

DEVELOPMENT OF AUTOMATED LOW COST BANANA
SLICER



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DEVELOPMENT OF LOW COST AUTOMATED BANANA SLICER



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Faculty of Electrical and Electronic Engineering Technology

DEVELOPMENT OF LOW COST AUTOMATED BANANA SLICER



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DEVELOPMENT OF LOW COST AUTOMATED BANANA SLICER

MUHAMAD NORAZLI BIN MD ALI

A dissertation submitted
in partial fulfillment of the requirements for the degree of
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Faculty of Electrical and Electronic Engineering Technology

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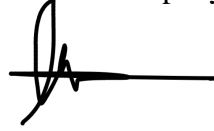
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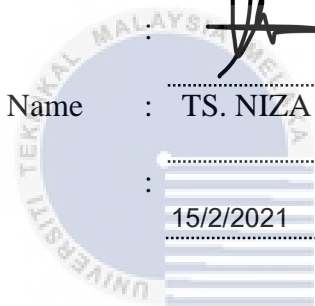
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DEDICATION

“Dedicated to all that support me, and continuously praying for me”

Thank You



ABSTRACT

Many entrepreneurs love to sell Malaysian delicacies and that is banana chips. They are interested to sell banana chips but the world is not so kind especially to entrepreneurs. They still lack experience and they have low capital. Because of low capital, they need to create banana chips manually to reduce cost. They cannot spend money on a slicing machine because it is expensive, thus do it manually is the only way to create the product. By doing this process manually, the capacity that can be produced is limited. The time consumption is also largely because the speed of the production is slow. The stamina to create the product is also high because the person needs to focus on slicing the banana to avoid slice too thickly or too thinly. There is an article about the women community that capable of creating the banana chips but they cannot expand their business even already 5 years in the industry until they are taught to use the technology. Hence, the purpose of this project is to develop a low-cost banana slicer machine. This can help to improve the production of the banana chips and reduce time consumption to slice the banana. Firstly, we need to research how the machine slice the banana because the machine is automatic and does not know right or wrong. This is by researching the various type of slicing machines that have already been created. When we found a suitable circuit and design we try to create the prototype and analyse the result. We repeat the process until we get the best result. The thing that needs to be considered is the type of blade, motor, and power supply. We also need to consider the material used especially the banana type. After we get the result we want, we try to brainstorm what additional feature that we can add to improve the quality of this machine. I hope the development of this banana slicer machine can help the banana chips entrepreneur to get profit and minimize the loss risk and can help economy performance to avoid an increase in food prices and groceries.

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ABSTRAK

Ramai pengusaha gemar menjual makanan istimewa Malaysia dan itulah kerepek pisang. Mereka berminat untuk menjual kerepek pisang tetapi dunia ini tidak begitu adil terutama kepada pengusaha kali pertama. Mereka masih kurang pengalaman dan mempunyai modal yang rendah. Oleh kerana modal yang rendah mereka perlu membuat kerepek pisang secara manual untuk mengurangkan kos. Mereka tidak dapat mengeluarkan wang untuk membeli mesin penghiris pisang kerana harganya mahal, jadi melakukannya secara manual adalah satu-satunya cara untuk membuat produk. Dengan melakukan proses ini secara manual, keupayaan yang dapat dihasilkan adalah terhad. Masa yang diperlukan adalah tinggi kerana kelajuan pengeluaran produk adalah perlahan. Stamina untuk membuat produk juga tinggi kerana mereka memerlukan tumpuan yang tinggi dalam memotong pisang untuk mengelakkan kepingan terlalu tebal atau terlalu nipis. Terdapat artikel mengenai komuniti wanita yang mampu membuat kerepek pisang tetapi mereka tidak dapat mengembangkan perniagaan mereka walaupun sudah 5 tahun berada di industri ini sehingga mereka diajar untuk menggunakan teknologi. Oleh itu, tujuan projek ini adalah untuk membangunkan mesin pengiris pisang kos rendah. Ini dapat membantu meningkatkan pengeluaran kerepek pisang dan mengurangkan penggunaan masa untuk memotong pisang. Pertama, kita perlu meneliti bagaimana mesin memotong pisang berfungsi kerana mesin itu automatik dan tidak tahu betul dan salah. Ini adalah dengan melakukan penyelidikan pelbagai jenis mesin pengiris yang telah dibuat. Apabila kami menemui litar dan reka bentuk yang sesuai, kami mencuba dengan membuat prototaip dan menganalisis hasilnya. Kami mengulangi proses sehingga kami mendapat hasil yang terbaik. Perkara yang perlu dipertimbangkan adalah jenis pisau, motor dan bekalan kuasa. Kita juga perlu mempertimbangkan bahan yang digunakan terutamanya jenis pisang. Setelah mendapat hasil yang kami mahukan, kami mencuba untuk mencetuskan idea tambahan apa yang boleh kami tambahkan untuk meningkatkan kualiti mesin ini. Saya berharap pembangunan mesin pengiris pisang ini dapat membantu pengusaha kerepek pisang untuk mendapatkan keuntungan dan mengurangkan risiko kerugian, dan dapat membantu prestasi ekonomi untuk mengelakkan kenaikan harga makanan dan bahan makanan.

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LIST OF SYMBOLS AND ABBREVIATIONS

PVC	-	Polyvinyl chloride
IDE	-	Integrated Development Environment
PIR	-	Passive Infrared
IR	-	Infrared
LED	-	Light-Emitting Diode
RPM	-	Revolutions per Minute



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CHAPTER 1

INTRODUCTION

1.1 Background Study

There are much tropical fruit in the world and banana is one of the fruits that is widely grown. It is cultivated over 130 countries including Malaysia. Banana is highly nutritious and easily digestible than any other fruits. Banana contains carbohydrates, proteins, fat, vitamins and minerals. Banana goes through a unique process known as negative geotropism. Usually, the plant or fruit grow toward the ground but for the banana, they grow toward the sun. This fruit grows against gravity, so that is why the banana has a curved shape. Banana descriptive appearance is a yellow fruit with thick skin and soft sweet flesh but the banana not usually yellow, the colour of the banana is based on its ripeness. Under ripe banana colour is green, then its turn light yellow and lastly turn dark yellow. The banana truly ripe when the colour is dark yellow. There are many ways to eat the banana, the common way to eat the banana is by peel it and eat it directly but the banana can also be cooked. We also can use a banana as an ingredient to make dessert. The popular product in Malaysia by cooking banana is the banana chip.

Banana chips are generally slices of bananas that covered with sugar or honey. We can also fry the banana inside the oil and covered it with hot spices or salty spices. Under ripe banana is usually used to make fried banana chips. This is because the under-ripe banana is still hard. If we use fully ripe banana, the banana already soft, it is sweet to eat directly but it is hard to slice the banana. To make the banana chip, we need to remove the banana peel and slice banana into thin slices. Next, pour spices or salt at the banana, then fried them into cooking oil. Some people bake the thinly slice banana by using an oven. Malaysian people love to eat banana chips as a snack and this gives chances to local that have skill in making banana chips to start a business. At the early stages, these people do not have much money to buy expensive equipment, so they need to produce banana chips manually. They peel the banana one by one and slice each banana thinly. Next, they pour spices or salt and fried them into cooking oil. Lastly, the finished product will be inserted into the container or plastic to be sold. For the factory that produce

banana chips, they usually have the machine that can slice many bananas automatically. This machine is hard to be obtained by new entrepreneur because it is costly and the machine take a lot of spaces. This machine work by inserting the banana into the machine then the banana is being sliced by the cutter that rotate inside the machine. The cutter is one of the mechanism in the machine that is used to slice the banana thinly. After a couple of minute, the user stop the machine and collect the banana slices inside the machine to be cooked into banana chips.

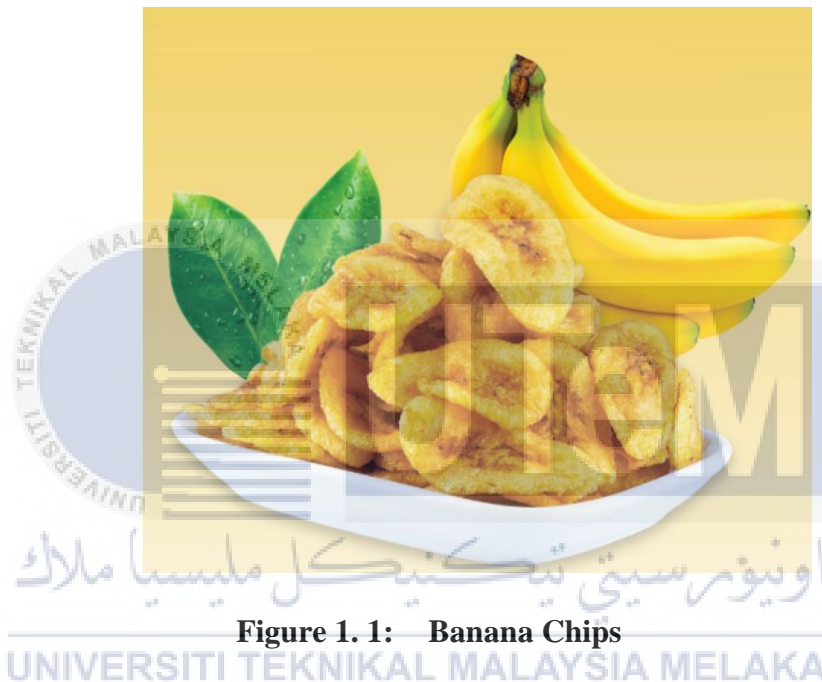


Figure 1. 1: Banana Chips

In figure 1.1, the figure displays a bunch of yellow bananas. Inside the white plate is an example image of the banana chips. The banana chips are sliced from the banana. Next, the banana slices are fried into the oil to create the banana chips.

1.2 Problem Statement

For the new entrepreneur that wants to sell a banana chip, their capital is small. The equipment that they need is the knife, cutting board, and cooking utensil. The knife and cutting board are used to slice the banana. They peel the banana and put it at cutting board to slice it thinly by using a knife. They need to slice the banana evenly to ensure even cooking. By the slice, the banana manually has a high risk of injuries because the banana

needs to be sliced evenly thin. The person needs to focus or it can cause injuries by cutting themselves. This requires a lot of time even for just one banana. To fill one container or plastic, it needs at least three bananas. If the entrepreneur plan to sell ten containers of banana chips, then it means the entrepreneur need to slice thirty bananas. They need to take in consideration time and their energy to slice the banana. It is not an easy task because the longer we slice the banana our focus will deteriorate. We need to rest and relax before we can slice the banana again. If we do not rest, we can injure ourselves or the banana will not be slice evenly. If we injured ourselves, we cannot slice the banana and we cannot make a profit. If we slice the banana not evenly it means the banana is damage and not suitable to make a banana chip. This can cause a loss before we make a profit. For a new entrepreneur, they need to minimize loss and try to make a higher profit.

This show that slice the banana manually consume a lot of energy and time. If we want to make more profit we need to increase the production of banana chips. It is almost impossible to increase banana chips production because human energy is limited. The time that we consumed to make banana chip is also large. To increase the production we need large energy and time that consumed is also need to be short. This is an efficient way to increase production with the minimal mistake. So that is why the big company use the machine to produce numerous banana chip. They can slice much banana in a short time with less energy. They have the advantage to slice the banana in the huge number in the short time while the person that need to slice the banana manually cannot slice the banana in huge number at the same time. This is the disadvantage for the small company with low capital.