



ANALYSIS OF CHEMISTRY LABORATORY EFFLUENTS AND IT'S TREATMENT.

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ABSTRACT This experiment is based upon the analysis of contamination present in the water samples obtained from chemistry lab. Through chemical procedures we are able to detect the toxicity level, pH level, heavy metals present, COD, organic and inorganic compounds present in the water sample. As there is a peak increase in industrialisation dumping of effluents released by small scale to large scale industries and laboratories in water bodies has increased on a high-risk level due to which problems such as GLOBAL WARMING has been a highest priority issue.

KEYWORDS : Alkalinity, COD, Heavy metals.

INTRODUCTION:

Water is the most essential natural resource available on Earth¹. Obtaining potable water are a major crisis rising in this current generation. Due to rise in industrialisation and urbanization chemical plants are unloading away harmful biochemical waste in water bodies. Effluents are the untreated waste water disposed off by industrial plant into water bodies containing full of impurities such as heavy metals², other organic³ and inorganic⁴ compounds. Discharged sewage consist of metals such as Lead(Pb), Zinc(Zn), Magnesium(Mg), Nickel(Ni), Arsenic(As), Copper(Cu) are dumped into water bodies⁵⁻⁸. Even cancerous metals such as cadmium(Cd), Chromium(Cr) are also discarded into pond⁹. There are other factors affecting the quality of water such as the bacterial growth occurring due to the water temperature, type of disinfectant used, degree of pipe corrosion, organic carbon level present in liquid¹⁰⁻¹².

METHODOLOGY:

Water sample was collected from the lab in a 5000 cm³ sterile glass bottle and brought back to the lab for further physico-chemical experiments.

The procedures for treatment of water sample so that we can treat that sample and may use for drinking purpose or other uses by purifying, clarifying, softening the water and making it beneficial for us. For this experiments the certain tests that were carried out were:

1. Cowdung Method
2. Charcoal Method
3. Alum Method

Cowdung Method:

Cow dung method is used for decomposition of organic matter present in the sample. The use of dry manure is used to detect the COD level of the water sample. If there are any changes occurring in the COD levels.

Charcoal Method:

Charcoal method is utilized for absorption of particles that produces colour of the water sample. Basically it is held for the coloration of the solution by which we can identify the heavy metals, organic and inorganic matter present in the sample.

Alum Method:

Alum Method purpose is to purify the sample. Alum is generally used in the water purification process as a chemical flocculant. Alum when added to the water sample it reacts with the impurities and other suspended materials present in the water and accumulates it at the bottom of the container.

The parameters carried out for this experiment were as follows:

- Colour
- pH Test
- Chloride Test
- Alkalinity Test
- Sulphite Test
- Hardness Test

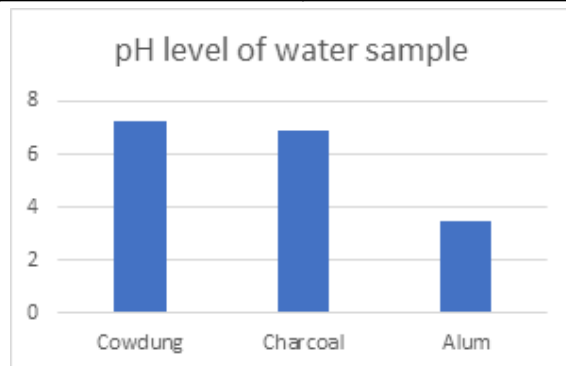
Colour:

The sample collected from the lab was found to be colourless with various amount of impurities present in it. Colour analysis is an important monitoring procedure. Colour in pond water may result in presence of organic inorganic compounds, heavy metals and other filths in water sample.

pH Test:

pH test is carried out to investigate whether the sample collected is acidic, basic or neutral. The water sample collected from the lab was found to be slightly acidic before treatment of the sample. The sample is acidic it might be due to the impurities present such as organic matter, faecal matter, heavy metals in the water sample.

Before Treatment	5.64 pH
After Treatment	
Cowdung-6g in 200ml	7.24 pH
Charcoal -2g in 200 ml	6.86 pH
Alum-10g in 200 ml	3.45 pH



Chloride test:

Chloride test is performed in order to identify the concentration of chlorine in water sample. As chloride is a harmful chemical hence a chloride test is required to achieve the amount of chloride ions present in the water sampling.

Requirements of the reagents for this reaction are:

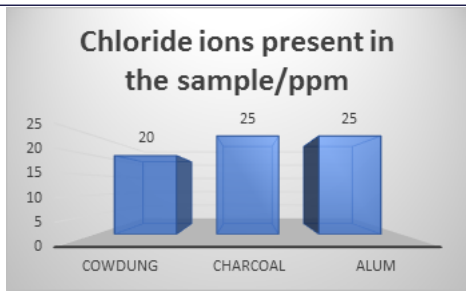
04A-1 Reagent, 04A-2 Reagent, 04A-3 Reagent

End Point of this experiment:

Blue to Violet

Observation:

Before Treatment	200ppm
After Treatment:	
Cowdung	180ppm
Charcoal	150ppm
Alum	150ppm



Alkalinity Test:

Alkalinity test is performed to measure the amount required to neutralise an acid. Alkalinity test is carried out by determining the capacity of water essential to make the acidic solution achieve neutralization point.

Requirements for alkalinity test are:

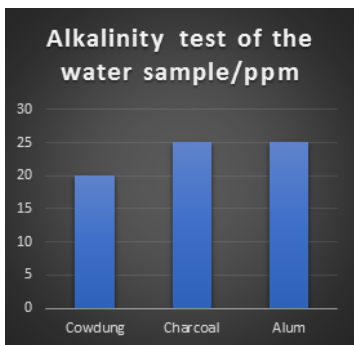
03A-1 reagent, 03A-2 Reagent, 03A-3 Reagent

End point of this experiment is:

Green-Reddish Violet

Observation:

Before treatment:	0 ppm
After treatment:	
Cowdung	600 ppm
Charcoal	20 ppm
Alum	10 ppm



Sulphite Test:

Sulphite test is carried out to calculate the amount of sulphide ions present in the water sample. To check the water sample for the presence of sulphite ions to analyse the toxicity caused in the water sample due to sulphite ions.

Requirements for this experiment are:

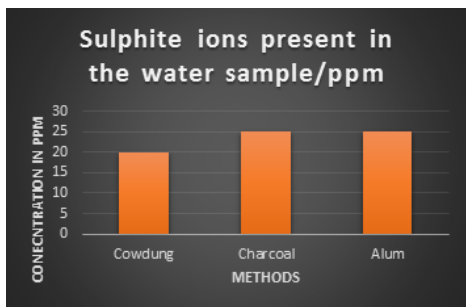
05A-1 Reagent, 05A-2 Reagent, 05A-3 Reagent

End Point:

Colourless to Violet Blue

Observation:

Before treatment	85ppm
After Treatment:	
Cowdung	20ppm
Charcoal	25ppm
Alum	25ppm



COD(Chemical Oxygen Demand):

COD is defines as the amount of reduced oxygen capacity of the water sample which is being treated. COD is usually used to detect the contamination caused due to organic matter present in the water sample.

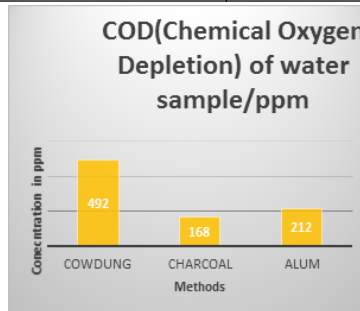
Requirements for this experiment are: 0.025N K₂CrO₇, 0.025N FAS Solution, 2% ferroin Indicator, 4N H₂SO₄.

End Point:

Green to Red

Observation:

Before treatment:	472 ppm
After Treatment:	
Cowdung	492 ppm
Charcoal	168 ppm
Alum	212 ppm



Applications:

The treated water can be:

1. Used for gardening purposes.
2. Used as coolants in powerplant industries.
3. Used to wash automobiles.
4. Used to generate thermoelectricity.
5. Used to wash utensils.
6. Reusage of water in septic tanks.
7. Recreation purposes
8. Used to build up artificial lakes for aqua activities such as boating.
9. Used for landscaping and irrigation purposes.
10. Used to breed aquaculture.

RESULT & DISCUSSION:

Methods	Results
pH Test	Before Treatment: 5.64 pH After Treatment- 1.Cowdung: 7.24 pH 2.Charcoal: 6.86 pH 3.Alum: 3.45 pH
Chloride Test	Before Treatment: 200 ppm After Treatment- 1.Cowdung: 180 ppm 2.Charcoal: 150 ppm 3.Alum: 150 ppm
Alkalinity Test	Before treatment: 0 ppm After Treatment- 1.Cowdung: 600 ppm 2.Charcoal: 20 ppm 3.Alum: 10 ppm
Sulphite Test	Before Treatment: 85 ppm After Treatment- 1.Cowdung: 20 ppm 2.Charcoal: 25 ppm 3.Alum: 25 ppm
Hardness test	Before Treatment: 200 ppm After Treatment- 1.Cowdung: 100 ppm 2.Charcoal: 150 ppm 3.Alum: 70 ppm
Chemical Oxygen Demand(COD)	Before Treatment: 472 ppm After Treatment- 1.Cowdung: 492 ppm 2.Charcoal: 168 ppm 3.Alum: 212 ppm

Here we observed that during pH test of the water sample several chemical tests were conducted to test the water sample and identify the impurities present in the sample. The tests performed were pH test, Alkalinity test, Chloride test, Sulphite test, Hardness of water and COD.

Through these experiments we came to a conclusion that in pH test before treatment was somewhat acidic (5.64pH). When cow dung was used it turned the solution more basic (7.24pH) and addition of charcoal has slightly increased the pH level (6.86pH) of the sample and when alum is added has turned the solution more acidic (3.45pH).

From chloride test we came to supposition that chloride ions were present in the solution. Before treatment it was specified that (200ppm). After treating the sample with cow dung (180 ppm) and after adding of charcoal (150 ppm) and when alum is added (150 ppm) of chloride ions present in the sample after the treatment.

Perform alkalinity test on the sample to identify the amount of acid required to neutralise the solution. Before treatment it was stated as (0 ppm). After the addition of cow dung the sample resulted in (600 ppm) and when charcoal was used as an additive it came up to (20 ppm) and when alum was added it bring about (10 ppm).

When sulphite test were carried out it came to notice that sulphide ions were also present in the sample. Before treatment it was noted down (85ppm). After treating it with cow dung it resulted in (20 ppm) when treated with charcoal (25 ppm) when alum was added to the sample it resulted in (25ppm).

Hardness of water was carried out on the sample. Before treating it was penned down as (200 ppm). After treatment with cow dung it observed to about (100 ppm), after charcoal was used as an additive (150 ppm) after addition of alum (70 ppm) as it tends to accumulate the metals present in the water sample.

COD was performed on the water sample and before treatment it was noted as (472 ppm) and after indulging it with cow dung it was written as (492 ppm), after insertion of charcoal it resulted in (168 ppm), when combined with alum it resulted in (212 ppm).

CONCLUSION:

After performing all the tests on the water effluent we came to an assumption that sample treated with charcoal, cow dung, alum all obtained certain results in the experiments carried out such as the pH test, Alkalinity test, Sulphite test, Chloride test, hardness of water, COD that treated water can be obtained if all the impurities are filtered properly with proper techniques we can achieve water which can be used for human beings.

ACKNOWLEDGEMENT:

We are thankful to the Director of Royal College of Arts, Science and Commerce Prof. A.E Lakdawala, Principal Dr. Vikas Vaidya and the management for constant encouragement and providing us with necessary facilities. Authors are also thankful to the management of Amity University, Panvel

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