



PROPOSAL: FOOD WASTE PROCESSOR

NURUL NADZIRAH BINTI SAZALI

08DMP19F1024

NURUL HUSNA BINTI TARMEZI

08DMP19F1017

THURGA A/P NAGENDRARAO

08DMP19F1022

MECHANICAL ENGINEERING DEPARTMENT

SESSION 2021/2022

DECLARATION

TITLE : FOOD WASTE PROCESSOR

SESSION : 2021/2022

1. NAME : **NURUL NADZIRAH BINTI SAZALI (08DMP19F1024)**

NURUL HUSNA BINTI TARMEZI (08DMP19F1017)

THURGA A/P NAGENDRARAO (08DMP19F1022)

2. We are the final 5 semester from **Sultan Salahuddin Abdul Aziz Shah Polytechnic, Shah Alam**, doing research on our final year project which is 'FOOD WASTE PROCESSOR'.

3. We declare that this thesis is an original report of my research, has been written by us and has not been submitted for any previous degree. The experimental work is almost entirely our own work; the collaborative contributions have been indicated clearly and acknowledged. Due references have been provided on all supporting literatures and resources.

Signature of students :

a) NURUL NADZIRAH BINTI SAZALI

(010504-08-0534)

b) NURUL HUSNA BINTI TARMEZI

(010925-08-0348)

c) THURGA A/P NAGENDRARAO

(010809-02-0612)

ACKNOWLEDGEMENT

Praises be to Allah Subhanahuwata'ala for providing me the time, good health and strength to work in completing this proposal. Acknowledgements are due to on the behalf of the Mechanical Engineering Department for giving me the opportunity to undergo this course of Final Year Project 2 as one of the diploma course requirements. High appreciation and deepest gratitude are given to my supervisor Madam Salhana binti Sahidin@Salehudin for her invaluable guidance, encouragement, generous assistance, patience and strong support throughout this study work, and also for his trust on my ability to produce the case study.

ABSTRAK

Projek ini tersirat daripada pemerhatian berdasarkan kaedah mesin ialah Mesin Pemproses Sisa Makanan. Objektif projek ini adalah untuk mereka bentuk, mengarang dan menganalisis prestasi pengisar makanan untuk pengusaha restoran dan kantin. Skop produk tertumpu kepada restoran dan kantin dengan kapasiti maksimum 2 kg sisa makanan dengan masa pemprosesan selama 20 minit. Saiz Pemproses Sisa Makanan ialah 50 cm x 30 cm x 40 cm. Masalah sedia ada kaedah sedia ada yang mengalami kesukaran dalam menguruskan sisa makanan dan persekitaran bersih hendaklah sentiasa dipantau. Bahan yang digunakan untuk membuat Pemproses Sisa Makanan adalah keluli tahan karat untuk kegunaan ketahanan. Hasilnya, projek itu berjaya direka untuk diautomatikkan sepenuhnya berbanding menggunakan tenaga manusia. Kesimpulannya, Food Waste Processor mencapai objektif yang dinyatakan.

ABSTRACT

This project is implied from observations based on the machine method is Food Waste Processor Machine. The objective of this project was to design, fabricate and analyse performance food grinder for restaurant and canteen operators. Scopes of product focuses on restaurants and canteens with the maximum capacity of 2 kg of food waste with processing time of 20 minutes. The size of Food Waste Processor is 50 cm x 30 cm x 40 cm. Existing problems of existing methods having difficulties in managing food waste and clean environment should be always monitored. The material used to fabricate Food Waste Processor was stainless steel for endurance usage. As a result, the project was successfully fabricated to be fully automated opposed to using human energy. In conclusion, Food Waste Processor achieved the objectives stated.

TABLE OF CONTENT

CHAPTER	CONTENT	PAGE
	DECLARATION	2
	ACKNOWLEDGEMENT	3
	ABSTRAK	4
	ABSTRACT	5
CHAPTER 1 INTRODUCTION		
	1.1 Introduction	8
	1.2 Research background	8
	1.3 Problem statement	9
	1.4 Project objective	9
	1.5 Research question	9
	1.6 Project scope	10
	1.7 Impact of the study	10
	1.8 Chapter summary	10
CHAPTER 2 LITERATURE REVIEW		
	2.1 Introduction	11
	2.2 Previous research / Review / Investigation	12-13
	2.3 Chapter summary	14
CHAPTER 3 METHODOLOGY		
	3.1 Introduction	15
	3.2 Project design	15
	3.2.1 Procedure / Data collection / Project production technique	16
	3.2.2 Sketching	17-18
	3.2.3 Inventor design	19
	3.2.4 Engineering drawing	20

3.2.5 Gantt chart	21
3.2.6 Flow chart	22
3.3 Materials and Equipment / Budget cost	23-24
3.4 Summary	25
CHAPTER 4 PRELIMIARY FINDINGS	
4.1 Introduction	26
4.2 Findings / Data / Preliminary investigation of the study	26-34
4.3 Recommendation	35
4.4 Conclusion	35
4.5 Reference	36
CHAPTER 5 CONCLUSION AND RECOMMENDATION	
5.1 Introduction	37
5.2 Conclusion	38
5.3 Recommendation	39
5.4 Project limitation	40
5.5 Summary	41
5.6 Reference	42

CHAPTER 1 : INTRODUCTION

1.1 INTRODUCTION

Every day Malaysians produce enough food waste to fill seven Olympic-sized swimming pools according to the solid waste management and public cleansing corporation (SWCorp). This means that out of the 38000 tonnes of domestic waste daily, 45% - or 17000 tonnes are food waste, out of which around 4080 tonnes are still edible. This is enough to feed some three million people three meals per day. as a result our group decided to design a food waste processor machine. This machine can reduce food waste in our country and also can make side income for the premise which is they can resell the fertilizer to the farmers.

1.2 RESEARCH BACKGROUND

According to Cambridge dictionary, food waste is defined as the food loss during retail and final consumption. Food wastes only refer to foods for human consumption. It also includes food for human consumption, which went out of the human food chain. These are the foods thrown away even if they are still fit for human consumption. What is worse is the fact that people throw food away even if it remains unopened. Also, consumers tend to prepare more than they can consume and this contributes to more food wastes. Everyone is guilty of wasting food without knowing the effects and consequences of it.

1.3 PROBLEM STATEMENT

What is done to food waste once it is collected? They're all dumped at landfills. The amount of food waste dumped at landfills can be equivalent to 5 twin towers. All these food waste creates a great amount of very harmful gas namely methane. It is the main reason for green house effect. Creation of methane gas also affects climate changes which

leads to global warming. Global warming eventually leads to glacier loss. Besides, uncollected rubbish at each house creates unpleasant smell and opens up space for cats and dogs to scatter them. It also attracts flies and rodent to it. To combat this problem, Food waste processor is a great way. It compost right at the time without having to wait for the rubbish to be collected. Thus, no dumping is done at landfills and no food waste is being uncollected .

1.4 PROJECT OBJECTIVE

- i. To design a small sized food waste processor for both cooked and raw food
- ii. To fabricate a small sized food waste processor for both and raw food
- iii. To analyse the performance of food waste processor

1.5 RESEARCH QUESTION

- i. How food waste processor affects our environment
- ii. Which food waste has the most negative impact on environment
- iii. What are the benefits of compost to plant

1.6 PROJECT SCOPE

This food waste processor is focused on restaurant and canteen operator. It is because these places have a large amount of food waste in Malaysia. The maximum capacity Of this machine is 2kg and the duration is 20 minutes per 2kg. The size of this machine is 60cm

1.7 IMPACT OF THE STUDY

A food waste processor for 2kg of food waste is fabricate. Suitable to be placed at restaurant and canteen operator. Moreover a simple and safe operation are required. The food waste that have been processed which is fertilizer to be used for landscapes is the end product.

1.8 CHAPTER SUMMARY

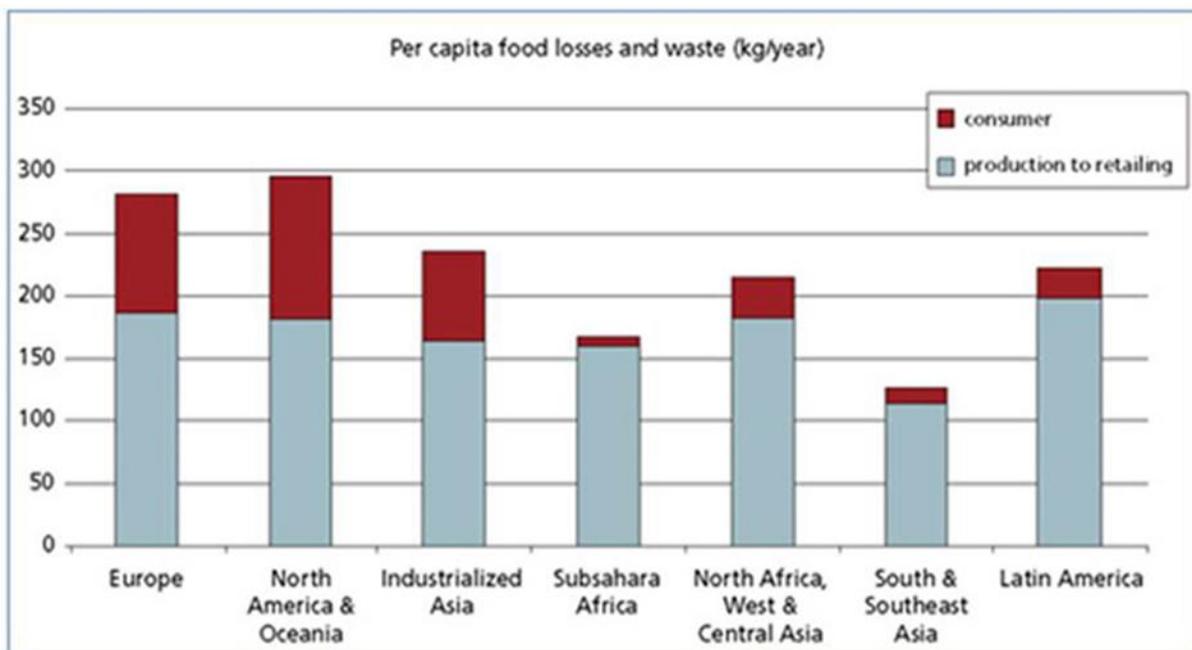
In conclusion from the research and observation that we have conducted, we found that they are few problems and constraints faced by the public or food premise in order to dispose their food waste in proper ways. In order to overcome the problems we have done with a brainstorming to come out with a solution that is to built a food waste processor and to evaluate and select the best design for the machine.

CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

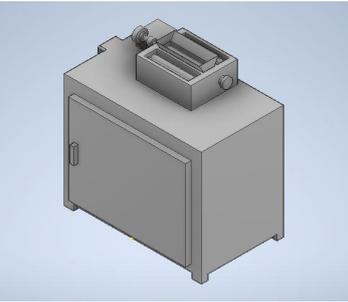
When thinking about food waste, the majority of us picture half eaten meals left at restaurants or left overs having to be tossed after they've overstayed their welcome in the fridge. But food waste, or more accurately 'Food Waste and Loss' (FWL), occurs at pretty much every level of the food production cycle. The most common causes of household food waste is produce left too long in the fridge or freezer, followed by people not finishing their meals.

EXAMPLE OF FOOD WASTE BAR CHART



PREVIOUS STUDIES/REVIEWS/INVESTIGATIONS

TITLE	AUTHOR/PUBLISHER	FIGURE	ADVANTAGES	DISADVANTAGES
1) Food Recycler Machine	BY WESTADMIN, WESTCOM 2020		<p>Interactive LCD Panel</p> <p>– Monitoring the working status of the machine, such as real-time working temperature, running mode as well as summary data.</p>	<p>Composting needs a lot of management and if it is done in the open may attract rodents and scavengers, not to mention the nasty smell. All this creates a challenge for maintaining hygienic conditions.</p>
FOOD WASTE RECYCLE MACHINE	SMARTCOMM ELECTRONICS 2020 INNOVATIVE MODEL		<p>The food waste can be thrown into this machine anytime and unlimited time, as long as does not exceed the max capacity, for example, 100KG/Day.</p> <p>The power consumption for 100KG/Day model is only 0.48 KW(480Watt),</p>	<p>This design break the traditional blade mixing. it is necessary to bring large designs such as 20tons back to the factory for repairs, which increases a lot of repair costs and repairs</p>

<p>Food Waste Composter</p>	<p>August 28, 2020 by digitalbuyersguide</p>		<p>It can crush food waste into something like sawdust for its collection, storage and recycling.</p>	<p>One of its major features is not too create leachate.</p>
<p>Food cyclor</p>			<p>All in one food composter makes composting kitchen waste a snap. Reduce kitchen waste up to 90% of its original volume.</p>	<p>No venting, draining or additives required.</p>
<p>GROUP PROJECT : FOOD WASTE PROCESSOR MACHINE</p>	<p>1.THURGA NAGENDRA RAO 2. NURUL HUSNA BINTI TARMEZI 3.NURUL NADZIRAH BINTI SAZALI</p>		<p>1.Reduce waste in landfill. 2.Creation of high quality compost. 3.Reduce the volume of food waste.</p>	<p>1.Loud. 2.Expensive cost. 3.Bad odours are possible</p>

2.3 SUMMARY

While these are many practical strategies which have been discussed to reduce food loss and waste. The largest barrier to eliminating food loss and waste is the corporate control of the global food system. And lastly food loss and waste are the main reason of the food waste processor and many other like above was creator and found in this technology world for save the waste food and global food system.

CHAPTER 3: METHODOLOGY

3.1 INTRODUCTION

Research methodology is important so that the research conducted has the most appropriate and effective method in answering research problems. Therefore, the study method designed involves the study design, project subjects or samples, project procedures, data collection procedures as well as data analysis procedures.

3.2 PROJECT DESIGN

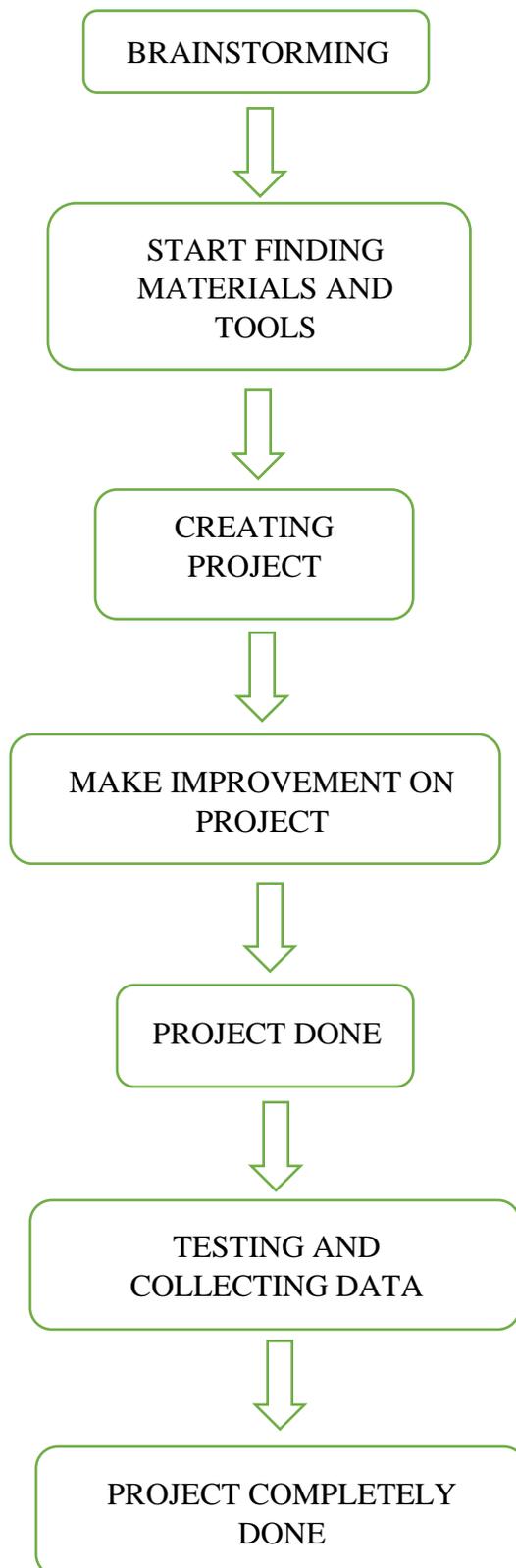
This project use a questionnaire method which is a descriptive approach that is widely used in field of research to collect data and information

- Project procedure
 - Food waste should be inserted into the input door
 - When the machine was full. The switch will turned on
 - Mixing blades will mix the food waste and the heater will turned on
 - The heater will dry out the food waste
 - After 20 minutes operation, food waste is ready to take out from the machine through output door

- Data collection

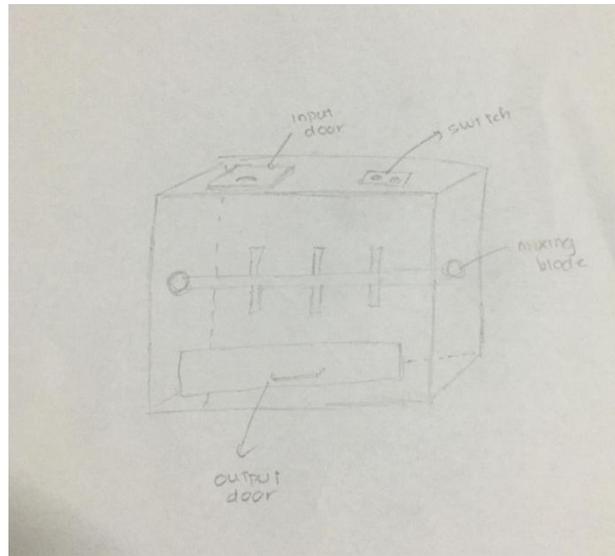
The method of data collection of this project is by doing research and observation via distributing questionnaire and brainstorming among group members. The questionnaire is being distributed to 76 respondents consist of both female and male. Brainstorming is also conducted to obtain the solution to overcome the problems.

3.2.1 PROJECT PRODUCTION TECHNIQUE

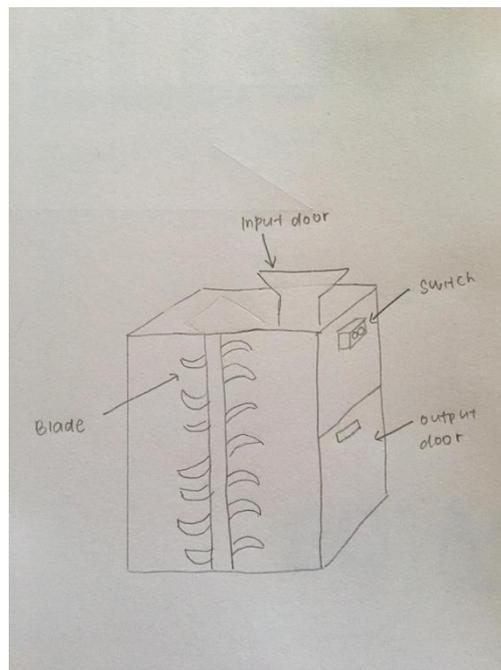


3.2.2 SKETCHING

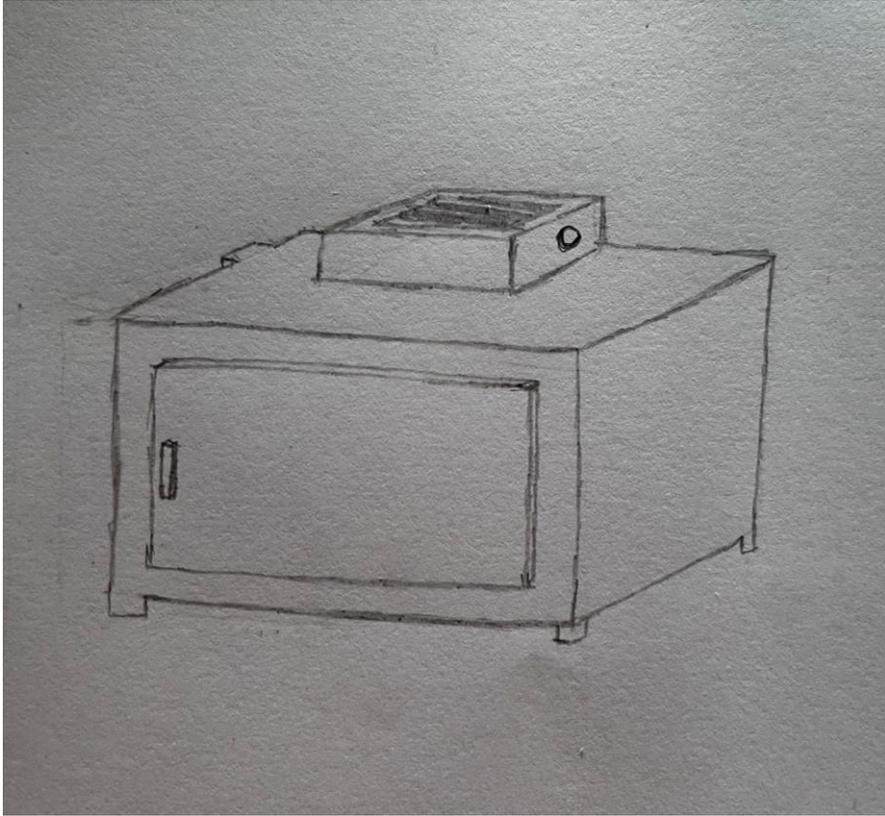
SKETCHING 1



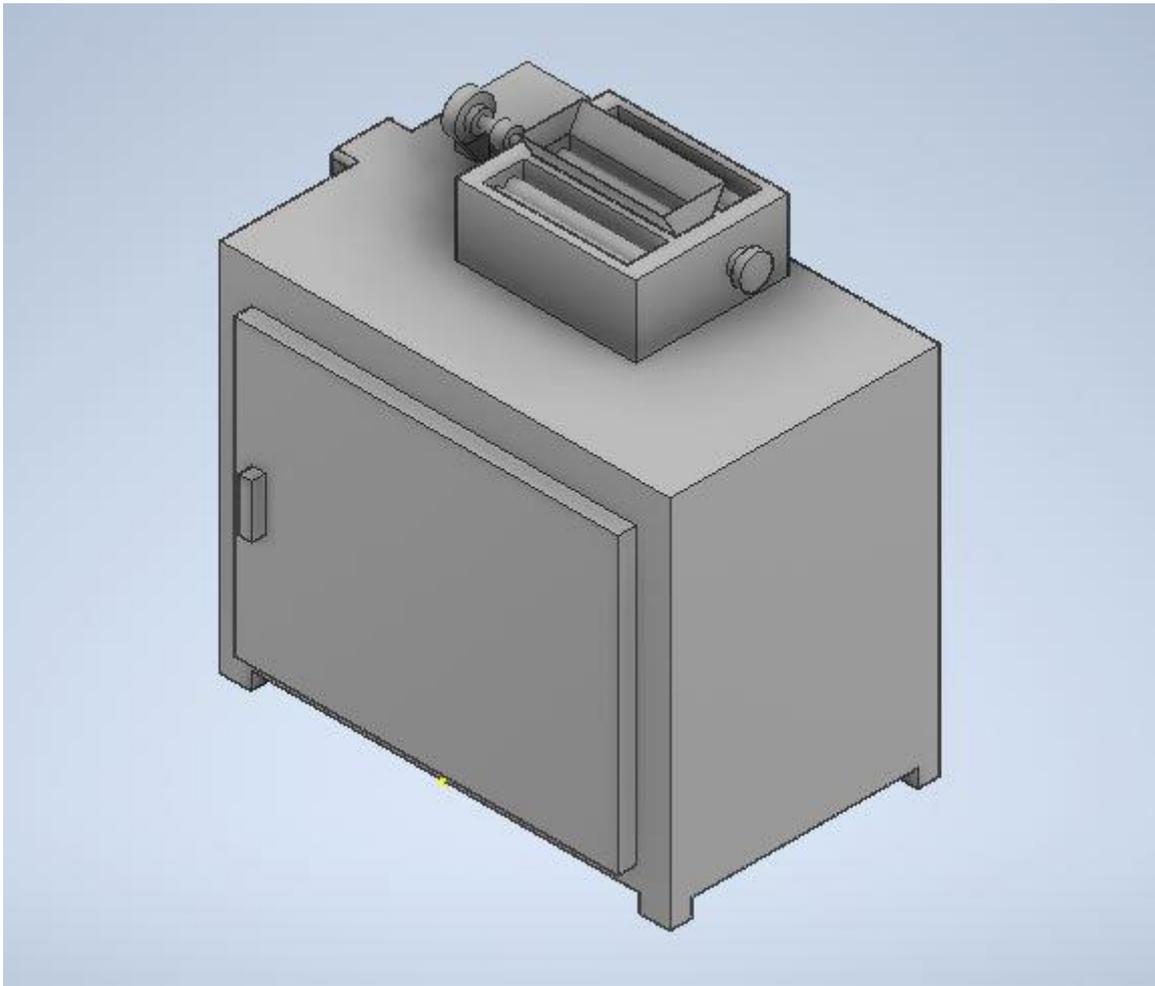
SKETCHING 2



SKETCHING 3

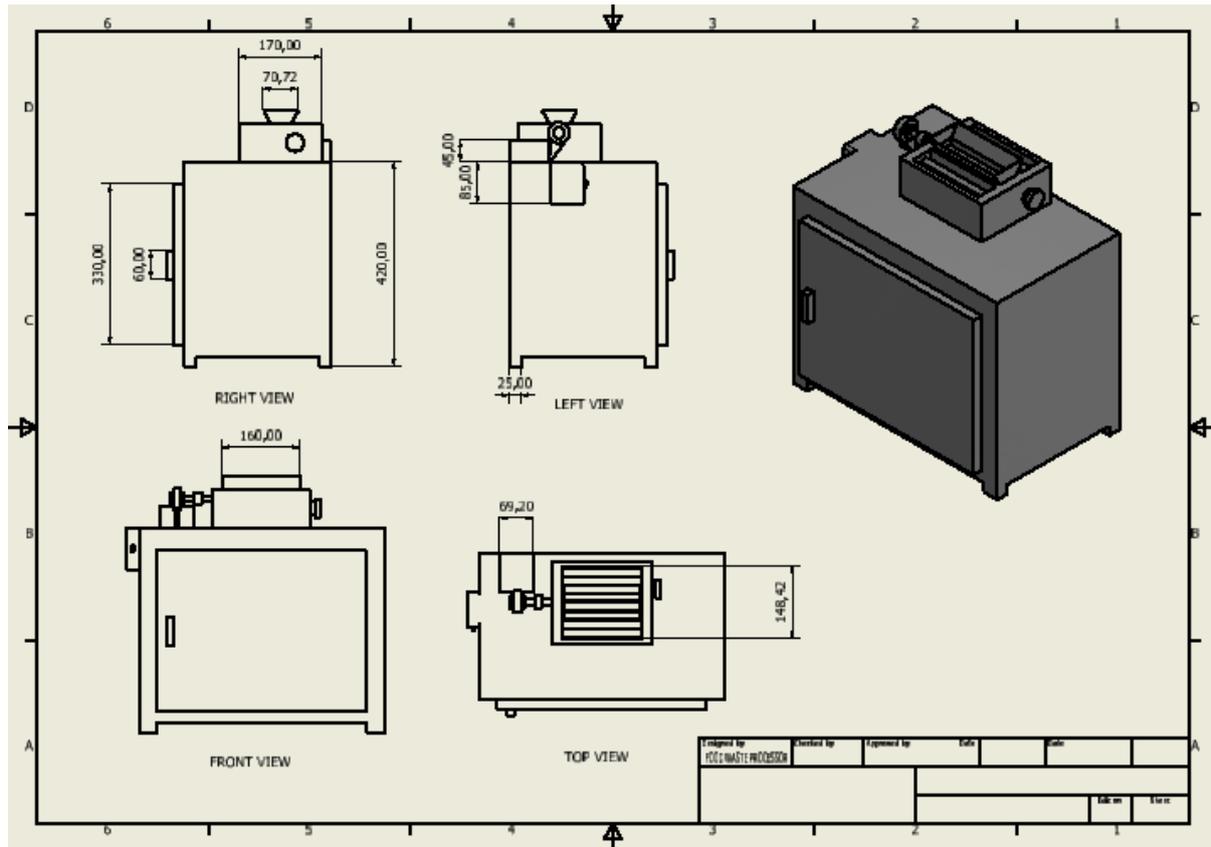


3.2.3 INVENTOR DESIGN



3.2.4 ENGINEERING DRAWING

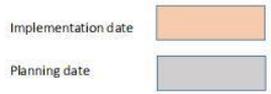
SIZE MACHINE



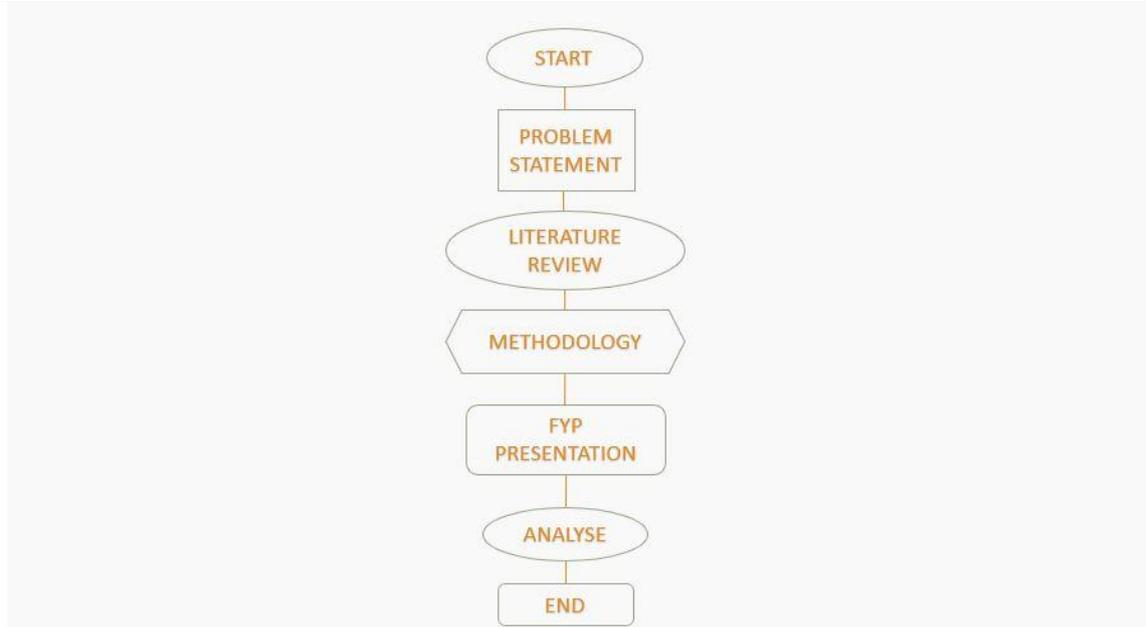
3.2.5 GANTT CHART

GANTT CHART

ITEM	MARCH				APRIL				MAY				JUNE			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PROJECT ACTIVITY	10/3	17/3	24/3	31/3	7/4	14/4	21/4	28/4	5/5	12/5	19/5	26/5	2/6	9/6	16/6	23/6
Introduction of project - Discuss the project with supervisor - Discuss a scope problem statement and objectives the project																
Literature work - Literature review - Search for information and knowledge according to project																
Methodology - Design part - Product sketching - Simulation works - Prediction result																
Presentation FYP - FYP 1 report finished																
Discuss and Analyse - Analyse data collection - Discussion																
Preparation and Presentation for Final Project - Conclude the project - Finished the final report and present final year project																



3.2.6 FLOW CHART



3.3 MATERIALS AND EQUIPMENT / BUDGET COST

- Mild Steel Hollow (19mm x 19mm x 1.2mm)	RM 1.80/kaki	26 kaki	RM 46.80
- Mild Steel Plate (Ketebalan 1.2mm)	RM 6.50/kp	13 kp	RM 84.50
- Mild Steel Angle (25mm x 25mm x 3mm)	RM 2.80/kaki	3 kaki	RM 8.40
- Mild Steel Wiremesh (10mm x 10mm)	RM 9.80/kp	2 kp	RM 19.60
- 12VDC Motor (Power Window)	RM 68.00/unit	1 unit	RM 68.00
- Motor Bracket (50mm x 50mm x 3mm)	RM 8.80/unit	1 unit	RM 8.80
- Motor Bush Coupling (ID 13mm)	RM 4.80/unit	1 unit	RM 4.80
- PSU 240VAC-12VDC 5A	RM 85.00/unit	1 unit	RM 85.00
- Kotak PVC Elektrikal	RM 18.00/unit	1 unit	RM 18.00
- Plug 3 Pin + 3 core Wayar (1meter)	RM 8.50	1 unit	RM 8.50

3.4 CHAPTER SUMMARY

From the 3 sketching design of food waste processor, we choose design 3 as a actual design for our project 1. Overall, the methodology of this project was successfully produced. From the idea that is, a rough sketch is produced. The next sketch produces an inventor's drawing which is then translated into an engineering drawing. The materials and techniques that have been selected help the production of this project to be successful.

CHAPTER 4 : PRELIMINARY FINDINGS

4.1 INTRODUCTION

Survey questions on "Food Waste Processor" had been answered by 78 respondents through Google Form platform. We have prepared 2 parts of questions namely part A and part B. In part B we have divided into 3 scope as below:

- i. The wrong way is thrown in by user preferences.
- ii. Reduce food waste.
- iii. The idea of innovation.

4.2 FINDING / DATA / PRELIMINARY INVESTIGATION OF THE STUDY

RESPONDENT RATE

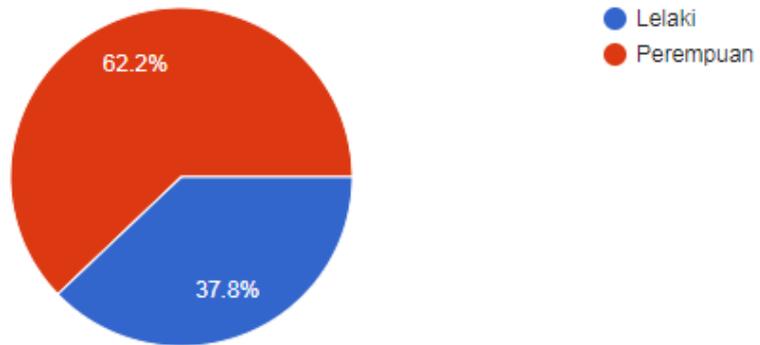
78 respondent have answered Google Form provided. A total of 76 respondent have answered completely and 2 respondent didn't answered completely. This product has the potential to be marketed as 61.8% agreed with the innovation idea.

4.3 RESPONDENT DEMOGRAPHIC PROFILE

- i. Information obtained from Google Form was answered by 62.2% female respondent and 37.8% male respondent.
- ii. In terms of age, 82.9% are aged 20-29, while 14.5% are aged 19 years and below, followed by 1.3% aged 40-49 and 1.3% of respondents aged 30-39.

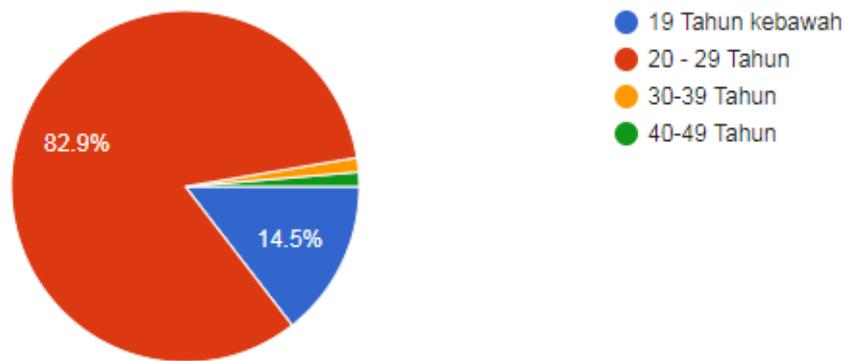
Jantina

74 responses



Umur

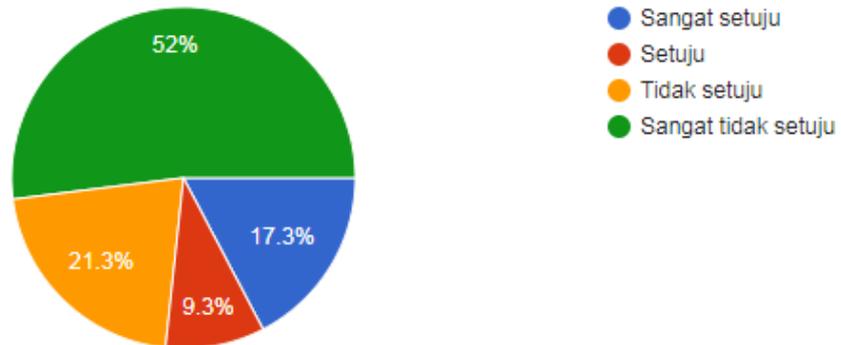
76 responses



B1- Tabiat pengguna membuang dengan cara yang tidak betul.

Sisa makanan dibuang melalui longkang.

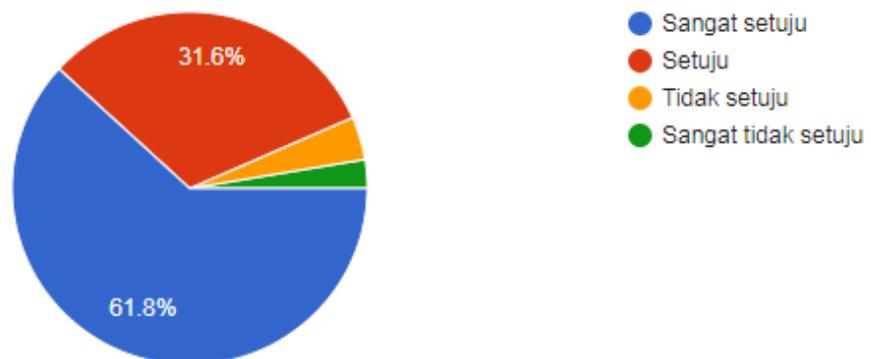
75 responses



- i. The highest total of 52% of respondent not agree with statement food waste is throw away through drains.

Sinki terdapat sisa makanan menyebabkan sinki tersumbat.

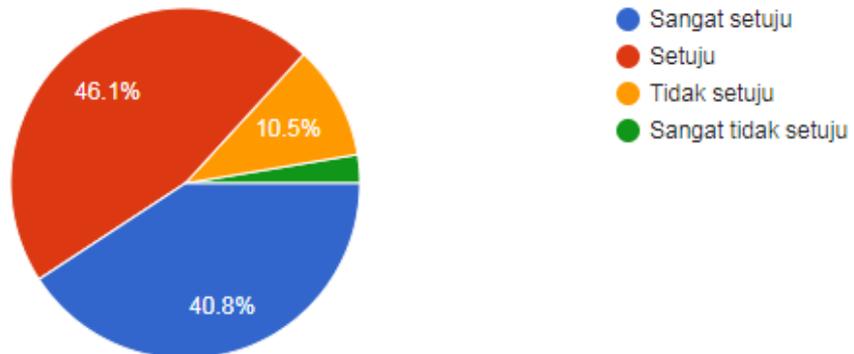
76 responses



- ii. The highest total of 61.8% of respondent agree with statement the sink contained food waste causing the clogged sink.

Saya tahu tentang cara betul tentang pembuangan sisa makanan.

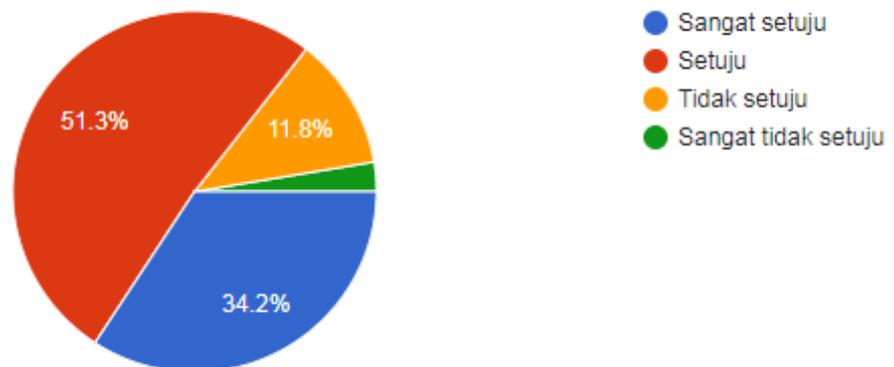
76 responses



- iii. The highest total of 46.1% of respondent agree with statement I know about the right way about food waste disposal.

Saya mengamalkan pengasingan jenis sampah.

76 responses

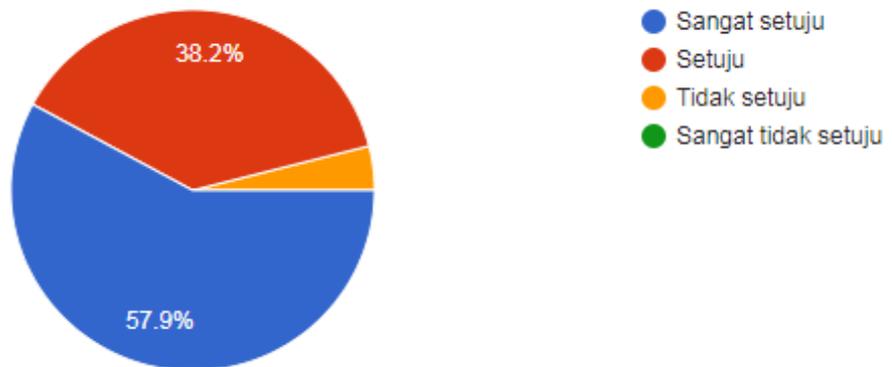


- iv. The highest total of 51.3% of respondent agree with statement I'm practicing waste segregation.

B2- Mengurangkan sisa makanan.

Saya tahu tentang pencemaran alam sekitar.

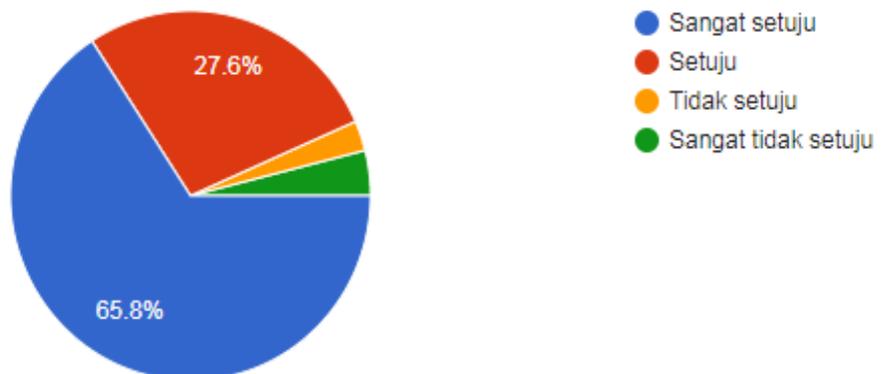
76 responses



- i. The highest total of 57.9% of respondent agree with statement I know about environmental pollution.

Longkang tersumbat sehingga menyebabkan banjir kilat.

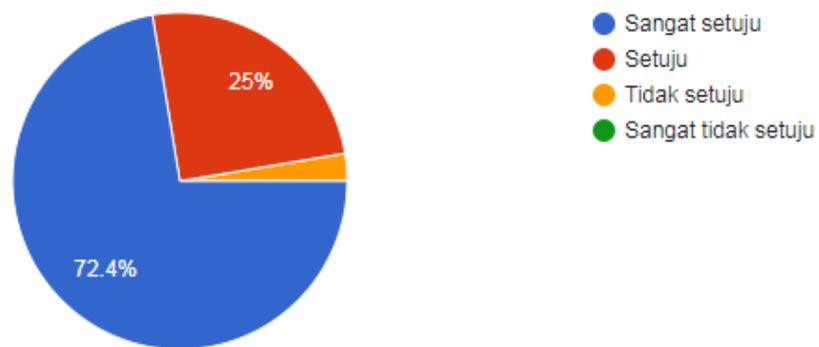
76 responses



- ii) The highest total of 65.8% of respondent agree with statement drains are clogged causing flash flood.

Sisa makanan menyebabkan menggalakkan pembiakan haiwan perosak seperti lalat dan tikus.

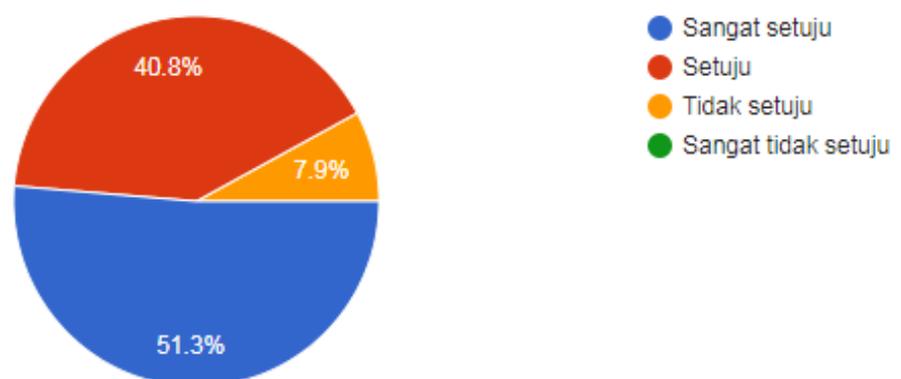
76 responses



- ii. The highest total of 72.4% of respondent agree with statement food waste caused in encouraging the breeding of pests such as flies and rats.

Sisa makanan boleh diproses dan dibuat baja pada tumbuhan.

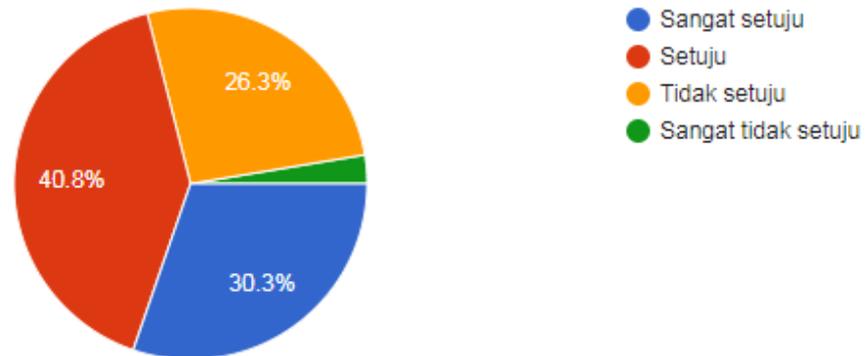
76 responses



- iii. The highest total of 51.3% of respondent agree with statement food waste can be processed and made into fertilizer on plants.

Saya tahu tentang baja kompos.

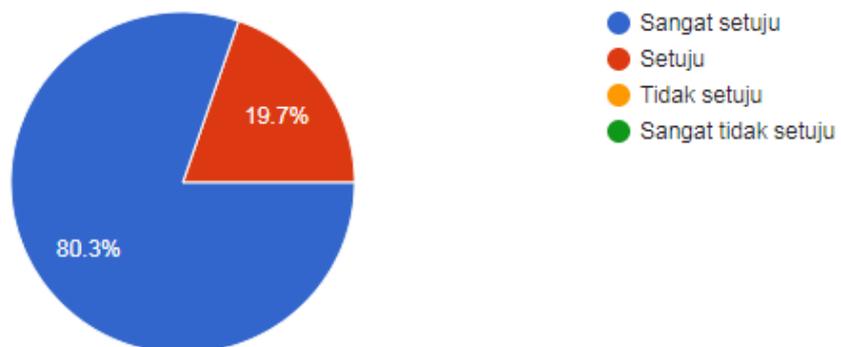
76 responses



- iv. The highest total of 30.3% of respondent agree with statement I know about compost steel.

Kawasan yang bersih amat penting untuk menjaga kesehatan dan keselesaan,

76 responses

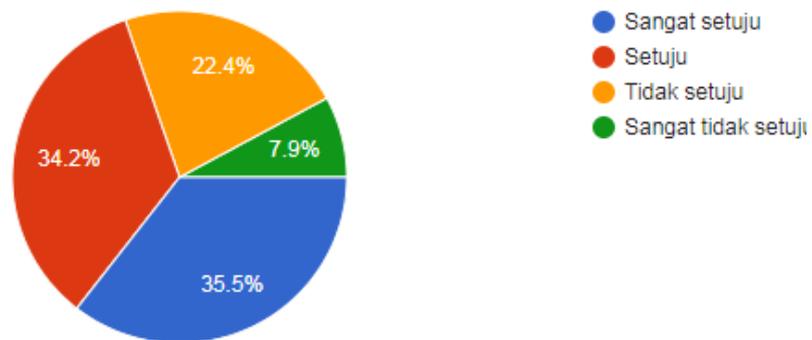


- v. The highest total of 80.3% of respondent agree with statement clean areas are very important for health and comfortable environment.

B3- Idea inovasi.

Setiap kedai makan mempunyai mesin pengisar sisa makanan.

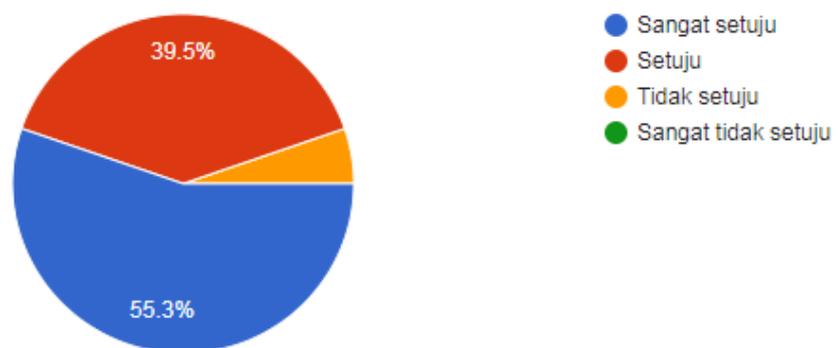
76 responses



- i. The highest total of 35.5% of respondent agree with statement every restaurant has a food waste processor.

Mesin pengisar sisa makanan dapat memudahkan proses kitar semula.

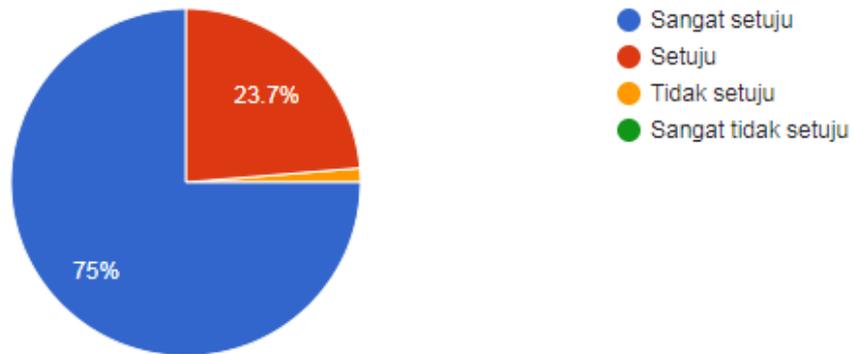
76 responses



- ii. The highest total of 65.8% of respondent agree with statement drains are clogged causing flash flood.

Amalan membuang sisa makanan dengan betul harus dijadikan amalan masyarakat.

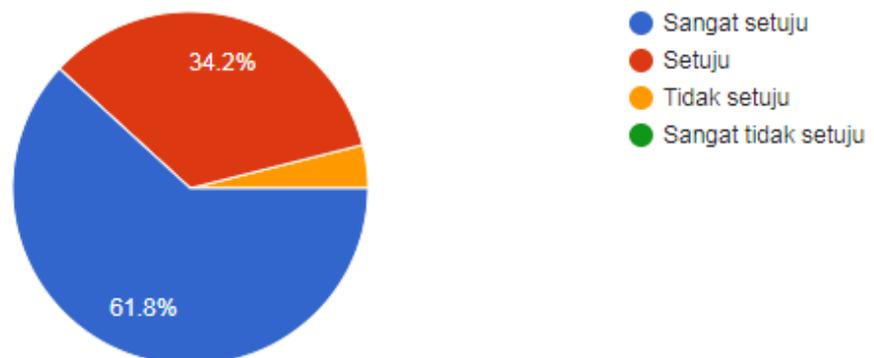
76 responses



- iii. The highest total of 75% of respondent agree with statement the procedure of disposing of food waste properly should become a community practice.

Produk ini mempunyai potensi untuk dipasarkan.

76 responses



- iv. The highest total of 61.8% of respondent agree with statement this product has the potential to be marketed.

4.5 RECOMMENDATION

In sum, this food waste processor will be used by many restaurant operators in dealing with food waste reduction. I hope this food waste processor will be improved by adding waterways in the machine to facilitate the cleaning work. Also, this machine no longer uses electrical power but uses solar energy.

4.6 CONCLUSION

- i. Food waste processor is suitable for use in restaurants, canteen and domestic entrepreneurs.
- ii. Processed food waste can be used to compost and extended the usage to farmers.
- iii. Help to reduce the greenhouse effect.

4.7 REFERENCE

- 1) <https://pppp.my/malaysian-food-waste.html>
- 2) <https://www.sunefun.com/200kg-food-waste-disposal-composting-machine-for-kitchen-restaurant-p2588942.html>
- 3) <https://bettermeetsreality.com/pros-cons-composting-benefits-disadvantages/>
- 4) <https://westcomsolutions.com/food-waste-machines/>
- 5) <https://westcomsolutions.com/benefit-food-waste-machine/>
- 6) [https://link.springer.com/chapter/10.1007/978-3-319-10906-0_9#:~:text=BiPRO%20\(2011\).%20Roadmap%20for%20Poland%20\(PL\)%2C%20Retrieved%20from%20http%3A//ec.europa.eu/environment/waste/framework/pdf/PL_Roadmap_FINAL.pdf](https://link.springer.com/chapter/10.1007/978-3-319-10906-0_9#:~:text=BiPRO%20(2011).%20Roadmap%20for%20Poland%20(PL)%2C%20Retrieved%20from%20http%3A//ec.europa.eu/environment/waste/framework/pdf/PL_Roadmap_FINAL.pdf)

CHAPTER 5 : CONCLUSION AND RECOMMENDATION

5.1 INTRODUCTION

In the literature review of this study, we discuss about the comparison between the food waste processor machine available in the market with the food waste processor machine that we produced. In addition, we will also make an evaluation of the project as well as the advantages and disadvantages of the project. we will also discuss the projects that have been innovated as well as the community's consent through a questionnaire to purchase our project if the product arrives on the market.

5.2 CONCLUSION

In this era of unclean environmental, friendly processor has become an action to save our environment and pollution are becoming more widely used. Whether in restaurants and school or work place canteen areas, the purpose of food waste processor is to facilitate the public can use an easy and quick way to destroy the waste food . In market research, we have produced a more professional, smarter and more creativity "FOOD WASTE PROCESSOR ". through this product, we not only have to make a benefaction to environmental protection and for taking care of health.

5.3 RECOMMENDATION

For suggestions, we would like to improve by way of cleaning the machine after use. Cleaning can be added in the machine to make it easier for the user. In turn can prevent odors and bacteria from multiplying. So it will be safe for the user when they use the machine. In addition, we can increase the speed of the motor to destroy food waste faster.

5.4 LIMITATION PROJECT

Hold the effectiveness of this product gives good results to the user. This product works well because it can prevent pollution in our country. Therefore, this product can be placed in eateries, canteens or even home use. In turn can help farmers in the use of compost fertilizer we can reduce the cost of purchasing high fertilizer costs. Farmers can use fertilizer made from food waste.

5.5 SUMMARY

In a scope, our product FOOD WASTE PROCESSOR, is effective in value the ability to improve the technology in this society and understanding the concept of food waste based on categories of flood problem, unclean environment. It can be concluded that food waste processor machine is useful thing for public to reduce the upcoming problems. It can be very useful for our environment.

5.6 REFERENCE

GANTT CHART

GANTT CHART

