissolved oxygen consumed by micro-organisms while assimilating and oxidizing the organic matter under aerobic conditions. The standard test condition includes incubating the sample in an air tight bottle, in dark at a specified temperature for specific time
- Air incubator(avoid light to prevent possibility of photosynthetic production of oxygen)- 27.C+- 1.C.

2. PROCEDURE:

- Sample BOD bottles were filled and closed with lids(Bubbles should not be formed)
- 2 ml of Magnesium sulphate solution and 2 ml of alkaline iodide was added.
- We shake the bottle and leave it aside undisturbed so that the precipitates settle down.
- Now lids were removed and 2 ml of H_2SO_4 was added, and the lids were closed now it was Shaked till clear solution was obtained.
- The bottle was transferred to 250 ml conical flask till 200ml.
- Now titration of content by sodium thiosulphate solution(0.025N) was done until yellow colour was appeared, now 1-2ml of starch indicator (end point is change of dark blue to calories) but the addition was done slowly in drop by drop order.
- Make the appropriate end point.

Day 8(21-09-2023)

- Chloride
- water containing chlorides is titrated with silver nitrate solution, chlorides are precipitated as white silver chloride. Potassium chromate is used as indicator, which supplies chromate ions.
- **PRINCIPLE:** To determine the chloride content in all water and waste water sample using **ARGENTOMETRIC** method. In a neutral or slightly alkaline solution potassium dichromate chromate can indicate the end point of the silver nitrate titration of Chloride. silver chloride is precipitated before red silver chromate is formed.
- **APPARATUS**
- Analytical balance
- Hot air oven
- Desicator
- STD measuring flasks
- Conical flask(250ml)
- Glass burette(50ml)
- Volumetric pipette (100 or 200ml)

Day 9(25-09-2023)

- Sulphate

PRINCIPLE: At acidic pH, SO_4 (sulphate) reacts with BaCl_2 to form BaSO_4 as the turbid compound.

Buffer solution: CH_3COONa , MgCl_2 , KNO_3 and CH_3COOH

A buffer solution is defined as a solution which resists any change in its pH value even when small amounts of the acid or the base are added to it.

PROCEDURE:

- 10ml buffer and then add 100ml of make up solution
- Add spoonful of barium chloride salt
- Then mix for 30 seconds
- Measure the absorbance in UV spectroscopy at 420nm

ABBREVIATION

- PPM- PARTS PER MILLION
- PPB- PARTS PER BILLION
- EC- ELECTRICAL CONDUCTIVITY
- PH- POTENTIAL OF HYDROGEN
- TDS- TOTAL DISSOLVED SOLIDS
- TSS- TOTAL SUSPENDED
- MG/L- MILLIGRAM PER LITRE
- MLSS- MIXED LIQUID SUSPENDED SOLIDS
- BOD- BIOCHEMICAL OXYGEN DEMAND
- COD- CHEMICAL OXYGEN DEMAND

Conclusion

- In a nutshell, I would like to conclude that this internship was a whole new opening of knowledge. From the first day to the last day of training was an addition of acquiring new information, the work from theoretical to demo all was done in a way which was easy to grab it. The workings of the laboratories from the planning to its operation was also known, in which NABL(National Accreditation Board for Testing and Calibration Laboratories) was the utmost importance. Education is the Key to unlock the world as popular saying, in this internship period I learned many new things that was out of my core and is well satisfied with the outcome