International Journal of Social Science (IJSS)
Vol.2 Issue.4 December 2022, pp: 1937-1948
ISSN: 2798-3463 (Printed) | 2798-4079 (Online)
DOI: https://doi.org/10.53625/ijss.v2i4.4242

THE EFFECT OF UTILIZATION OF ACTIVATED CARBON FROM RUBBER SEED SHELLS AND COAGULANTS FROM KEPOK BANANA PEELS IN WELL WATER OF KENTEN LAUT RESIDENCE TOWARDS PARAMETER pH, TSS, TDS AND TURBIDITY

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Article Info

Article history:
Received Oct 02, 2022
Revised Nov 11, 2022
Accepted Nov 24, 2022

Keywords:
Well Water, Activated Carbon, Rubber Seed Shells, Coagulants, *Kepok* Banana Peels.

ABSTRACT

Water is basic necessity in our daily life. But in fact, the water sources used by surrounding communities in Kenten Laut residence's wells are still murky and still do not meet the standard specifications for drinking water. This study aims to determine the effectiveness of using activated carbon from rubber shells and optimal coagulation from *kepok* banana peels in improving the water quality of residence's wells by using the parameters of pH, TSS, TDS and turbidity. Based on the research which has been conducted, the optimum effectiveness that could be used to increase pH value with dose of 0.1 grams was the coagulants from *kepok* banana peels of 7.08, while the activated carbon results were close to alkaline. Meanwhile, for other parameters, the optimum effectiveness for improving the water is the dose of 0.5 grams of rubber seed shell activated carbon, it could reduce TSS up to 90.66%, TDS 91.04% and turbidity 97.37%. Meanwhile, by using coagulant from *kepok* banana peels the effectiveness was only TSS 73.33%, TDS 40.29% and turbidity 68.86%.

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1. INTRODUCTION

Water is a material that makes life happen on earth. All living things, both plants, animals and humans, really need water for their survival. Humans usually use water to meet their needs, such as bathing, cooking, washing, drinking, cleaning the house, and also as a drug solvent (Hapsri, 2015). Sources of clean water that are usually used by the general public include PAM (Drinking Water Company), dug wells, pumped water, lake water, sea water and also river water (Yusuf et.al., 2011).

One source of contamination in groundwater can also be caused by human activities. Human activity can be represented by the dense population in an area, the higher the population density, the higher the potential for pollution can be assumed (Fauzi, 2018). Pollution in water can cause the color of the water to turn yellow, smell and foam, and can cause pathogenic microbes to multiply and cause various types of diseases such as Diarrhoea, *Dysentery Amoeba*, *Typus*, *Abdomilis*, and *Cholera* (Trisna, 2018).

Advances in science and technology have created various findings in the process of managing clean water, such as water treatment with chemicals or commonly known as alum. Besides the benefits of using alum, there are also negative impacts from the use of these chemicals which can have negative effects on human health and also the environment. To minimize the use of chemicals that can cause negative effects on

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health, natural alternatives can be used to purify water, namely by using natural ingredients from plants.

Utilization of plants as an alternative to natural water purification has many advantages. This plant is an organic material that is easily decomposed or *biodegradable*, so it does not cause environmental pollution and is also safe when used. Apart from not being able to pollute the environment, water purification from natural materials can also minimize costs (Maliandra et al., 2014). Plants can be used as natural water purifiers because they contain coagulant active substances and can be used as activated carbon.

One type of banana peel that can be used as water purification is kepok banana peel. Banana peel besides having the ability to purify water also has the ability to inhibit bacteria. The content of banana peels such as *flavonoid compounds, saponins, alkaloids*, are known to be used as antibacterials (Wahyuni et.al., 2019). Apart from kepok banana peels, rubber seed shells can also be used as a water purifier. Rubber fruit shells are used as activated carbon because they have a fairly high lignocellulosic composition.

From the explanation above makes the writer interested in researching comparison of the use of rubber seed shells as raw material for activated carbon and leather bananas as a coagulant raw material to improve the quality of well water in Laboratory. It is hoped that with this research, the community can Utilizing rubber seed shells and kepok banana peels which have been considered so far Waste that is thrown away can have economic value in the future and can be used as waste alternative as a method to purify and improve water quality clean.

1.2 Limitation of the problem

The limitation of the problem that will be discussed in this study is about the effect of utilizing activated carbon from rubber seed shells and coagulant from kepok banana peels in well water on the parameters of pH, TSS, TDS and *Turbidity*. The well water that was used as a sample was taken from 3 sample points of employee housing wells at the Kenten Laut Housing Complex and saw the effect of the two treatment processes above which one is better.

1.3 Objectives

To determine the effect of using rubber seed shells as natural active carbon and kepok banana peels as natural coagulants to treat well water on the parameters of pH, TSS, TDS and *Turbidity* and find out the best processing of the two processes above.

1.4 Benefits

Can determine the effect of activated carbon from rubber seed shells and coagulant from kepok banana peels in well water on the parameters of pH, TSS, TDS and *Turbidity* and can determine the best processing of the two processing processes above.

2. LITERATURE REVIEW

2.1 Water

Water is a very vital natural resource and is needed to determine the sustainability of all living things on this earth (Mawardi, 2014). well water

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is shallow groundwater to a depth of less than 30 meters, well water is generally at a depth of 15 meters and is also known as free groundwater because the groundwater layer is not under pressure.

2.2 Rubber seed shells

Rubber seed shells are materials that have been known as less useful materials. Rubber seed shells can be used as a raw material for making activated charcoal, but some people use it as an ingredient in various handicrafts. Rubber seed shell is used as activated carbon because it has a fairly high lignocellulosic composition. The high composition of lignocellulosic can be seen in Table 2.1.

Table 2.1 Rubber Seed Shells

Composing Components	Percentage (%)
Cellulose	48,64
Lignin	33,54
Pentosan	16,81
Ash Content	1,25
Silica Content	0,52

Source : M. Zulfadhli, 2017

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2.3 Activated Carbon

Adsorption is a process of absorption of certain materials so that with this absorption process it can make clear water because the substances in it can be bound with adsorbents. Adsorption usually uses some adsorbent material from activated carbon. Activated carbon is one of the adsorbents used in the absorption process.

Activated carbon is amorphous carbon from flat plates composed of covalently bonded C atoms in a flat hexagonal lattice with one C atom at each corner. Its chemical structure makes it possible to adsorb organic matter and other nonpolar compounds from gas or liquid streams. Due to these properties, activated carbon has been used for decades for gas purification, separation of gas mixtures, especially solvent recovery, heavy metal removal, color removal from solutions and water purification. The activated carbon standard according to SNI can be seen in Table 2.2.

Table 2.2 Activated Carbon Standards (SNI) 06/3730/1995

Parameter Requirment Type	Parameter
Water Content	Max. 15 %
Kadar AbuAsh Content	Max. 10 %
Kadar Zat MenVolatile Matterguap	Max. 25 %
Fixed Carbon	Min. 65 %
Absorption Power Against Iodine	Min. 750 mg/g

Source: M. Zulfadhli, 2017

The activation process is an important thing to note besides the raw materials used. What is meant by activation is a treatment of carbon that aims to enlarge the pores, namely by breaking the hydrocarbon bonds or oxidizing thesurfacemolecules so that the carbon undergoes a change in properties, both physical and chemical, namely its surface area increases and affects the adsorption power. The activation methods commonly used in the manufacture of activated carbon are chemical and physical activation (Rajagukguk, 2011).

2.4 Kepok Banana Peel

Banana peel is a waste material that is quite abundant, which is about 1/3 of unpeeled bananas. In general, banana peels have not been widely used, usually only disposed of as organic waste and are also used as animal feed (Lestari, 2004). Kepok banana peel contains several biochemical components in the form of cellulose, hemicellulose, chlorophyll pigments and pectin substances containing *galacturonic*, *arabinose*, *galactose*. The content of these chemical components is known to be used as an absorbent for heavy metals (Abdi *et al.*, 2015). Some compositions of unripe banana peels based on cell wall analysis consist of 37.52% hemicellulose, 12.06% cellulose and 7.04% lignin (Simangunsong, *et.al*., 2017).

The active substance in banana peel that plays a role in the coagulation process is protein. It is the acidic conditions of well water that increase the attraction towards the positive charge on the amino acids in the protein molecule. These acidic conditions can enhance and affect the performance of molecules that appear efficiently as coagulant agents (Priyatharishini et al., 2019).

2.5 Coagulation and Flocculation

Coagulation is the clumping of colloidal particles that form precipitates. With the occurrence of coagulation, the dispersed substances no longer form colloids. Coagulation can be processed physically or chemically. Physical treatment, for example by heating, cooling, or stirring. whereas chemically, for example by adding electrolytes or coagulants that have a different charge from suspended particles and colloids. While flocculation is a process that aims to combine small flocs which eventually form larger flocs so that they can settle (Marieanna, 2013).

In water treatment, to achieve an optimum coagulation process, it is necessary to regulate all conditions that are interrelated and affect the process. Conditions that affect include pH, temperature, coagulant concentration and stirring.

3. RESEARCH METHODOLOGY

3.1 Time and Place of Implementation

Sampling of the well water used in this study came from Location X. The research started from September, 10th, 2022 to September, 28th, 2022. The research was conducted at the Chemistry Laboratory.

3.2 Data Collection Techniques

1. Literature study

The data obtained in the preparation of this research report were sourced from relevant and appropriate literature

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from outside, several books and research journals.
2. Data collection
Apart from literature study, the data included is also data obtained directly from the field when carrying out research in the Chemistry Laboratory.

3.3 Research Flowchart
3.3.1 Preparation Of Activated Carbon from Rubber Seed Shells

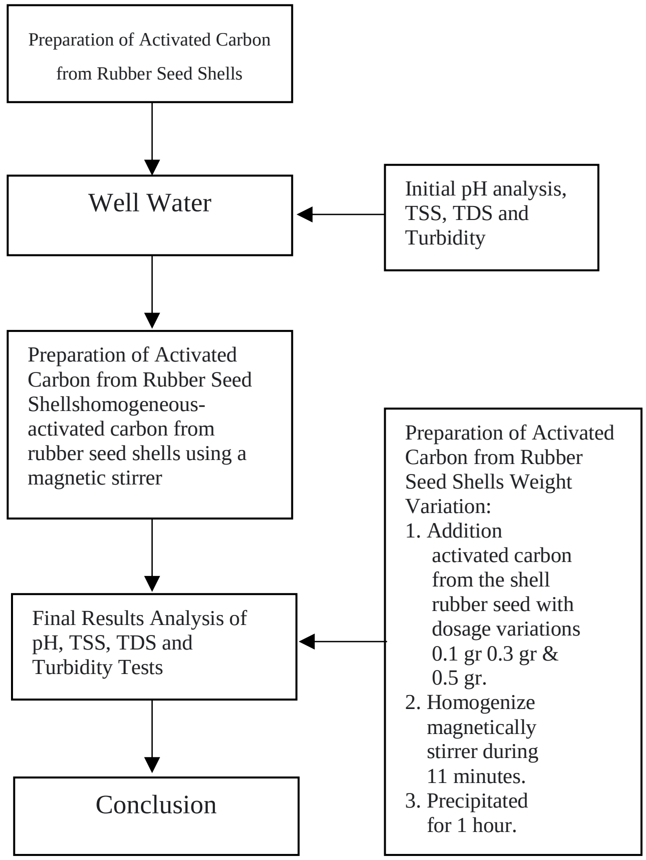

Figure 3.1 Flowchart for Making Activated Carbon from Rubber Seed Shells

3.3.2 Preparation Of Coagulant From Kepok Banana Peel

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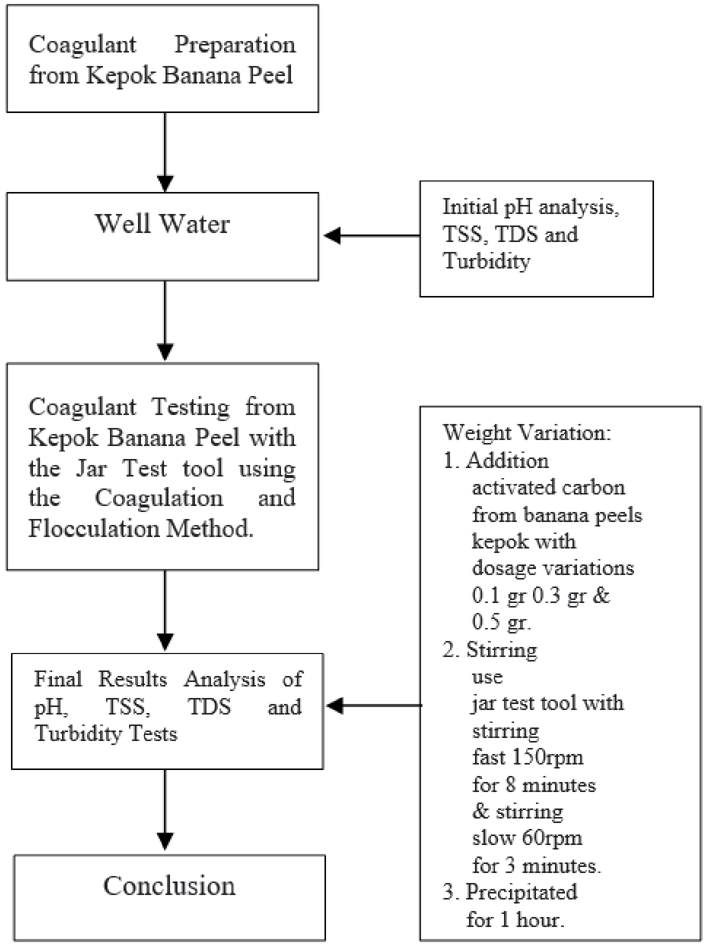

Figure 3.2 Flowchart for Making Coagulant from Kepok Banana Peel

RESULTS AND DISCUSSION

4.1 Results and Discussion Analysis of Treatment of well water 1, 2, 3 using Activated Carbon from Rubber Seed Shells

4.1.1 Analysis of pH (power of Hydrogen)

pH is the degree of acidity used to express the level of acidity or alkalinity possessed by a solution (BSE, 2014). In this study the researchers used 500 ml of well 1, well 2 and well 3 water samples which were put into a beaker glass. Then enter the activated carbon with varying doses of activated carbon 0.1 gram, 0.3 gram and 0.5 gram with a stirring time of 11 minutes and a settling time of 1 hour. From the results of this study, the following pH results were obtained:

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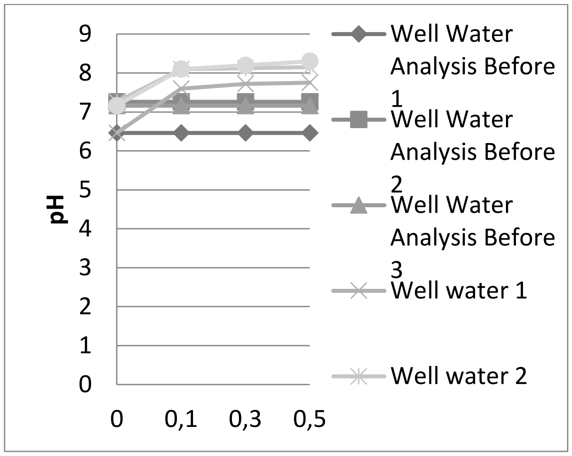

Figure 4.1 Graph Of pH Analysis

From the graph in Figure 4.1 it can be seen that the pH content of well water was 1, 2, 3 before treatment, namely 6.46, 7.26, 7.16. After getting the treatment there was an increase in the pH of the water. For variations in the dose of 0.1 gram, the increase was 7.60 in well 1 water, and there was an increase of 8.10 in wells 2 and 3. Meanwhile, at a dose of 0.5 grams for well water 1, well water 2 and well 3 the pH value increased to near alkaline, which was 7.75 in well water 1, then an increase of 8.15 and 8.30 respectively in well water 2 and 3. In neutral pH conditions or tending to be alkaline the absorption of all ions is low and the efficiency is also decrease. This is because at a neutral pH, the ions in water can experience hydrolysis in solution so that it becomes unstable and causes the ability of activated carbon to absorb these ions to also decrease. In addition, the pH tends to be alkaline because the activated carbon from the rubber seed shell has alkaline properties which can increase the pH value in well water (Nurhasni, 2017).

4.1.2 Analysis of TSS *(Total Suspended Solid)*

TSS is insoluble particles and particles that are difficult to settle, causing turbidity in water. Solids are particles that are smaller in size and weight than sediment, for example such as clay, certain organic materials and chemicals that are insoluble in water (Kusniawati & Budiman, 2020). In this study the researchers used 500 ml of well 1, well 2 and well 3 water samples which were put into *a beaker glass*. Then added activated carbon with varying doses of activated carbon 0.1 gram, 0.3 gram and 0.5 gram with a stirring time of 11 minutes and a settling time of 1 hour. From the results of this study, the following TSS results were obtained:

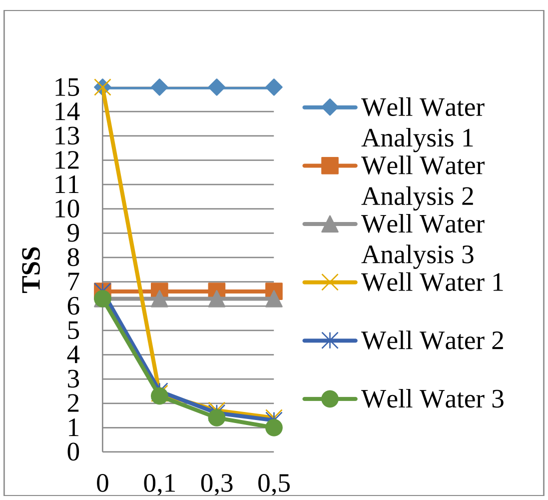

Figure 4.2 Graph of TSS Analysis

From the graph in Figure 4.2 it can be seen that the optimum dose of activated carbon for TSS parameters. In well water 1 with a dose of 0.5 grams of 1.4 mg/l, for well water 2 with a dose of 0.5 grams of 1.3 mg/l and in well water 3 that is a dose of 0.5 of 1.0 mg /l. The decrease in the TSS of well water is due to the adsorption process which results in contact between the sample and the adsorbent surface. The longer the contact time, the better the adsorption process (Kasam, et al., 2005). This happens because the adsorbent has pores that can bind TSS ions so that these ions stick to

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the surface of the adsorbent, and an *outlet* with a lower TSS level is produced than *the inlet* (Hakim Nur Huda, 2006). So in conclusion that activated carbon from rubber seed shells can reduce the TSS content of well water 1, 2 and 3, where the initial TSS content in well water 1, 2 and 3 is 15 mg/l, 6.6 mg/l respectively l and 6.3 mg/l.

Analysis Of TDS *(Total Dissolved Solid)*

TDS is a dissolved solid in water which indicates the presence of organic and inorganic substances and dissolved materials (Ariani, *et.al.*, 2020). An increase in dissolved solids will increase the disease and reduce the growth rate of fish and decrease fish reproduction. In addition, the quantity of fish natural food will decrease, indirectly causing pollution to fish which will have a negative impact on human health if it accumulates in the body (BSE, 2014). In this study the researchers used 500 ml of well 1, well 2 and well 3 water samples which were put into *a beaker glass*. Then enter the activated carbon with varying doses of activated carbon 0.1 gram, 0.3 gram and 0.5 gram with a stirring time of 11 minutes and a settling time of 1 hour. From the results of this study, the TDS results were as follows:

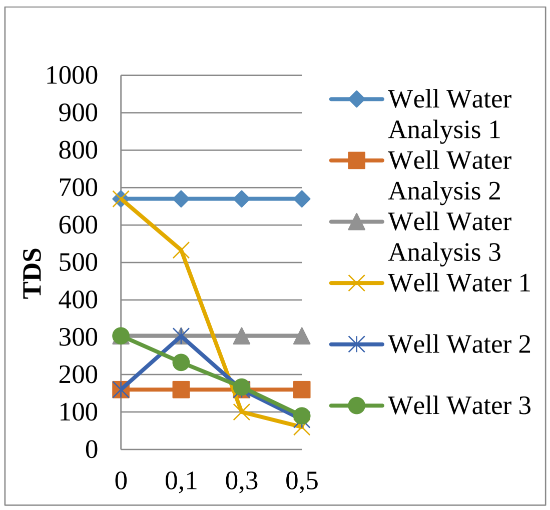

Figure 4.3 Graph of TDS Analysis

From the graph in Figure 4.3 it can be seen that the optimum dose of activated carbon for the TDS parameter as a whole the treatment process occurs at a dose of 0.5 gram of 60 mg/l in well water 1 and in well water 2 and well 3 of 80 mg/l and 90 mg/l. The decrease in the TDS of well water is due to activated carbon which has been processed in such a way that the pores in the activated carbon become open and thus the carbon will have a high absorption power (Mifbakhuddin, 2010). So in conclusion that activated carbon from rubber seed shells can reduce the TDS content of wells 1, 2 and 3, where the initial TSS levels in wells 1, 2 and 3 are respectively 670 mg/l, 160 mg/l and 304 mg/l.

Analysis Of *Turbidity*

Turbidity is a measure that uses the effect of light as a basis for measuring the state of water on the NTU (*Nephelometric Turbidity Unit*) scale. Water can be said to be cloudy if it contains many suspended particles so that it can have a dirty effect. Materials that cause turbidity in water are clay, silt and organic materials as well as the presence of other suspended particles (Ramdysari, 2014). In this study the researchers used 500 ml of well 1, well 2 and well 3 water samples which were put into *a beaker glass*. Then enter the activated carbon with varying doses of activated carbon 0.1 gram, 0.3 gram and 0.5 gram with a stirring time of 11 minutes and a settling time of 1 (one) hour. From the results of this study results were obtained *turbidity* the following

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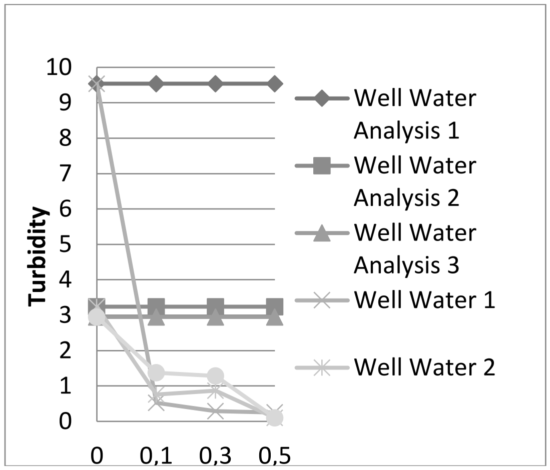

Figure 4.4 Graph Of Turbidity Analysis

From the graph above in Figure 4.4 it can be seen that overall this Activated Carbon is effective in reducing *turbidity*. It is proven that almost all processing processes have succeeded in reducing the quality standard levels. This can be seen clearly in the initial water level in well 1 which was originally above the quality standard level, after the processing was successfully reduced to below the quality standard level. The optimum dose of activated carbon for the *turbidity* mostly occurs at a dose of 0.5 gram of 0.25 NTU. In well water 1 and in well water 2 and well water 3 it is 0.10 NTU. The decrease in *turbidity* is caused by activated carbon which has been processed in such a way that the pores on the activated carbon become open and thus the carbon will have a high absorption power (Mifbakhuddin, 2010). So in conclusion that activated carbon from rubber seed shells can reduce the water content of wells 1, 2, and 3, where the initial turbidity levels in well water 1, 2, and 3 are respectively 9.54 NTU, 3.24 NTU, and 2 .95 NTUs.

4.2 Results and Discussion Analysis of Well water treatment 1, 2 and 3 using coagulation from Kepok Banana Peel

Analysis Of pH (*Power of Hydrogen*)

pH is the degree of acidity used to express the level of acidity or alkalinity possessed by a solution (Team BSE, 2014). In this study, researchers used 500 ml of aged water, well water 2 and well 3 as much as 500 ml which were put into *a beaker glass*. Then added coagulant from kepok banana peel with three variations of coagulant weight with doses of 0.1 gram, 0.3 gram and 0.5 gram with fast stirring at 150 rpm for 3 minutes and continued with slow stirring time at 60 rpm for 8 minutes. Floc settling time was 1 hour. From the results of this study, the following pH results were obtained:

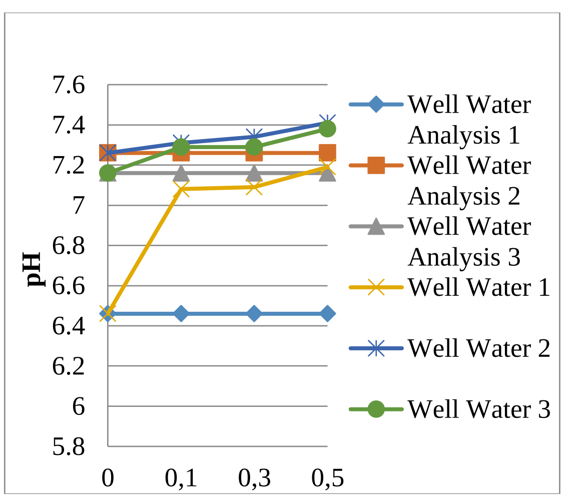

Figure 4.5 Graph of pH Analysis Results

From the graph in Figure 4.5 it can be seen that the pH content of well water 1, 2 and 3 before treatment was

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6.46 each; 7.26; and 7.16. After the treatment, it was seen that there was an increase in the optimum water pH to 7.08 with a variation of the dose of 0.1 gram and in well water 2 and well water 3 the pH value was 7.31 with a variation of the dose of 0.1 gram and 7.29 at a variation of the dose of 0. 1 gram and 0.3 gram.

Based on these results it shows that the pH parameter increases the dose of coagulant from kepok banana peel, the pH value increases which indicates that more impurities are bound to the banana peel. The active components in the kepok banana peel can affect H^+in the water thereby affecting the pH value. This is in line with research (Suharlina and Umroh, 2016) which states that the increase in the pH value of the particles with coagulant treatment from banana peel powder (Putri, Yelfira and Desti, 2021).

4.2.2 Analysis of TSS *(Total Suspended Solid)*

TSS is insoluble particles and particles that are difficult to settle, causing turbidity in water. Solids are particles that are smaller in size and weight than sediment, for example such as clay, certain organic materials and chemicals that are insoluble in water (Kusniawati and Budiman, 2020). In this study the researchers used 500 ml of well 1, well 2 and well 3 water samples which were put into *a beaker glass*. Then add the coagulant from kepok banana peel with three variations of coagulant weight with doses of 0.1 gram, 0.3 gram and 0.5 gram with fast stirring at 150 rpm for 3 minutes and followed by slow stirring at 60 rpm for 8 minutes. Floc settling time was 1 hour. From the results of this study, the TSS results were obtained as follows:

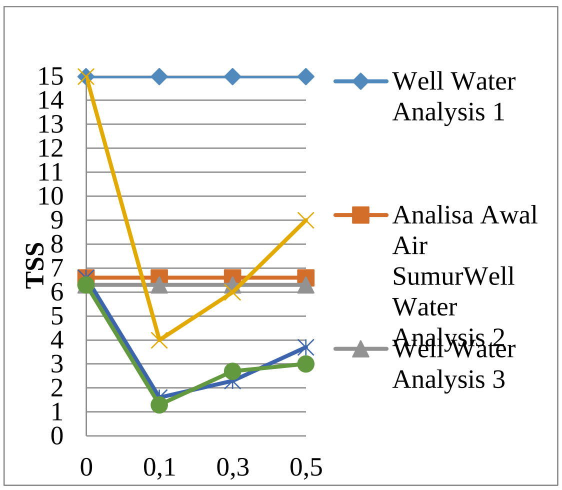

Figure 4.6 Graph of TSS Analysis

From the graph in Figure 4.6 it can be seen that the optimum coagulant dose for the TSS parameter occurs at a dose of 0.1 gram for all well water. The TSS produced was 4.0 mg/l in well water 1 and in wells 2 and 3 for a dose of 0.1 gram of 1.6 mg/l and 1.3 mg/l. At a coagulant dose of 0.5 grams, there was an increase in the TSS value in well 1, well 2 and well 3 water. This was because at this dose the coagulation/flocculation process was maximized and the additional dose of coagulant only increased the amount of organic matter in the solution system (Hesty et al, 2020). In addition, the increase in TSS value is due to the stirring speed. If the stirring is too slow, the flocs are formed slowly and vice versa, if the stirring is too fast, the flocs are broken (Sugiarto, 2007). So in conclusion that coagulation from Kepok Banana Peel can reduce the TSS content of aged water 1, 2 and 3, with initial levels of TSS in well water 1, 2 and 3 of 15 mg/l, 6.6 mg/l respectively and 6.3 mg/l. Even though it is effective, it still needs to be considered that there will be an increase in TSS caused by the coagulant starting to experience saturation in absorbing pollutant content.

Analysis Of TDS *(Total Dissolved Solid)*

TDS is a dissolved solid in water which indicates the presence of organic and inorganic substances and dissolved materials (Ariani, *et.al.*, 2020). An increase in dissolved solids will increase the disease and reduce the growth rate of fish and decrease fish reproduction. In addition, the quantity of fish natural food will decrease, indirectly causing pollution to fish which will have a negative impact on human health if it accumulates in the body (BSE, 2014). In this study the researchers used 500 ml of well 1, well 2 and well 3 water samples which were put into *a beaker glass*. Then add the coagulant from kepok banana peel with three variations of coagulant weight with doses of 0.1 gram, 0.3 gram and 0.5 gram with fast stirring at 150 rpm for 3 minutes and followed by slow stirring at 60 rpm for 8 minutes. Floc settling time was 1 hour. From the results of this study, the TDS results were obtained as follows:

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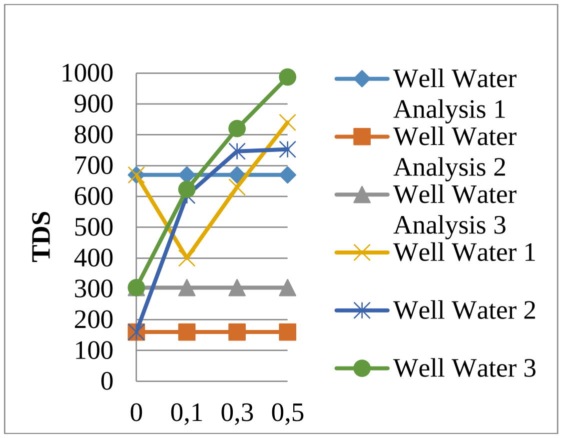

Figure 4.7 Graph of TDS Analysis

From the graph in Figure 4.7 it can be seen that the optimum coagulant dose for the TDS parameter occurs at a dose of 0.1 gram as a whole in the three well waters of 400 mg/l in well water 1 and well water 2 and well water 3 values TDS is 603 mg/l and 623 mg/l. Whereas at the 0.5 gram dose variation, there was an increase in the TDS value in well 1, 2 and 3 well water, namely 840 mg/l, 746 mg/l and 987 mg/l. This is because there is a coagulant from the kepok banana peel which dissolves in the water so that it will indirectly add to the organic and inorganic components of the well water (Wicakso and Mirwan, 2014). In addition, the increase in the TDS value is due to the stirring speed. If the stirring is too slow, the flocs are formed slowly and vice versa, if the stirring is too fast, the flocs are broken (Sugiarto, 2007).

So it can be concluded that the coagulation process from kepok banana peels is declared less effective in reducing the pollutant content of well 1, 2 and 3 well water. Because the TDS content of well 1, 2 and 3 water continues to increase with a variation of 0, 1 gram, 0.3 gram and 0.5 gram where the initial TDS levels in well water 1, 2 and 3 were 670 mg/l, 160 mg/l and 304 mg/l respectively.

Analysis Of *Turbidity*

Turbidity or turbidity is a measure that uses the effect of light as a basis for measuring the state of water on the NTU (*Nephelometric Turbidity Unit*) scale. Water can be said to be cloudy if it contains many suspended particles so that it can have a dirty effect. Materials that cause turbidity in water are clay, silt and organic materials as well as the presence of other suspended particles (Ramdysari, 2014). In this study the researchers used 500 mL of well 1, well 2 and well 3 water samples which were put into *a beaker glass*. Then add the coagulant from kepok banana peel with three variations of coagulant weight with doses of 0.1 gram, 0.3 gram and 0.5 gram with fast stirring at 150 rpm for 3 minutes and followed by slow stirring at 60 rpm for 8 minutes. Floc settling time was 1 hour. From the results of this study, the *turbidity* as follows:

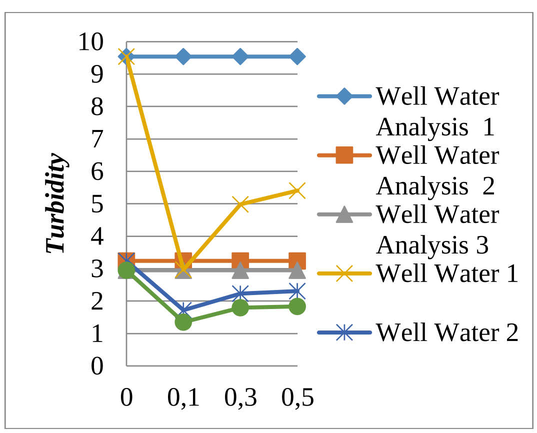

Figure 4.8 Graph of *Turbidity*

From the graph in Figure 4.8 it can be seen that the overall optimum coagulant dose for the *turbidity* occurs at a dose of 0.1 gram of 2.97 NTU in well water 1 and in well water 2 and well 3 of 1.72 NTUs and 1.35 NTUs. At a dose of 0.5 gram coagulant, there was an increase in the *turbidity* value in well water 1, well water 2 and well water 3.

This was due to repulsive forces occurring between positively charged particles resulting in a floc deflocculation process which resulted in the solution becoming increasingly turbid (Coniwanti , Mertha and Eprianie, 2013). So in conclusion that the well water treatment process using the coagulation process from kepok banana peels is effective in reducing the water content of wells 1, 2, and 3, where the initial turbidity levels *in* well water 1, 2, and 3 are respectively 9.54 NTU , 3.24 NTU, and 2.95 NTU.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusion

Based on the results of research on the Effect of Utilizing Activated Carbon from Rubber Seed Shells and Coagulants from Kepok Banana Peels in Improving the Quality of Well Water on pH, TSS, TDS and *Turbidity* , it can be concluded that:

1. On the pH parameter, processing well water using the coagulant process from kepok banana peels is the most effective because the analysis results are still close to normal pH, while the pH using activated carbon from rubber seed shells continues to increase towards alkaline. The effectiveness of the optimum dose for the well 1 water sample included testing the pH parameter using a coagulant dose of 0.1 gram of 7.08 which was neutral, whereas activated carbon was not effective because the pH tended to be alkaline.
2. In the TSS parameter, well water treatment using activated carbon from rubber seed shells is more effective because the analysis results decrease, while in TSS using coagulant from kepok banana peels it continues to increase. The optimum effectiveness for well water 1 is 90.66%, for well water 2 is 80.3% and for well water 3 is 90% using activated carbon from rubber seed shells. Whereas the coagulant from kepok banana peel for well 1 water was 73.33%, for well 2 water was 75% and for well 3 water was 79.36%. On the TDS parameter, well water treatment using activated carbon from rubber seed shells is more effective because the analysis results decrease, while the TDS using coagulant from kepok banana peels continues to increase. The optimum effectiveness for well 1 water is 91.04%, for well 2 water is 50% and for well 3 water is 70.39% using activated carbon from rubber seed shells, while for coagulant from kepok banana skin for well 1 water is 40.29% and in water wells 2 and 3 the analysis results continue to increase.
3. In the *turbidity*, well water treatment with activated carbon from rubber seed shells is more effective because the analysis results decrease, while in *turbidity* using coagulant from kepok banana peels it continues to increase. The optimum effectiveness for well water 1 is 97.37%, for well water 2 is 96.91% and for well water 3 is 96.61% by using activated carbon from rubber seed shells, while for coagulant from kepok banana peels for well water 1 is 68.86%, in well water 2 is 46.91% and in well water 3 is 54.23%.

5.2 Suggestions

In future research, further research is needed to carry out water treatment of the Kenten Laut Residential well using these two methods at once, because in this study, activated carbon from rubber seed shells is effective against TSS, TDS and turbidity parameters, while the pH parameter *is*effective by using coagulant from kepok banana skin.

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International Journal of Social Science (IJSS)
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