WASTE WATER FILTER
FROM DOMESTIC KITCHEN

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A report is submitted to Civil Engineering Department as a partial fulfillment of the requirements of the Diploma in Civil Engineering

CIVIL ENGINEERING DEPARTMENT

SESSION I : 2022/2023

DECLARATION OF ORIGINAL AND OWNERSHIP

TITLE: WASTE WATER FILTER FROM DOMESTIC KITCHEN

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SESSION I: 2022/2023

1.MUHAMMAD IRSYAD BIN MOHAMMAD SIDEK

2.MUHAMMAD AKMAL AIMAN BIN MOHD AZHAR

3.AHMAD AZIM ANIQ BIN AHMAD AKNUL

We are the students of the final year of **Diploma in Civil Engineering, Civil Engineering Department, Politeknik Sultan Salahuddin Abdul Aziz Shah.**

1. We are the students of the final year of **Diploma in Civil Engineering, Civil Engineering Department, Politeknik Sultan Salahuddin Abdul Aziz Shah.**

2. We acknowledge that 'The project above' and the intellectual property contained therein are the work of our original work/invention without taking or imitating any intellectual property from any other party.

3. We agree to transfer ownership of the intellectual property of the'Project' to the Politeknik Sultan Salahuddin Abdul Aziz Shah to meet the requirements for the award of the Diploma in Civil Engineering to us.

4. Made and truly acknowledge by the said,

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In front of me,

PUAN SALIZAWATI BINTI KAMARUZZAMAN (… .....)

(No. Identification Card: 760908-05-5418)
as project supervisor on date: (Salizawati binti Kamaruzzaman)

ACKNOWLEDGMENT

We would like to express our deepest appreciation to all those who provided us the possibility to carry out this report. A special appreciation and gratitude to our beloved supervisor, Puan Salizawati binti Kamaruzzaman for the coordination of this project. On top of that, we would also like to thank her for her encouragement and guidance throughout the process of this final year project.

Furthermore, we would also like to acknowledge much appreciation of the Semester 4 and Semester 5 students and lecturers of Civil Engineering Department for giving theirbest cooperation that help us a lot throughout the process of this final year project.

Finally, we would like to extend our acknowledgement to the Politeknik Sultan Salahuddin Abdul Aziz Shah (PSA), Shah Alam for providing this opportunity and our fellow friends and family members for their support as well.

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 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 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.

CHAPTER 1: INTRODUCTION

1.1. INTRODUCTION

Project Course is a compulsory course for certain programs of study that must be implemented by the student as meeting the qualification requirements of the award Diploma in Polytechnic Ministry of Higher Education (MOHE). This course provides an opportunity to students to apply knowledge and skills and showcase the ability in the realization of the idea of innovation creativity and the solution of the problem to direction of production of projects/studies that have commercial value and are competitive. Project/study implementation covers all learning and teaching processes (PdP) is theoretical, practical, scientific writing, monitoring and evaluation. Throughout the implementation of the project, students are guided by supervisors to explore new knowledge and skills as well as associating with existing knowledge and ensure that the project can be completed within the stipulated time. From the chapter 1 we talk about the wastewater filter from the domestic stove serves as a dirty water filter from the sink to make it safer to use for domestic use.

For your information, water is an important component in supporting human life and other life on earth including animals and plants. Without human water and other life would not exist because the formation of man and other life is closely related to water. Apart from human drinking water and other life, there is also a need for water in everyday life.
Water is considered as one of the most important natures in earth. It is one of the most essential things that is required for every living organism. Water covers 71% of earth surface. On earth 96.5% water present in seas, 1.7% water present in ground water, 1.7% water occurs in nature as snow and glaciers. Safe drinking water is essential for human being. In order to develop a healthy and hygienic environment, water quality should be maintained within the respective standards. Source of Wastewater is obtained from combination of the domestic, industrial, commercial, agricultural activities.

Wastewater obtained from various sources need to be treated very effectively in order to maintain a hygienic environment. Filter technology is based on physical process to treat the contaminants like color, total solids, dissolved solids, and suspended solids, BOD, COD etc. Thus, providing an economically feasible and eco-friendly technology to improve the quality of life of rural peoples. (“V. Anusuya, R. Malathi, P. Subash Kumar & S. Sunil Barath, April, Page Number 39-42, 2017”).

1.2 RESEARCH BACKGROUND

In this project we used a bottle to be the main ingredient of our FYP project. This bottle will also be replaced with the original sink filter and this bottle will be used as a domestic waste filter. Among the ingredients contained in the bottle filter are the sugarcane, fabric, gravel and rice husk.

1.3 RESEARCH PROBLEM

("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,") he said. According to Professor Dr Yang Farina Abdul This step as a method to educate the people to use water prudently. The waste that occurs has something to do with cost.

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 more focused on water supply and wastewater engineering. The project is intended for wastewater filters from domestic stoves used for daily domestic use not for commercial. The size of this filter is 31 cm in height and 8 cm wide. In addition this water is not recommended for drinking but can be used. Next, filter dirty water from the waste to get clean water.

1.6 SIGNIFICANT OF STUDY

Effectively, wastewater treatment plants do as describe, they treat the water that goes down our drains before discharging it back into the environment. Regardless of the efforts that are being

made to install these plants worldwide, more is required. Water is one of our most important resources and it's being squandered. There are multiple ways to treat wastewater, and the better the process, the higher the percentage that it can be reused before it gets dumped into the ocean. Wastewater is a process that coverts wastewater from its unusable state into an effluent that can be either returned to the water cycle with minimal environmental issues or reused for another purpose.

Filtration is the process in which solid particles in a liquid or gaseous fluid are removed using a filter medium that allows the fluid to pass through while retaining the solid particles. It may mean the use of a physical barrier, chemical, and a biological process. The removal of particles takes place with processes including straining, flocculation, sedimentation and surface capture. The basic requirements are, the filter medium (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 allows the use of force.

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 concluded that low-cost absorbers are effective at removing harmful pollutants from wastage water. This filter process removes impurities such as pH, solid volume, dissolved solids, suspended solids, biochemical oxygen demand, chemical oxygen demand, and dissolved oxygen from effluents with good results. Wastewater, whether domestic or industrial have several undesirable components, the organic and inorganic pollutants that are potentially harmful to the environment and human health. The treatment of wastewater and its proper management has become a necessity in order to conserve this vital resource.

CHAPTER 2: LITERATURE STUDIES

2.1 INTRODUCTION

A literature review is a comprehensive summary of previous research on atopic. The literature review surveys scholarly articles, books, and other sources relevant to a particular area of research. The review should enumerate, describe, summarize, objectively evaluate and clarify this previous research. It should givea theoretical base for the research and help the author to determine the nature of the research. The literature review acknowledges the work of previous researchers, and in so doing, assures the reader that the work has been well conceived. It is assumed that by mentioning a previous work in the field of study,that the author has read, evaluated, and assimilated that work into the work at hand.

This water filter product uses recyclable recycled materials and has its own content. Therefore, the function of each material will also be described in this chapter in detail. Field studies should be studied first to ensure the effectiveness of the project to achieve the objectives of the product. Researchers have searched for some information related to the project materials that will be used through resources available on the internet to meet the exact specifications for the project.

2.2 LITERATURE REVIEW

2.2.1 DEFINITION OF DIRTY WATER

Many people know that dirty water contains many bacteria, viruses and germs that can cause disease. However, not many people know what kind of bacteria are contained in it. (Dwi Andi Susanto, 2012). Among the substances contained in dirty water is Escherichia Coli (E. coli) bacteria are also often present in dirty water. (Ikhda Rizky Nurbayu, 2020). Wastewater contains dissolved and suspended materials from a variety of domestic, commercial, or

industrial sources including chemicals, soaps, heavy metals, nutrients, and effluents from sewing and non -sewing systems (such as septic treatment tanks). (Petra MacGowan, 2015)

As such, domestic wastewater can be used for daily use such as watering flowers and so on after being filtered, but the water from the project filter is not suitable for drinking. This is because the BOD value is not in the value that corresponds to the standard value that is to reach the minimum value of 5.

2.2.2 GRAVEL

Coarse stones and pebbles are used to filter coarse solutions (Kaw Zi Wei, 2016). Pebbles serve as a filter material and aid oxygen aeration. (Muhamad Gustiray, 2014). Pebbles, natural stones, and even coconut fiber have the function of filtering out large -sized dirt such as moss, leaves, or animals. (Tiara Syahra Syabani, 2022)

2.2.3 SUGARCANE WASTE

"After the discussion we conducted various experiments from various materials from plants where the results we found that sugarcane residue has a substance that can eliminate bacteria." (Nur Azwa Hisyam, 2017). On the other hand, in front of their school many sugarcane juice sellers Based on information from various literature, it is known that sugarcane residue has a high carbon content of up to 90%, which has great potential to be an activated carbon raw material. To use it, the sugarcane residue is carbonated by the pyrolysis method. Then, the residue is heated for 6 hours to become activated carbon. The new form of the sugarcane residue is then used to filter mercury and iron waste in the river. " at home. Another larger one can be applied at PDAM faucets for the distillation of clean water flowing to residents 'homes," (Hansen, 2015)

M/S 6

2.2.4 RICE HUSK

In the husk is reported to contain the outer layer of rice husk of high silica material. It can also cause this material to have a high porosity, light weight and a wide outer surface that allows this material to be suitable as an absorbent material (absoebent) and insulator (insulator). (Dato 'Mohd Anim Hosnan, 2015)

2.3 CONCLUSION

In conclusion, in this chapter we can make a study of the material to be used through previous studies. With this, we were able to obtain various information and ideas to implement our project. Therefore, with the help of previous studies we were able to implement the project more efficiently and avoid mistakes. In addition, the project can also utilize used materials.

CHAPTER 3: METHADOLOGY OF STUDIES

3.1 INTRODUCTION

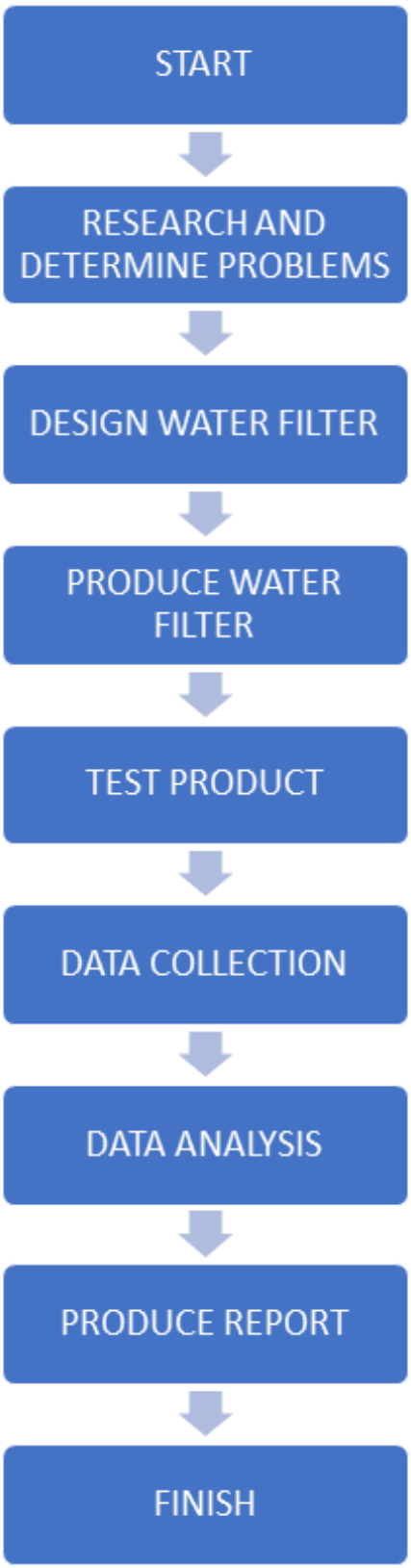
The approach and process for developing, gathering, and evaluating data to generate a thorough design study is known as methodology. The way of a topic being examined, as well as the reasons for using a certain approach and technique, is referred to as methodology. The methodology's goal is to assist people comprehend the technique of application more broadly or in greater depth by providing a description of the research process.

The design of this wastewater filter from domestic kitchen is the result of discussions and ideas from group members. This design is very easy to produce in terms of design and use of materials. The selection of this material is based on previous studies conducted by researchers through the internet as well as reading material to select the best material in the filter.

3.2 DESIGN PROJECT

MATERIAL	FUNCTION
Fabric	Filter large particle
Rice Husk	Filter for the removal of contaminants in water
Gravel	Hold back precipitates containing impurities
Sugarcane	Eliminate some types of bacteria in the water filter
Silica sand	Remove water turbidity

3.2.1 FLOWCHART FOR METHADOLOGY



3.2.1.1. START

Students are briefed by a lecturer on the Final Year Project (FYP) in the first week of semester 4.

3.2.1.2 RESEARCH AND DETERMINE PROBLEMS

Research is described as the generation of new concepts, techniques, and understandings via the development of new knowledge and/or the creative application of existing information. Another way to think about Issue Definition is that the aim or ideal state determines the severity of a problem or even if one exists at all.

3.2.1.3 DESIGN WATER FILTER

Group members starting to do project design by thinking and discussing between them the best design for water filter to be used. This project is eco friendly because

3.2.1.4 PRODUCE WATER FILTER

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

3.2.1.5 TEST PRODUCT

Testing is the process of determining how well something functions in general. Testing determines a person's knowledge or. After the product finished, we will test the project whether it is successful or not.

3.2.1.6 DATA COLLECTION

Data collection is the act of acquiring and quantifying information on variables of interest in a systematic manner that allows researchers to answer research questions, test hypotheses, and assess outcomes. For this project we will collect the data by using BOD and COD calculations. Ph value also will be calculated in this experiment. From that, we will get the result whether the water is safe to use or not.

3.2.1.7 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.

3.2.1.8 PRODUCE REPORT

Research findings are presented and discussed in reports. They give the reader a justification for the study, a description of the research technique, the findings, the results, a logical discussion, and conclusions/recommendations.

3.2.1.9 FINISH

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

3.3 CONCLUSION

This 'Water Filter Waste from Domestic Kitchen' aims to filter dirty water from the sink. Dirty water contains harmful bacteria such as e-coli. Therefore, this filter will filter small particles such as bacteria and dirt from the water.

To produce this water filter, researcher must filter waste water into one bucket. Then, the substance in the filter will be used to filter all the contaminated substances or harmful bacteria. The material is such as fabric, gravel, rice husk, and sugarcane waste. All the material must achieve 'Standard Water Quality Malaysia' after results.

4.0 REFERENCES

Coarse stones and pebbles are used to filter coarse solutions	(Kaw Zi Wei, 2016)
Pebbles serve as a filter material and aid oxygen aeration	(Muhamad Gustiray, 2014).
Pebbles, natural stones, and even coconut fibre have the function of filtering out large -sized dirt such as moss, leaves, or animals	(Tiara Syahra Syabani, 2022)
"After the discussion we conducted various experiments from various materials from plants where the results we found that sugarcane residue has a substance that can eliminate bacteria."	(Nur Azwa Hisyam, 2017).

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CHAPTER 4:DATA ANALYSIS

4.1 INTRODUCTION

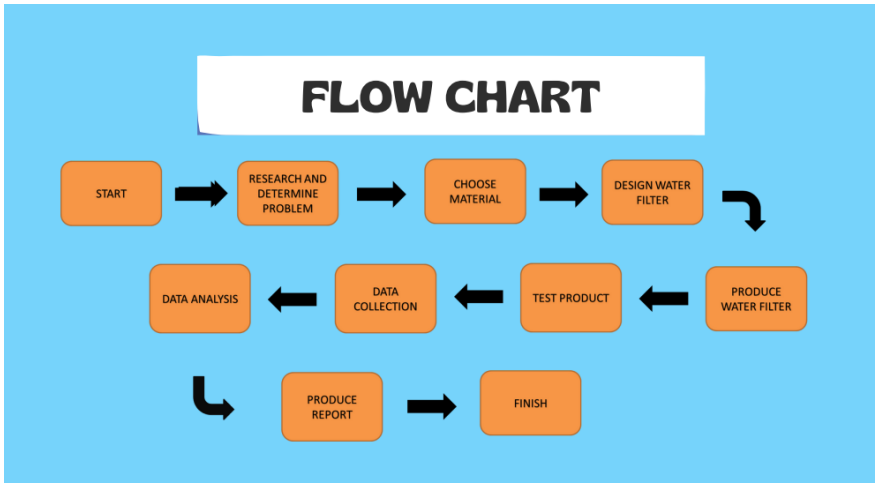
This chapter discusses the findings of the study based on test results and feedback by respondents to the questionnaire conducted. Results from this chapter areobtained from questionnaires that were distributed to students of semester 4 and semester 5 and lecturers of the Department of Civil Engineering (JKA) involved in thesubject of Steel Structure Design from Sultan Salahuddin Abdul Aziz Shah Polytechnic (PSA). Once all the data and information are obtained, analysis is done tosee the effectiveness of the study.

The waste water filter from domestic kitchen project serves as a filter of dirty water from the sink. Our project is made from used materials that have their own functional and benefit for water treatment projects for domestic use only and it is inconvenient to drink. The outcome of the project is that we can reuse the water for domestic use such as watering flower plant, washing cars and others. The test that used are Biochemical Oxygen Demand (BOD), pH water and turbidity to identify whether the water is suitable for domestic use.

4.2 DATA ANALYSIS

4.2.1 STUDY TYPE OF PROJECTS

This project took 8 weeks to complete it starting from research and determine problem to produce report based on the flow chart below starting 23 August 2022 to 18 October 2022.

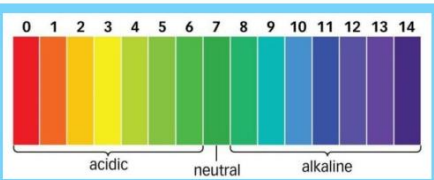


4.2.2 REAL TYPE OF PROJECTS

For this project, we made 2 test which is Biochemical Oxygen Demand (BOD) and Turbidity. BOD is a measure of the amount of oxygen required to remove waste organic matter from water in the process of decomposition by aerobic bacteria (those bacteria that live only in an environment containing oxygen). While the other test is turbidity which measure of relative clarity of a liquid. It is an optical characteristic of water and is a measurement of the amount of light that is scattered by material in the water when a light is shined through the water sample. The higher the intensity of scattered light, the higher the turbidity. We use 2 water samples which is before and after filtered for each test. The test must be handled carefully such as wear gloves, mask and other equipment of protection especially hazardous materials such as aluminums sulphate for turbidity test.

RESULT

No	Parameter	Unit	Before	After	Analysis Method
1	Ph @ 25'C	-	6.87	7.44	APHA 4500 – H'B (2005)
2	Biochemical oxygen demand @ 20'c, 5 days	mg/1	76	67	APHA 5210 B (2005)



Tulen: 2 – 20 mg/L
Sedikit tercemar: 20 – 100 mg/L
Sederhana tercemar: 100 – 500 mg/L
Sangat tercemar: 500 – 3,000 mg/L
Amat tercemar: 3,000 – 15,000 mg/L

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Affiliated Environmental Laboratory

CERTIFICATE OF ANALYSIS

CERTIFICATE NO. : CN 09145 – 2022
Date of Issue : 07/10/2022
Page : 1 of 1
Lab Ref .No. : 5665-5666/2022 - 09

Company : **Politeknik Shah Alam**
Muhammad Irsyad Bin Mohammad Sidek,
23-10-1, Ilham Apartment,
Taman TTDI Jaya, 40150,
Shah Alam, Selangor Darul Ehsan.

Attention : ***Mr. Muhammad Irsyad***

Samples were collected by customer.

Date Sample Received : 29/09/2022
Total & Type of Sample : 2 water samples
Sample Marking : 5665: Before (29/09/2022)
5666: After (29/09/2022)
Date of Analysis : 29/09/2022 – 03/10/2022

No	Parameter	Unit	5665	5666	Analysis Method
1.	pH @ 25°C	-	6.87	7.44	APHA 4500 - H°B (2005)
2.	Biochemical Oxygen Demand @ 20°C, 5 days**	mg/l	76	67	APHA 5210 B (2005)

**Date BOD Analysis Started: 29/09/2022
APHA: Denotes American Public Health Association, 20th and 21st Edition (1998&2005).
• All the presented results relate only to the items tested.

.....
Nurul Syahidz Adila Zaini
B. Sc (Hons) Chemistry Forensic Analysis
M/5098/7213/15/19
(Chemist)

STANDARDS MALAYSIA
SAMM NO. 084

UiTM - A&A Laboratory : Bangunan Makmal Penyelidikan Alam Sekitar, Kolej Kediaman Kenanga 2, Zon C,
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Tel : 603-5512 0663 Fax : 603-5510 3701 Website : www.environment.com.my

4.4. TURBIDITY WATER TEST RESULT

NO	PARAMETER	UNIT	BEFORE	AFTER	ANALYSIS METHOD
1	Ph @ 25'c	-	**6.87**	**7.44**	**APHA 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**	

BIOCHEMICAL OXYGEN DEMAND CALCULATION

%difference = 76-67 / 76 x 100%

= 12% (reduce)

TURBIDITY CALCULATION

%difference = 85.4 – 35.7/85.4 x 100%

= 58% (reduce)

4.5 CONCLUSION

The study of the questionnaire is very important in the success of a project and to find out whether the objectives are achieved or not through the test we made.

Based on the result achieved it can be concluded that the use of water filter can have a positive impact to the user. For example, the Biochemical Oxygen Demand got 12% of reduce water and 58% for turbidity. This show that water filter actually have positive impact in filtering dirty water.

CHAPTER 5: DISCUSSION AND CONCLUSION

5.1 INTRODUCTION

This is the last chapter for the research. In this chapter, researchers need to conclude all the discussion and research from all the chapter before. Researcher also need to give recommendations that should be express as reflection for the entire study.

5.2 CONCLUSION

The water filter project is one of our innovations that use the concept of organic material to ensure that there are not any chemical elements polluted in it. Moreover, from the result we acquire, we could see that this product can change the cost and rate of daily water consumption for domestic use. Furthermore, in order to achieved the objectives, researchers use organic materials that are different from other water filter but still have the same function and benefits in order to reduce cost. The use of water is only for domestic use and not for drinking.

5.3 RECOMMENDATION

Based on the project, it may be called the best because waste water from the sink was previously thrown away without being reused, however this filter project can reuse the waste water for domestic use. Efforts should be made to advertise and promote this project. This is since this project has the benefit of dealing with the expense of water usage and bill payment. Furthermore, the convenience of use and design characteristics can be improved by suggestions from customers who have used it to make this product extremely popular. This is significant because it is difficult to provide awareness and convenience to customers without the involvement of users of this product. Moreover, researchers also can get feedback from customers for improvement and innovation in the future.

5.4 PROJECT LIMITATION

According to the study's findings, there are few problems that we face which is cost and materials that be used is too common. So, researcher use other materials with the same function in order to reduce the cost. The BOD value is the same as it was before filtering using this waste filter project, which is slightly polluted. However, it is only designed for daily usage and cannot be consumed. Aside from that, the primary goal of this study is to determine the values of Ph, BOD, and turbidity. The conclusion that can be drawn from the level of water use after filtering is that it is still safe to use and can help to solve the problem of water scarcity while also saving money on water use. Research had been done for BOD and turbidity to make sure that the water is in the parameter for domestic use.

5.5 SUMMARY

Based on all the research that has been applied to all of the chapter, this project can address the use of water consumption per person in this country to avoid the waste of water per day. The installation of this water filter located under the sink that is very easy to use in each home.

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Turbidity,

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