"INVESTIGATION INTO THE EFFICACY OF ADSORBENT FORTHE TREATMENT OF WASTE WATER"

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ABSTRACT

In treatment of Waste water adsorbents such as Rice husk and activated carbon are commonly used to remove contaminants , impurities and pollutants from water. Thestudy of this experiment is to compare the Chemical oxygen demand (COD),Total suspended solids (TSS),Total dissolved solids(TDS), suspended solids (SS) reduction in wastewater using Rice husk and Activated carbon . Rice husk, a by product of rice production, is rich in cellulose and lignin,which are natural adsorbents. Activated carbon, on the other hand, is a highly porous materialthat has been treated with oxygen to increase its adsorption capacity. Together, they can effectively remove pollutants such as heavy metals, organic compounds, and bacteria from waste water. The activated carbon is then mixed with the waste water to adsorb the impurities.The treated water can then be reused or discharged safely into the environment. This method is cost-effective, sustainable, and environmentally friendly.

Keyword- *Chemical oxygen demand (COD),Total suspended solids (TSS), Total dissolved solids(TDS), suspended solids (SS), Rice husk and Activated carbon.*

1. INTRODUCTION

Carbon and rice husk are two materials that are commonly used in wastewater treatment. Both of these materials have unique properties that make them effective at removing pollutants fromwaste water . Carbon is a highly porous material that has a large surface area. This makes it an excellent adsorbent for organic and inorganic pollutants in wastewater. When wastewater is passed through a bed of activated carbon, the pollutants are trapped on the surface of the carbon particles. Activated carbon can remove a wide range of contaminants, including heavy metals, volatile organic compounds (VOCs), and pesticides.Rice husk, on the other hand, is a byproduct of rice processing that is often considered a waste material. However, it has been found to be an effective adsorbent for pollutants in wastewater. Rice husk contains silica, which gives it a high surface area and makes it effective at adsorbing heavy metals, dyes, and organic compounds .In wastewater treatment, carbon and rice husk can be used in a variety of ways. They can be used as a fixed bed or a fluidized bed in a reactor, as a filter medium in a sand filter, or as a component of a mixed media filter.

2. OBJECTIVES

- The primary objective of the treatment of waste water is to effectively remove contaminants from the water.
- By using activated carbon and rice husk in wastewater treatment is used to reduce the concentration of pollutants in the wastewater to a level that meets to gardening , domestic purpose ,flushing.
- In addition, the use of activated carbon and rice husk in wastewater treatment is asustainable solution that can help to reduce the environmental impact of wastewater treatment. By using these natural materials, we can reduce the amount of chemical additives that are needed in the treatment process, which in turn reduces the amount of waste generated from the treatment process.

3. LITERATURE REVIEW

PHAIR J W, VAN DEVENTER J S J

IN THE YEAR 2012

Rice husk, also known as rice hull, is the outermost layer of the rice grain and is a byproduct of rice milling. It has been found to be a potential material for treating wastewater, as it contains high levels ofsilica, which can adsorb pollutants such as heavy metals and organic matter. In one study, researchers used rice husk as a low-cost adsorbent to remove heavy metals from wastewater. They found that the rice husk was able to effectively remove lead, cadmium, and zinc from the wastewater. Another study used rice husk carbon as an adsorbent to remove dyes from wastewater. The researchers found that the rice husk carbon was able to effectively adsorb the dyes, and that the adsorption capacity increased withan increase in the dosage of rice husk carbon. A different study found that rice husk ash, a byproduct ofburning rice husk, can be used to remove pollutants such as phosphates and nitrates from wastewater. The researchers found that the rice husk ash was able to effectively remove these pollutants and that the removal efficiency increased with an increase in the dosage of rice husk ash. Overall, rice husk and its byproducts have shown to be effective in removing pollutants from wastewater. However, more research is needed to optimize the adsorption process and to investigate the long-term stability and reusability of rice husk as an adsorbent.

M. T. Rhaman

IN YEAR 2015

Activated carbon (AC) was prepared by the conventional carbonization and KOH activation and amorphous silica was extracted by alkali extraction followed by acid precipitation from rice husk on a laboratory scale. The performance of the produced activated carbon and amorphous silica were examined using I2 value measurement, methylene blue (MB) adsorption test, pH measurement, FTIR and SEM-EDX analysis. The optimum temperature for production of AC was obtained at 700 0C. The AC by alkali extraction method was show higher activity than KOH activation. The maximum I2 value, MB adsorption value & pH value shows at 700 0C followed by alkali extraction with 15% NaOH, which were 510.82 mg/g, 61.1 mg/g and 7.32 respectively. The FTIR analysis shows presence of Si-O-Si bondwith a strong peak at 1078.28 cm-1. The SEM image of silica sample shows that the most of organic component is burnt out during combustion.

Jinping Li

IN THE YEAR 2016

As a kind of extensive sources and low cost industrial waste, fly ash has many features, such as porosity, large surface area, adsorption capacity, chemical activity and weakly alkaline, which seem a wide prospect of application in wastewater treatment. This study proposed the acid modification test on fly ash. The effectof key factors including the particle size, pH, the dosage of fly ash, adsorption time and dosage of the modifier on domestic sewage removal efficiencies were evaluated. The optimum conditions and thecorresponding removal efficiency were determined. The results show that the removal efficiency is increasedfirstly and steady subsequently with the increase of fly ash dosage, increased firstly and decreased subsequently with the increase of adsorption time, and increased firstly and decreased subsequently with theincrease of pH value.

4. METHODOLOGY

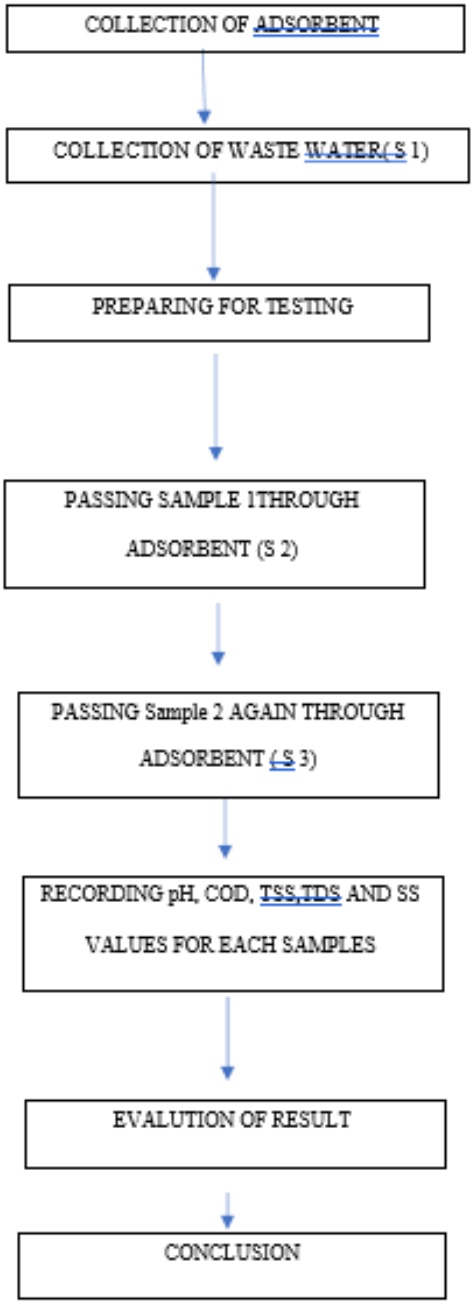


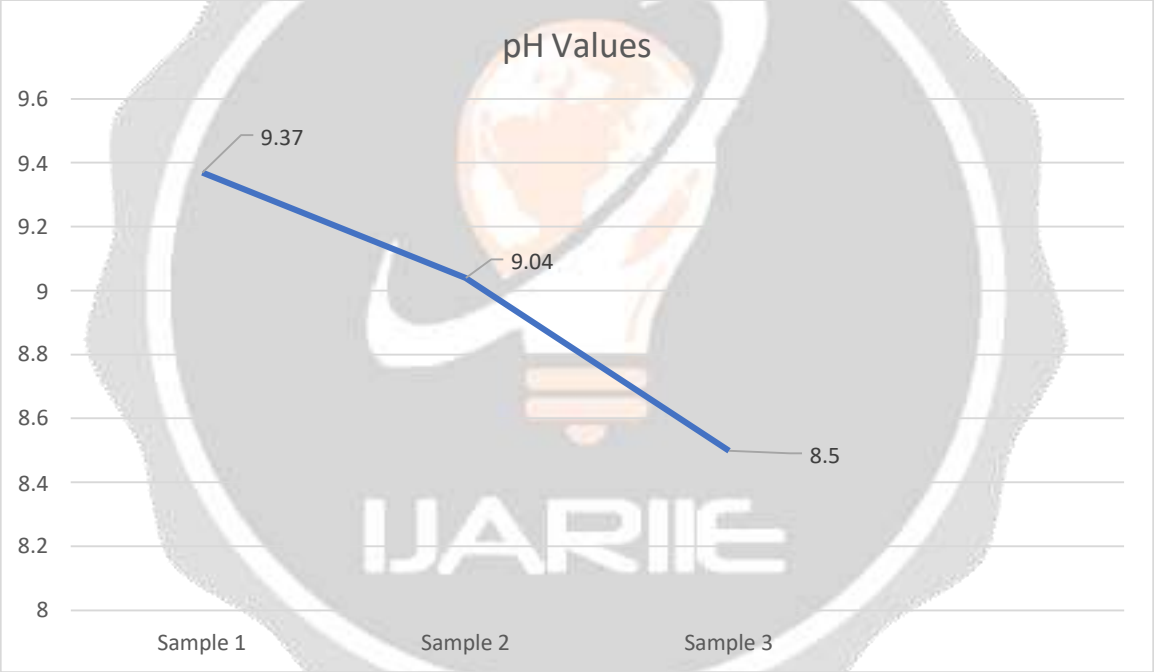
Fig: 1 Flowchart

5. TESTS, RESULTS AND DISCUSSION

1. pH Values.

Table 5.1 pH result

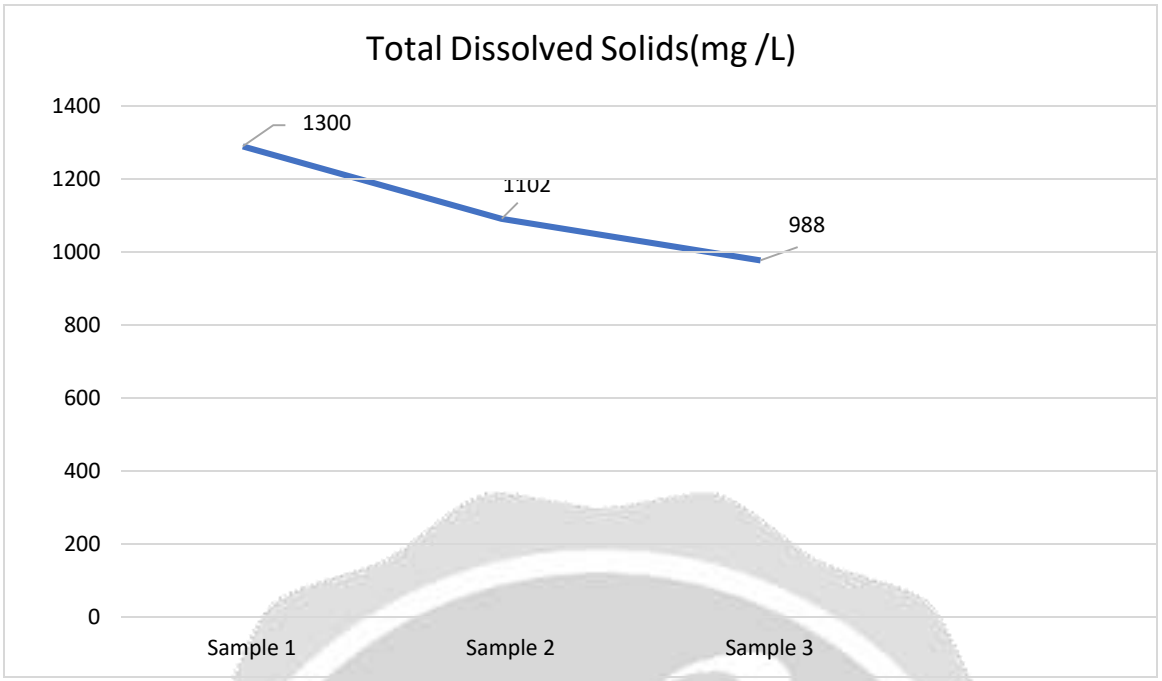
SL NO	SAMPLES	RESULT
1	**S 1**	**9.37**
2	**S 2**	**9.04**
3	**S 3**	**8.50**



2. Total Dissolved Solids.

Table 5.2 TDS Result

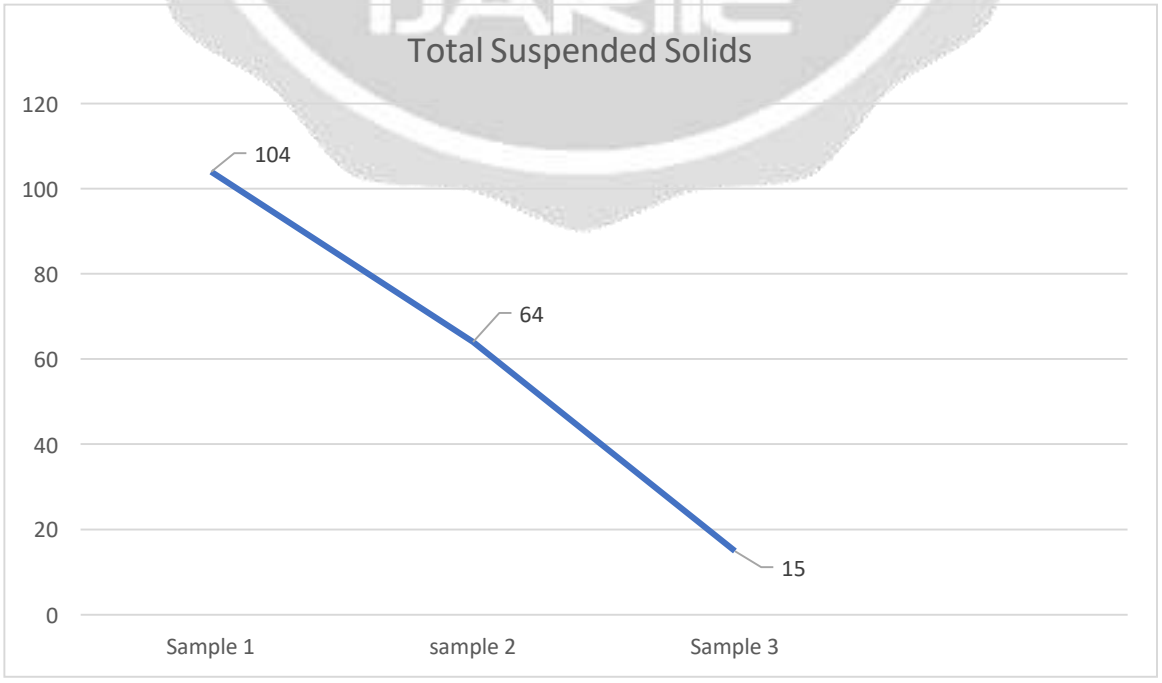
SL NO	SAMPLES	RESULT
1	**S 1**	**1300**
2	**S 2**	**1120**
3	**S 3**	**988**



3. Total Suspended Solids.

Tables 5.3 TSS Result

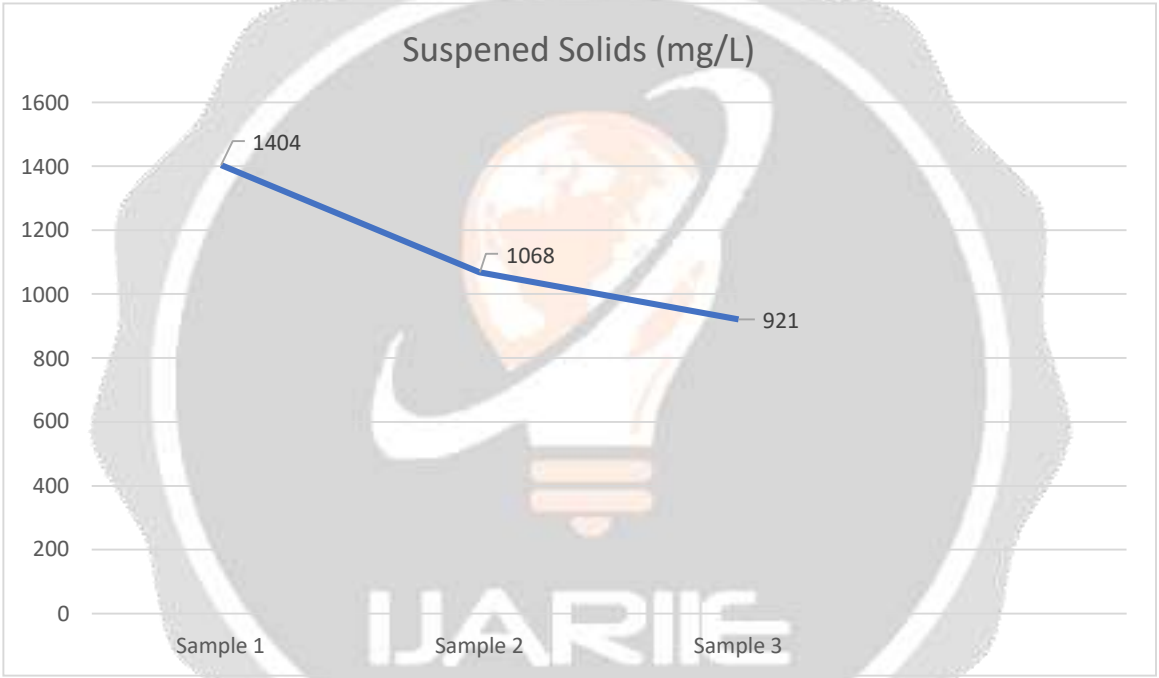
SL NO	SAMPLES	RESULT
1	**S 1**	**1404**
2	**S 2**	**1068**
3	**S 3**	**921**



4. Suspended solids.

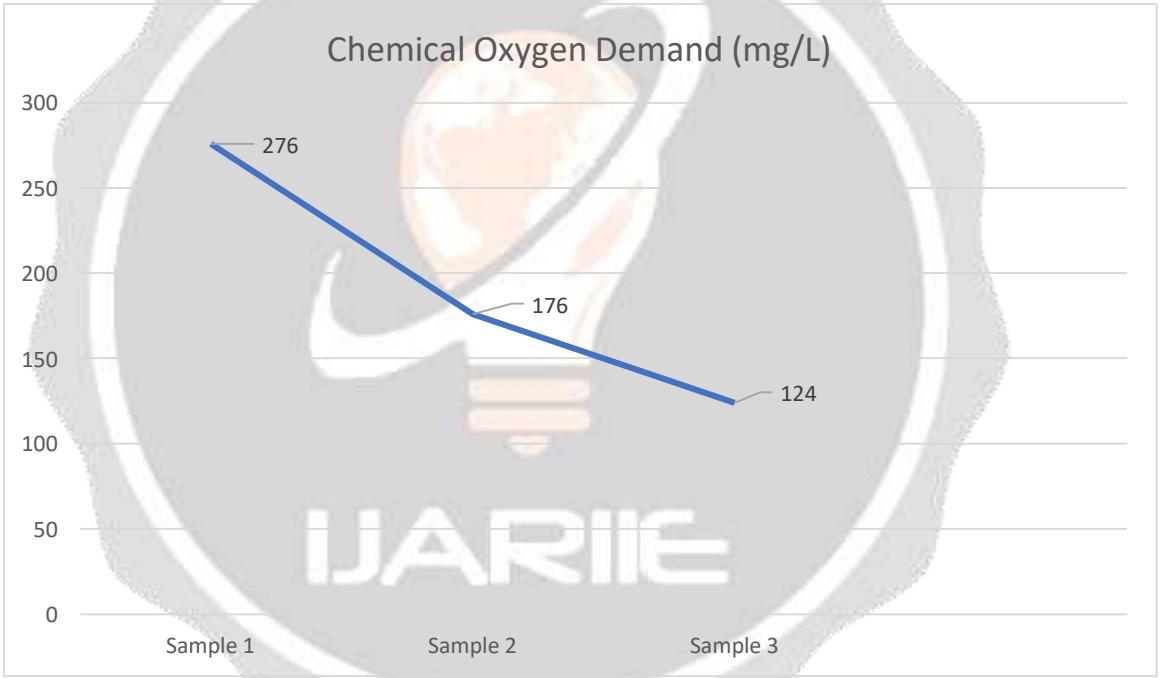
5. Tables 5.4 SS Result

SL NO	**SAMPLES**	**RESULT**
1	**S 1**	**1404**
2	**S 2**	**1068**
3	**S 3**	**921**



6. Chemical Oxygen Demand.

SL NO	SAMPLES	RESULT
1	**S 1**	**276**
2	**S 2**	**176**
3	**S 3**	**124**



6 DISCUSSION

- The values of pH testing of waste water were reduced from 9.37 to 9.04 and finally reduce to 8.50. Hence by this we can notice that the basicity of the water is reduce.
- The values obtained from the TDS testing is noticed that has an decreasing values from 1300to 1120 and finally reduces to 988. Thus the Dissolved solids have been decreased.
- The values obtained from TSS testing is noticed that , it has decreased values from 104 to 64and then finally reduces to 15 . thus the total suspended solids have been reduced .
- The values obtained from suspended solids is noticed that it has be reduced from 1404 to 1068 and finally S3 reduces to 921
- The values obtained from COD is noticed that the values is reduced from 276 to 176 and finallyreduced to 124 .

7 CONCLUSION

- The adsorbents rice husk and activated carbon used in waste water treatment effectively removes the containments from the collected sample.
- The treated water can now be used for domestic use and for gardening and also forflushing and so on.
- By treating this waste water with natural materials like rice husk and activated carbon can reduce the amount of chemical additives that are needed in treatment process.
- Thus use of this natural materials in waste water treatment will be effective and sustainable solution for removing pollutants from waste water and protecting theenvironment.

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