



POLITEKNIK SULTAN SALAHUDDIN ABDUL AZIZ

SHAH

**WASTE WATER FILTER FROM
DOMESTIC KITCHEN.**

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(08DKA20F1090)

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DECLARATION OF ORIGINAL AND OWNERSHIP

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ABSTRACT

In general, water filters use organic materials that have various functions and advantages. Therefore, this product has been innovated in the FYP project using organic materials as one of the ways to filter dirty water into clean water. Among the objectives listed in the making of this project is to create a water filter from the kitchen sink. In addition, the second objective of this project is to identify the pH value and determine the Biochemical Oxygen Demand (BOD) value before and after filtering. Next, the objective of this product is produced to determine the turbidity value of the water before and after filtering. This product undergoes two tests, the first is the Biochemical Oxygen Demand (BOD) test to find the amount of dissolved oxygen required by microorganisms to decompose organic matter. The second test is to test the turbidity of the water whether the water is in a suitable condition for use according to the set standards. Both of these tests use two water samples which are water before filtering and water after filtering. There are five materials used in the filter, which are cloth, rice husk, sugar cane bagasse, gravel, and silica sand. Each material has its own function as a nurse of polluted water. However, this project only focuses on daily use and its water is not suitable for drinking. Among the daily activities that can be done using the filtered water are watering flower plants, washing the car and more.

ABSTRAK

Secara amnya penapis air menggunakan bahan organik yang mempunyai pelbagai fungsi dan kebaikan tersendiri. Oleh itu, produk ini telah diinovasikan di dalam projek FYP menggunakan bahan-bahan organik sebagai salah satu cara untuk menapis air yang kotor menjadi bersih. Antara objektif yang tersenarai di dalam pembuatan projek ini adalah mencipta penapis air daripada sinki dapur. Selain itu, objektif kedua projek ini adalah mengenalpasti nilai pH dan menentukan nilai Biochemical Oxygen Demand (BOD) sebelum dan selepas ditapis. Seterusnya, objektif produk ini dihasilkan untuk menentukan nilai kekeruhan air sebelum dan selepas ditapis. Produk ini menjalani dua ujian iaitu pertama ujian Biochemical Oxygen Demand (BOD) untuk mencari jumlah oksigen terlarut yang diperlukan oleh mikroorganisma untuk mengurai bahan organik. Ujian kedua adalah menguji kekeruhan air sama ada air tersebut berada di dalam keadaan yang sesuai untuk digunakan mengikut piawaian yang ditetapkan. Kedua-dua ujian ini menggunakan dua sampel air iaitu air sebelum ditapis dan air selepas ditapis. Terdapat lima bahan yang digunakan pada penapis tersebut iaitu kain, serbuk beras, hampas tebu, batu kerikil, dan pasir silika. Setiap bahan mempunyai fungsi tersendiri sebagai perawat air tercemar. Walau bagaimanapun, projek ini hanya memfokuskan untuk kegunaan harian dan tidak sesuai untuk diminum airnya. Antara aktiviti harian yang boleh dilakukan menggunakan air tapisan tersebut ialah menyiram pokok bunga, membasuh kereta dan lain lagi.

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CHAPTER 1: INTRODUCTION

1.1 INTRODUCTION

A project course is a required course for some programmes of study that the student must complete in order to qualify for the Diploma in Polytechnic Ministry of Higher Education (MOHE). This course gives students the chance to put their knowledge and abilities to use and demonstrate their aptitude for realising original ideas, solving problems creatively, and directing the creation of projects and studies with a competitive edge. The implementation of a project or research includes all aspects of learning and teaching (PdP), including theory, application, writing in the context of science, monitoring, and evaluation. Students are mentored by supervisors as they work on the project to explore new information and abilities, connect them to what they already know, and make sure the project can be finished in the allotted time. The wastewater filter from the household stove doubles as a filthy water filter from the sink to make it safer to use for domestic usage, as discussed in chapter 1. For your information, water is crucial to maintaining both human life and the existence of other living forms, such as plants and animals, on Earth. Because the formation of man and other life is directly tied to water, without humans, water and other life would not exist. Water is required in daily living in addition to for human consumption and other life.

One of the most significant natural elements on earth is water. It is among the most important things that every living thing needs. 71% of earth's surface is covered in water. On Earth, there is 96.5% water in the oceans, 1.7% water in the ground, and 1.7% water that is naturally found in snow and glaciers. Water that is safe to drink is crucial for human survival. Water quality needs to be maintained within the appropriate norms in order to create a healthy and hygienic environment. Wastewater is produced by a variety of home, commercial, industrial, and agricultural activities. In order to maintain a clean environment, wastewater obtained from various sources needs to be handled very well. To handle impurities including colour, total solids, dissolved solids, suspended solids, BOD, and COD, among others, filter technology is based on physical processes. by delivering an affordable and environmentally friendly technology, we can raise the standard of living for people living in rural areas. . (“V. Anusuya, R. Malathi, P. Subash Kumar & S. Sunil Barath, April, Page Number 39-42, 2017”)

1.2 RESEARCH BACKGROUND

As the major component of our FYP project in this project, we used a bottle. This bottle will also serve as a domestic waste filter in addition to being swapped out for the original sink filter. The bottle filter's materials include sugarcane, fabric, gravel, and rice husk.

1.3 RESEARCH PROBLEM

According to Professor Dr Yang Farina Abdul This step as a method to educate the people to use water prudently ,he said ("Malaysians use about 210 liters of water a day. This means that each of us has wasted almost 50 liters of water, more than what is recommended. Imagine the waste based on the number of Malaysians,"). Cost has an impact in the waste that occurs.

1.4 RESEARCH OBJECTIVE

The objective project should include the following, to produce wastewater filter from domestic kitchen. To identify the treatment efficiency of the domestic waste water by using multimedia technology . To compare the test results of various parameter in the sample before and after filtration (COD).

1.5 SCOPE OF STUDY

The project is mainly concerned with wastewater and water supply engineering. The project is meant for domestic stoves that are used daily for domestic purposes alone, not for commercial purposes. This filter is 8 cm in width and 31 cm in height. Moreover, although this water can be used, it is not advised for consumption. After that, filter the waste to recover water.

1.6 SIGNIFICANT OF STUDY

Wastewater treatment facilities do exactly what they say on the tin; they clean the water that flows down our drains before releasing it back into the environment. Despite the progress being made to deploy these plants all over the world, more is still needed. One of our most valuable resources, water, is being wasted. There are several techniques to treat wastewater, and the more effectively the method, the more likely it is that the wastewater will be reused instead of thrown into the ocean. The processing of wastewater from its unusable form into an effluent that can either be returned to the water cycle with little impact on the environment or used for another purpose is known as wastewater.

Filtration is the technique of removing solid particles from a liquid or gaseous fluid by passing the fluid through a filtration process while retaining the solid particles. It could imply using a biological, chemical, or physical barrier. Processes used to remove particles include straining, flocculation, sedimentation, and surface capture. The filter fluid (thin or thick barrier) of the liquid with suspended solids, the actuator force to cause the fluid to flow, and the filter that holds the filter medium, contains liquid, and permits the application of force are the fundamental needs.

1.7 CONCLUSION

The conclusion that I get from this Waste Water Filter from domestic kitchen project are to avoid the wastage of water. It can be said that inexpensive absorbers work well in removing dangerous pollutants from waste water. This process help effectively removes contaminants from effluents including pH, solid volume, dissolved solids, suspended particles, biochemical oxygen demand, chemical oxygen demand, and dissolved oxygen. Domestic and industrial wastewater both contain undesired organic and inorganic contaminants that could be dangerous to the environment and global health. It is now essential to clean wastewater and properly handle it in order to preserve this valuable resource.

CHAPTER 2: LITERATURE STUDIES

2.1 INTRODUCTION

A literature review is the accumulated information of previous studies on a particular topic.

The literature review evaluates the overall theory, evidence, books, and other materials relevant to the research topic studied. The results of the study can explain, present, and evaluate clearly about the topic.

This water filter product has its own content and is made from recyclable recycled materials. Therefore, this chapter's detailed description of each material's function will include it. To make sure the project is successful in achieving the goals of the product, field studies should be conducted first. To meet the exact specifications of the project, researchers have looked up some information on the project materials that will be employed using online resources.

2.2 DEFINITION OF TERMS

2.2.1 DEFINITION DIRTY WATER

Most people are aware that contaminated water is full with bacterial infections, viruses, and germs. However, not many individuals are aware of the type of bacteria that are present. (2012) Dwi Andi Susanto Escherichia coli (E. coli) bacteria are one of the elements in dirty water, as well as other contaminants. 2020 (Ikhda Rizky Nurbayu). Chemicals, soaps, heavy metals, fertilisers, effluents from sewing and non-sewing systems, as well as other home, commercial, or industrial sources are all present in wastewater as dissolved and suspended components (such as septic treatment tanks). (2015) Petra MacGowan.

Domestic wastewater can thus be filtered and utilised for regular purposes like watering plants and the like, but the water from the project filter is dangerous to eat. This is due to the BOD value not being in the range that corresponds to the minimum value of 5 in the standard value.

2.2.2 GRAVEL

To filter coarse solutions, coarse stones and pebbles are employed (Kaw Zi Wei, 2016). Pebbles act as a filtering material and encourage oxygen aeration. (2014 Muhammad Gustiray). Large-sized debris, such moss, leaves, or animals, can be filtered out by pebbles, natural stones, or even coconut fibre. (2022, Tiara Syahra Syabani).

2.2.3 SUGARCANE WASTE

“After the debate, we carried out a number of tests using a variety of plant-based materials, and the findings showed that sugarcane residue has a chemical that can kill bacteria.” (2017's Nur Azwa Hisyam) However, there were numerous people selling sugarcane juice in front of their school. It is known that sugarcane residue has a high carbon content of up to 90%, which has a potentiality to be an activated carbon raw material based on information from numerous literature. The sugarcane residue is carbonated using the pyrolysis process before being used. The remaining material is then heated for six hours to create activated carbon. The modified sugarcane residue is then employed at home to filter river debris containing iron and mercury. For the distillation of pure water going to residents' houses, a second, larger one can be used at PDAM faucets (Hansen, 2015)

2.2.4 RICE HUSK

According to reports, the outer layer of rice husk with a high silica content can be found in the husk. Additionally, it may result in this substance's high porosity, light weight, and broad outer surface, making it excellent as an insulator and an absorbent material (insulator).

2.3 CONCLUSION

The content that will be used from earlier studies can be studied in this chapter, in conclusion. With the help of this, we were able to gather a variety of data and concepts for our project. As a

result, with the aid of earlier research, we were able to carry out the project more effectively and without making mistakes. Additionally, the project can make use of recycled components.

CHAPTER 3: METHODOLOGY OF THE STUDY

3.1 INTRODUCTION

Methodology refers to the strategy and technique used in the development, collection, and evaluation of data to produce a thorough design study. Methodology refers to the manner a topic is researched as well as the justifications for utilising a certain methodology. The by describing the study process, methodology aims to help individuals understand the technique of application more thoroughly or extensively. The group's opinions and ideas helped shape the design of this wastewater filter from a typical kitchen. In terms of design and material usage, this design is fairly simple to make. In order to choose the best material for the filter, this material was chosen based on earlier research studies that researchers had carried out online and by reading material.

3.2 FLOWCHART FOR METHODOLOGY



Figure 3.1 The flowchart for methodology

➤ **START**

Students are briefed by a lecturer on the Final Year Project (FYP) in the first week of semester

➤ **RESEARCH AND DETERMINE PROBLEMS**

Research is defined as the creation of novel ideas, methods, and comprehensions through the discovery of new information and/or the inventive use of already known data.

A different way to look at issue definition is to consider how the goal or ideal condition affects how serious a problem is, or even whether one is there at all.

➤ **DESIGN WATER FILTER**

Members of the group begin the project design process by thinking about and debating among themselves the ideal design for the intended purpose of the water filter. Through use of recycled and natural materials, this project is eco-friendly.

➤ **PRODUCE WATER FILTER**

Researcher and started to produce water filter from natural substance and used material after finalizing the design guided by supervisor

➤ **TEST PRODUCT**

Finding out how well something works generally is the process of testing. Tests are used to evaluate anyone else's knowledge or. We will evaluate the project's success after the product is completed.

➤ **DATA COLLECTION**

In order to answer research questions, test hypotheses, and evaluate results, data collecting involves gathering and measuring information on variables of interest in a systematic way. BOD and COD calculations will be used to get the data for this project. In this experiment, the ph value will also be calculated. We shall learn from that whether the water is safe to use or not.

➤ **DATA ANALYSIS**

Data collected by experiment BOD and COD. The procedure of collecting, measuring, and evaluating correct insights for research using established approved procedures is referred to as data collection. Based on the facts gathered, a researcher might evaluate their hypothesis.

➤ **PRODUCE REPORT**

In reports, research findings are displayed and debated. They provide the reader with an explanation of the study's justification, a description of the research methodology, a breakdown of the findings and outcomes, a logical discussion, and conclusions and suggestions.

➤ **FINISH**

Finish is an end or to completion. The project is considered successful if it is going well without any problems.

3.2.1 PRODUCT DESIGN



Table 3.1 Detail material and function of product

MATERIAL	FUNCTION
Sugarcane	The design can eliminate some type of bacteria in the water filter
Rice husk	Rice husk as a filter for removal of contaminants in water
Gravel	Hold back precipitates containing impurities
Net	Hold the material
Fabric	Filter large particle
Silika sand	overcome the problem of cloudy, smelly water and water that causes itching

3.3 CONCLUSION

To filter soiled water from the sink, this device is called "Water Filter Waste from Domestic Kitchen." E. coli and other dangerous germs are present in dirty water. Therefore, this filter will remove microscopic impurities from the water, like germs and debris.

The researcher must filter waste water into one bucket in order to make this water filter. Then, all the polluted materials or dangerous microorganisms will be filtered using the substance in the filter. Fabric, gravel, rice husk, silica sand, and sugarcane waste are some examples of the material. After results, all materials must meet Malaysia's "Standard Water Quality"

BAB 4 : RESEARCH FINDINGS AND DISCUSSION

4.1 INTRODUCTION

This filter project was created using used bottle materials. This project is used to filter waste water from the sink until it is filtered into clean water but the water cannot be drunk at all. The result of this filtered water will be used for daily activities such as watering trees, gardening in the yard and mopping the floor outside the veranda if necessary. The project also aims to save and avoid significant water wastage. The materials contained in the water filter have their own functions.

4.2 RESEARCH/EXAMINATION FINDINGS.

4.2.1 STUDY TYPE PROJECTS.

To produce this project must refer to the flow chart made by the researcher before making any work action so as not to make a mistake. In addition, the function of the Gant chart is to explain or explain the dates that need to be completed and updated for the project to be successful and this information will be easier for the researcher to complete the project work. Next, this project took 8 weeks for the production process of a water filter and results.

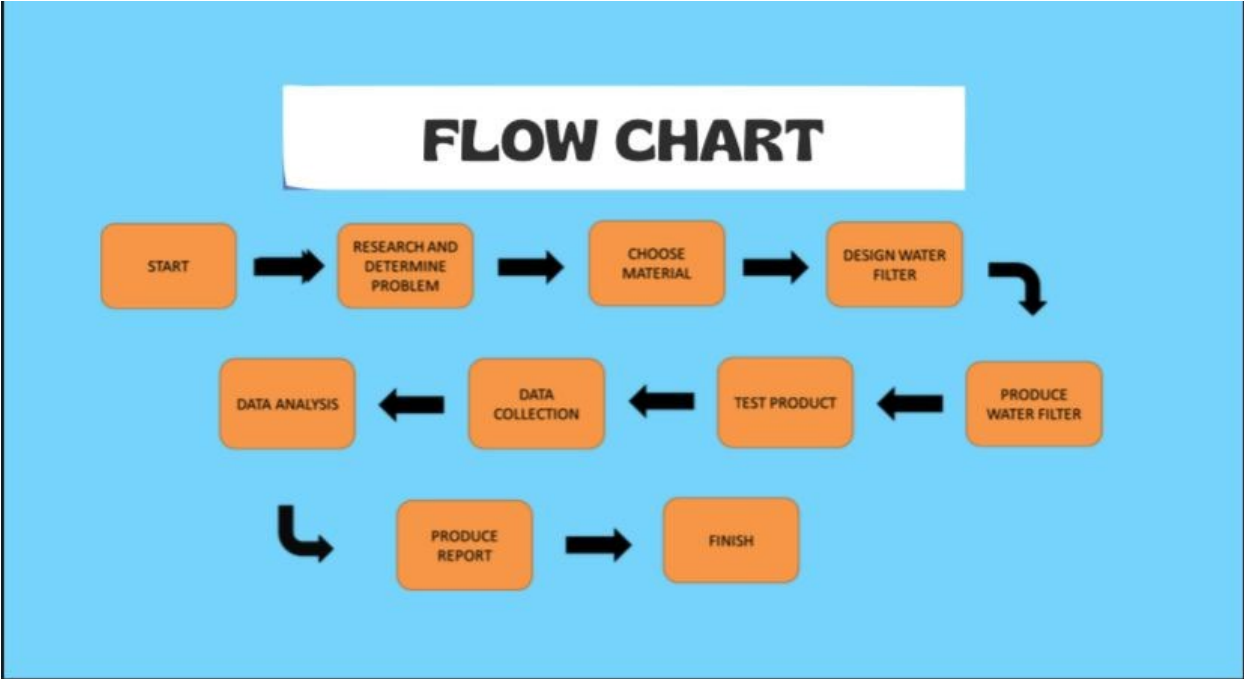


Figure 4.1 The flow chart

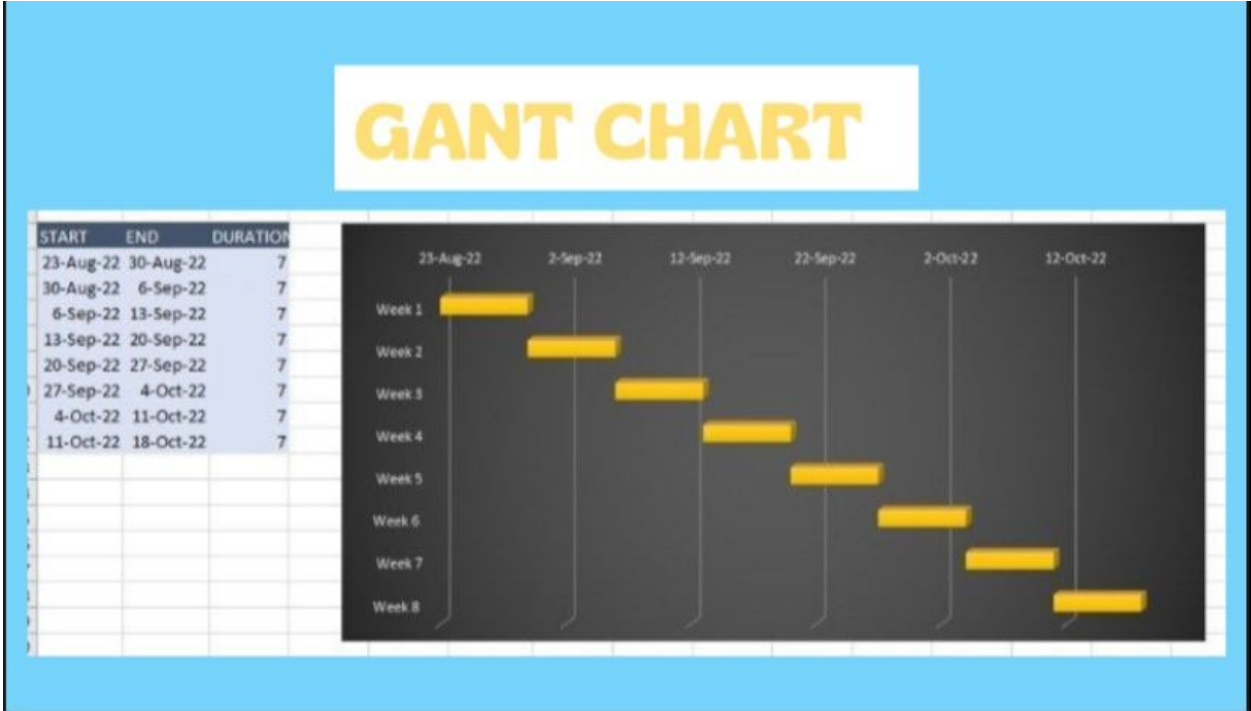


Figure 4.2 The Gantt Chart

4.2.2 REAL TYPE PROJECTS

Among the advantages found in the researcher's results is that after being tested with a pH value of 7.44 which is neutral which means the condition of the water is good compared to before being tested which is 6.87. There is a deficiency in this project which is the result of BOD with a result of 67 after testing while before the test totalling 76 this shows the fact that the result of 20 to 100 mg/l is moderately polluted. One of the processes of this study was carried out in the water laboratory at UITM SHAH ALAM

Table 4.1: Table of data

NO	PARAMETER	UNIT	BEFORE	AFTER	ANALYSIS METHOD
1	Ph @ 25°c	-	6.87	7.44	ALPHA 4500 - H'B (2005)
2	Biochemical oxygen demand @ 20°c, 5 days	Mg/L	76	67	APHA 5210 B (2005)
3	Turbidity	NTU	85.4	35.7	-

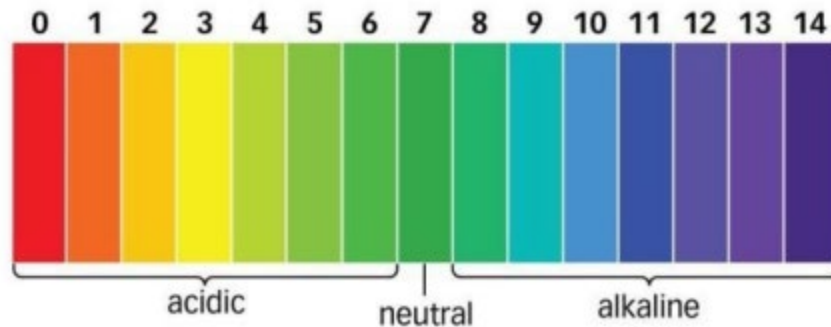


Figure 4.3 Reference of pH data

<i>Tulen: 2 - 20 mg/L</i>
<i>Sedikit tercemar: 20 - 100 mg/L</i>
<i>Sederhana tercemar: 100 - 500 mg/L</i>
<i>Sangat tercemar: 500 - 3,000 mg/L</i>
<i>Amat tercemar: 3,000 - 15,000 mg/L</i>

Figure 4.4 Reference of Biochemical Oxygen Demand data

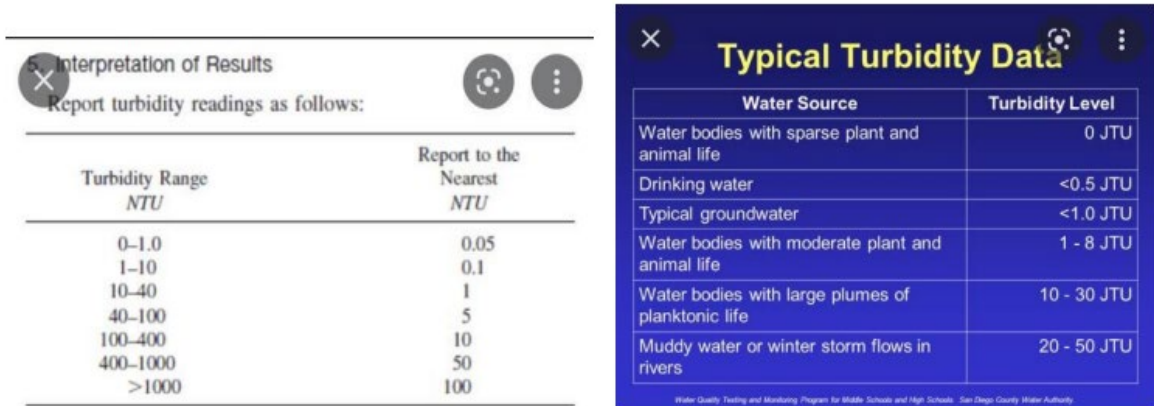


Figure 4.5 Reference of turbidity data

4.3 DISCUSSION

The waste water filter from this sink is capable of effectively treating used waste water, as shown by the facts presented above. Although the change is not very big, it is sufficient to allow for well-functioning and secure usage of the water according to the scale established by scientists or water treatment researchers. Additionally, the BOD value of 67 mg/L indicates that the water quality is only marginally polluted. Because the aim of our project is just focused on everyday usage and not for commercial use, this waste water filter from the sink can still be utilised even though the value is somewhat polluted similar to the result before filtering. Finally, for the turbidity data, the turbidity value after using this filter is 35.7 NTU compared to before using it which is 85.4 NTU with a difference of 58%. This shows the turbidity value after using a suitable filter for plant life which is a value of 1JTU.

CHAPTER 5: DISCUSSION AND CONCLUSION

5.1 INTRODUCTION

The findings and recommendations for using a water filter from the kitchen sink are summarised in this chapter. Careful research has been done to ensure that the issue of water waste may be reduced, allowing for the resolution of the water crisis and the reduction of water use costs. The research and function of each material have been taken into consideration while developing a product that uses organic materials as a material for filtering waste water in order to ensure that our goals are met. The research has shown that each material employed is excellent for filtering waste water and creating fresh water molecules in terms of pH, BOD, and turbidity.

5.2 CONCLUSION

To ensure that there are no chemical components that could hurt the user, this water waste filter is an innovation that only uses organic materials and used materials. The outcomes of this product study can also alter how much and how quickly people use water each day, which will affect the water issue. The conclusion that can be drawn from the usage of this filter on a regular basis in the kitchen sink offers the possibility of cost savings and the opportunity to make use of any extra water utilised.