



# CREATIONS de UiTM

INTERNATIONAL MEGA INNOVATION CARNIVAL 2024

Navigating Innovation and Seizing Global Fortune

CHANGE THE WORLD THROUGH INNOVATION

## e-PROCEEDING

27<sup>th</sup> APRIL 2024

UNIVERSITI TEKNOLOGI MARA  
CAWANGAN SELANGOR, KAMPUS DENGKIL  
MALAYSIA

ORGANISED BY:



Pusat  
Asasi

## Tapipoon: Innovating Tapioca as an Edible Cutlery

\*Roosevelt Chemundai Marshal Rogers, Shawn Selie Standlie, Randi Victor Rooney, Alexysious Rengga Unggit and Siti Norida Abdul Kadir

Centre of Foundation Studies, Universiti Teknologi MARA, Cawangan Selangor, Kampus Dengkil, 43800 Dengkil, Selangor, Malaysia

\*Corresponding author: 2023831122@student.uitm.edu.my

### ABSTRACT

Ever since the realization of the fact that plastic products can pollute our environment, many parties have stepped in to help reduce the usage of it. This innovation comes to light when our group is tasked by our lecturer to propose a product of our choice to be innovated. A compilation of research papers done by various constitutions worldwide about tapioca is used to assist our research better. We also prepared a survey for the public to survey their opinions regarding the compatibility of tapioca as cutlery. We then proceeded to survey some villages around Sarawak which provide high quality tapioca, theoretically formulate the ratio of ingredients used to make the cutlery and collecting data on potential market impact and other related information. To assist our project development as well, we also conducted interviews with the public, and discovered that our product has potential to be alongside its eco-friendly counterparts such as paper and rice straws. We strongly believe that our product has a potential to be commercialized domestically in the future, with improvements on our product's quality to be done frequently.

**Keywords:** tapioca; mother nature; cutlery; green-based.

### 1. INTRODUCTION

Tapipoon is a cutlery set made of tapioca (*manihot esculenta*). Eco-friendly based products can be seen nationwide such as paper and rice straws, but we detected that it too has flaws. With that problem in mind, we decided to prepare some hypotheses to help guide us in our product's development. The hypotheses can be seen below:

1. Does our product impact human health?
2. What impact can our product give towards plastic pollution?
3. Is our product durable for beverage and food usage?
4. Will our product be useful as a way to practice and nurture environmental conservation?

Some interesting findings can be found when conducting our research, such as it has the ability to melt slowly into warm foods and acts as a flavoring, can withstand warm and cold foods and beverages, and can decay easily if unused. When comparing our product with existing plastic cutleries and eco-friendly cutleries, we observed that our product has some benefits and also flaws. We also believe our product can also help environmental conservation as it has similar effects with existing eco-friendly products. Our main role is to promote that tapioca is easily found anywhere nationwide, and that it is sustainable for conservation efforts in the long run.

This research is first used as an assignment for a university subject. Seeing the potential of this research to be a future product, we then decided to delve deeper to see how far our product can go. We conducted some readings from reputable sources about the plantation of tapioca, specifically in Sarawak. It is found that tapioca is sometimes planted together with paddy fields or in small scale (Yakup Pendak et al., n.d). While no research papers so far had mentioned about the usability of tapioca as a cutlery, but we found potential in the future development of our product. A research paper shows that when cassava peels are discarded as waste, it will lead to environmental concerns due to decomposing of the peels (Edma et al., 2014). Considering that situation and other factors such as pests and infections, this greatly increases our reasoning to help reduce this problem.

We also refer to existing research papers regarding plastic pollution and compare it with the environmental impact our product can make. 92.4% of the respondents in a research done in Malaysia recognizes the negative impacts of plastic towards human health (S.M. Parveena, 2024). Plus, marine debris too will severely impact our coast lines in Malaysia which is rich with marine biodiversity (S. H. Fauziah et al., 2021). With reference to this information, we have come to a small conclusion that our product will certainly give a huge impact environmentally. The source of tapioca is planned to be in Sarawak, because of multiple factors. Most villages in Sarawak plant tapioca in small scale, and has high quality produce compared to its Peninsular counterparts. Its suitable humid environment too produces more contents in each tapioca, hence making sure the availability is secured.

## 2. METHODOLOGY

### 2.1 Planning of prototype & interview and survey sample questions

Initially, we only planned to propose our product's prototype using a spoon. However, after discussing with our lecturer, we then changed our product to be a full set of cutleries (spoons, forks, butter knives, etc.) The cutlery is made from tapioca with wheat flour. The measurement for the cutlery is as shown below:



**Figure 1.** Final design of prototype



**TAPIPOON**



Purata panjang semua perkakas= 9 CM  
Purata lebar semua perkakas – 2.3CM



**DIPERBUAT DARI UBI KAYU**  
-Ubi kayu diukir menjadi bentuk "Cutlery"

**Figure 2.** Plannings of prototype

**Average size of all cutleries = 9 cm**  
**Average length of all cutleries = 2.3 cm**

The ingredients to make this product only consists of tapioca and some wheat flour. No final measurements for the prototype has been decided yet, however we decided that our measurement

for our initial prototype is measured as: 100g of wheat flour to 500g of tapioca for a full set of cutlery. The steps to make the cutlery are as shown below:

1. Harvest the tapioca from chosen villages in Sarawak.
2. These tapiocas are then separated and washed to remove existing dirt.
3. Using a peeler, remove the skin from the tapioca.
4. The tapioca is then cooked until soft, then is mashed into a dough. Mix it together with wheat flour to prevent stickiness of the dough.
5. Carve the dough into desired cutlery shape, then separate it according to their desired uses.
6. Place the dough in the oven which is set to 180°C and heat the dough for 10-15 minutes.

Leave the cutlery to cool down for 1 hour and test for durability and sturdiness.

To test the finished prototype, we conducted a durability test to ensure our product is ready to release. The durability test consists of water resistance, fragility and sturdiness of each prototype. Details for each test are as below:

### 3. RESULTS AND DISCUSSION

#### 3.1 Water resistance test

Each prototype will be submerged in a water for 2 hours to see how much water each prototype can absorb. Results are as shown in Table 1.

**Table 1.** Results for water resistance test

Test Prototype	Water Absorped (cm <sup>3</sup> )
1	30
2	29
3	29
4	30
5	30

#### 3.2 Fragility & Sturdiness Test

A weight of 10 kg will be placed on top of each prototype to see how long each prototype can last before they break. A stopwatch and a programmed table in Microsoft Excel are used to record the data. Results are as shown in Table 2.

**Table 2.** Results for fragility & sturdiness test

Test Prototype	Durability (S)
1	60
2	61
3	59
4	60
5	60

To further complement our research, we also conducted surveys with the public regarding our product in general to see consumer compatibility with our product. These survey questions are distributed to 40 people and the table below shows the survey questions together with the percentage of answers given:

**Table 3.** Survey questions and results of survey

Survey Questions	Yes (%)	No (%)
Do you think that our product, Tapipoon has a potential to be among the eco-friendly cutleries to be used in the future?	90	10
Do you see yourself using our product in your household in the long run?	87.5	12.5
Is our product up to your initial expectations when first promoted?	75	25

### 3.3 Expected Collaboration & Commercial Potential

Based on our observation on the potential marketing and usability of this product among the general public, we believe that this product can attract attention and be able to generate some profit, depending on how large our scale of products can be. We initially plan to start promoting these in our local shops inside our campus, Anjung Dengkil. These shops mostly sell food and drinks to our students and would have a high potential to use our product. Our local ‘Mamak’ stalls and restaurant in the area around our campus as well could also be another potential since they receive customers almost every day.

Comparing the cost of existing plastic cutleries and our product, it is very obvious that our product is more costly compared to plastic cutleries because most consumers still rely on it for events and gatherings. The price for an average plastic cutlery in Malaysia is RM 2.00 per piece whereas our product is about RM 3.00 per piece. As for collaborations, we will start by looking for local companies who can help us in mass produce our products and ship them nationwide. Commercially, we believe that we can attract more consumers to use our products because it has potential to be a part of the household with future changes. The initial cost that we set for this product is RM 20.00, since most of the cutlery in the early stages can be made in small amounts with limited machinery and workers.

## 4. CONCLUSION

Overall, this product shows positive feedback from everyone involved in the survey, and is able to achieve all the objectives we initially planned for it. Not only can this product reduce the usage of plastic cutleries, but at the same time we are able to educate the general public about the existence of edible cutleries and use it. We plan to eventually improvise some initial plans for our product. First, we would like to insert some unique flavors for the users to enjoy eating the cutlery after a meal, such as vanilla and chocolate. Secondly, we plan to change the measurements of the cutlery to fit everyone’s usage. Thirdly, since the initial cost of the product is expensive, we plan to find a collaborators or factory to mass produce it and provide customers with a lower price.

## ACKNOWLEDGEMENT

Our appreciation also goes to our beloved lecturer, Madam Siti Norida Abdul Kadir for her never ending support of our group and gave us all the advice and support to make this project a success. Special thanks to the group members as well, Roosevelt Chemundai, the group leader for ensuring our project is going smoothly and making sure everything is prepared on time. Shawn, for proposing this idea in the first place and bringing us to where we are now. Randi, for helping us whenever we needed him, especially in crucial times before the day of the presentation. Alexysious, who helps a lot in explaining perfectly the details of this product and preparing everything necessary.

## REFERENCES

Nurul Aini Edama, Alawi Sulaiman, Siti Noraida Abd. Rahim (2014). Enzymatic saccharification of Tapioca processing wastes into biosugars through immobilization technology. Faculty of Plantation and Agrotechnology, Universiti Teknologi MARA, Malaysia.

Shahul Hamid Fauziah, Mohammed Rizman-Idid, Wee Cheah, Kar-Hoe Loh, Sahadev Sharma, NoorMaiza M.R, Michael Bordt, Teerapong Praphotjanaporn, Azizan Abu Samah, Johan Shamsuddin bin Sarabuddin, Mary George (2021). Marine debris in Malaysia: A review on the pollution intensity and mitigating measures. University of Malaya, Malaysia, University of Ottawa, Canada and University of New South Wales, Australia.

Sarva Mangala Parveena (2024). Exploring public awareness, influencing factors and policy implications towards microplastic pollution: Perspectives from Malaysia. Faculty of Medicine and Health Sciences, University Putra Malaysia (UPM), Malaysia.

Yakub Pendak, Jaman Osman, Megir Gumbek, Lily Eng (n.d). Penanaman Ubi Kayu. Jabatan Pertanian Sarawak, Malaysia.