

**DIETARY FIBER SOURCE
FROM PINEAPPLE BY-PRODUCT**

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LEARNING OUTCOME

- Introduction
 - Background of the process
 - Problem definition
- Objective and Scope
- Methodology
- Result and Discussion
- Conclusion and Recommendations



DIETARY FIBER

AN INTRODUCTION

- Dietary fiber is the edible part of plants that are resistant to digestion and absorption in small intestine.
- Two types which are, soluble dietary fiber (SDF) and insoluble dietary fiber (IDF).
- Recommended to take enough quantities of dietary fiber, for adults 26 to 35 g per day and children 15 to 20 g per day.
- A lot of benefit by taking dietary fiber such as the health of the digestive system.
- Previous studies, use cereals and wheat as a source for dietary fiber.

However,

- In my study, I will use pineapple by-product (PBP) which is the core as a source for dietary fiber formulated food products.

Since,

- PBP are more convenient because they have the requirement for dietary fiber intake to be balanced, water soluble fraction represent more than 50%.
- PBP is used as an animal feeds or fertilizers.
- PBP industries are inexpensive and available in large scale.

Therefore,

- PBP is being used as a source in making dietary fiber product

Why,

- PBP contains about 70% to 80% of IDF.
- PBP is a good source of vitamin C where pineapple contains about 25mg per 100g of vitamin C.
- Malaysia is one of the top country in pineapple planted instead of Philippines.

OBJECTIVE

To study new potential source of dietary fiber supplement from PBP.

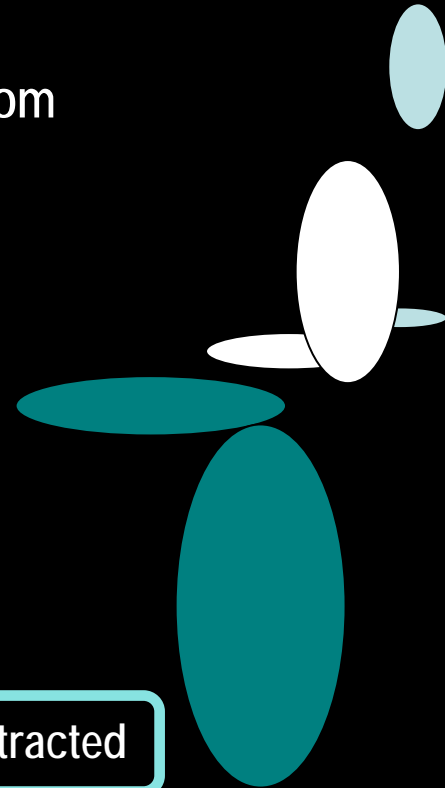
SCOPE

Identified dietary fiber in PBP

The properties of dietary fiber will be extracted

The characterization of dietary fiber product will be studied

The comparison with different sources of dietary fiber



METHODOLOGY

Dietary fiber

• Enzymatic-gravimetric

Proximate
analysis

- Protein
- Ash
- Moisture

Characterization
of
Dietary fiber

• Swelling capacity

METHODOLOGY

Dietary fiber

Soluble Dietary fiber

Insoluble Dietary fiber

MINUS

MINUS

Ash + Protein

Ash + Protein

Total soluble
Dietary fiber

Total insoluble
Dietary fiber

Total dietary fiber

RESULT AND DISCUSSION

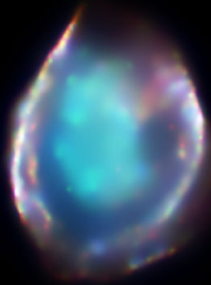


Table 1: Comparison PBP content with other fruits (g/100g)

Type of Fruits	Moisture	Ash	Protein	Total Dietary Fiber (TDF)
Apple	83.6	0.36	0.05	2.21
Banana	73.37	1.09	0.01	1.79
Citrus	75.30	3.30	10.20	0.57
Grape	81.76	5.48	0.073	0.60
Mango	83.71	2.34	0.02	1.76
PBP	82.40 \pm 1.050	0.136 \pm 0.001	0.0500 \pm 0.002	2.01 \pm 0.111

Moisture Content

- Using moisture analyzer about one and half hour at temperature of 120 °C.
- Moisture content for PBP is 82.40%.
- High amount of moisture content among other fruits.
- Fulfill the requirements to be a high dietary fiber product.

Ash Content

- Ash content are related to the moisture content.
- PBP has low ash content due to the high amount of moisture content.
- The relation can be show by this equation:

$$\% \text{ Ash (dry basis)} = \frac{\text{Weight after ashing} - \text{tare weight of crucible}}{\text{Original sample weight} \times \text{dry matter coefficient}}$$

$$\text{Dry matter coefficient} = \% \text{ solid}/100$$

Protein Content

- Protein content in PBP is moderate which is 0.0500 ± 0.002 compared to other fruits.
- Fortunately, protein content in PBP are high when compared to local fruits such as banana and mango.
- Protein analysis have been made using Biuret method
- Biuret method does not detect nitrogen from nonprotein sources and very few substances other than protein interfere with the Biuret reaction.

Total Dietary Fiber Content

- It was found that PBP had more than 20% of TDF.
- It was quite high percentage when compared with other fruits in the table.
- Unfortunately, according to Figuerola et al (2005)., this product could be considered as low source of TDF.
- Compared to the other fruits such as lemon had more than 60% of TDF.

RESULT AND DISCUSSION

Table 2: Comparison between PBP and other fruits for dietary fiber fraction (g/100g)

Type of Fruits	TDF	IDF	SDF
PBP	2.0078 ± 0.111	1.9849 ± 0.111	0.0227 ± 0.001
Banana	1.79	1.21	0.58
Mango	1.76	1.08	0.69

Comparison for Dietary Fiber Fraction

- PBP had a high content of TDF which is 2.0078 ± 0.111 g/100g compared to banana and mango.
- PBP have a high amount of IDF which is 1.9849 ± 0.111 g/100g.
- An advantages since IDF is a good stool softener, makes stools heavier and speeds their passage through the gut.
- It also absorbs many times its weight in water, swelling up ad helping to eliminate feces and relieve constipation.

Comparison for Dietary Fiber Fraction

- Unfortunately, PBP had less amount of soluble dietary fiber which is 0.0227 ± 0.001 g/100g while banana have 0.58 g/100g and mango have 0.69 g/100g.
- Disadvantages of PBP since soluble dietary fiber functioning well in that discipline which is a good cholesterol absorber.

RESULT AND DISCUSSION

Table 3: Comparison between PBP and fresh pineapple (g/100g)

Types	IDF	SDF	TDF
PBP	1.9849 + 0.111	0.02272 + 0.001	2.0076 + 0.111
Fresh Pineapple	1.42	0.04	1.46

Comparison between PBP and fresh pineapple

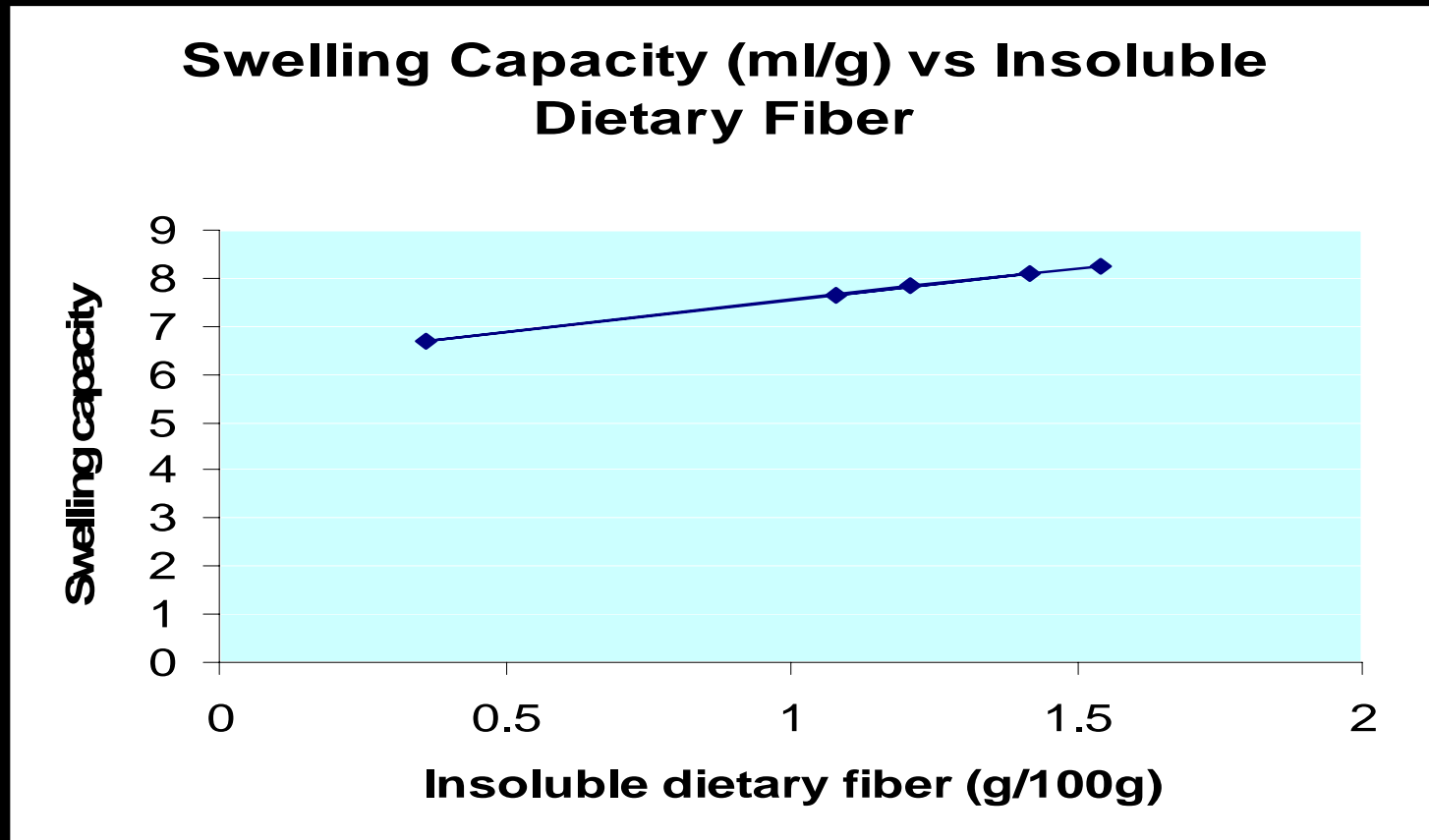
- Considerable differentiation content of TDF between PBP and fresh pineapple.
- Due to the incomplete removal starch.
- Increase the weight and inflates the estimates of dietary fiber.
- Starch is most problematic in the fiber analysis.
- Other possibilities is PBP especially at the pith had high amount of total dietary fiber since the pith is hard and difficult to digest compared to the fresh pineapple.

RESULT AND DISCUSSION

Table 4: Swelling capacity (ml/g) due to IDF content

Type of Fruits	IDF (g/100g)	Swelling Capacity (ml/g)
Apple	1.54	8.27
Banana	1.21	7.83
Grape	0.36	6.69
Mango	1.08	7.65
Pineapple	1.42	8.11

Figure 1: Relationship between Swelling Capacity and IDF



Relationship between Swelling Capacity and IDF

- Swelling capacity for PBP is quite high which is 8.11 ml/g compared to grape which is 6.69 ml/g.
- Swelling capacity is related to the amount of IDF fraction in fruits.
- Graph shows the content of IDF is proportionally linear to the swelling capacity.

Relationship between Swelling Capacity and IDF

- According to Lopez *et al.*, (1996), water could be held in capillary structures of the fiber as a result of surface tension strength.
- Water could interact with molecular component of dietary fiber through hydrogen bonding or dipole forms.
- Known that the structural characteristics and the chemical composition of the fiber play important roles in the kinetic of water uptake.

CONCLUSION

PBP had 20% of total dietary fiber which are, IDF content is 19.8% and SDF content is 0.2%. PBP is suitable as a source of dietary fiber product although the content of TDF is low, but fortunately the fraction of IDF is high.

RECOMMENDATIONS

- Fiber analysis using other methods.
- Use the PBP in actual foods since the swelling capacity is high.
- In the future, another analysis is recommend on the PBP since the content of insoluble dietary fiber a high in PBP.

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THANK YOU

High Dietary Fiber

The importance by taking dietary fiber product

- To help the intestines work properly
- To reduce diseases such as coronary heart disease and cholesterol

The uses fruit by-product as a source for dietary fiber product

- Fruits contain a balanced water soluble fraction
- Fruits are high in health promoting phytonutrients, antioxidants, flavonoids and polyphenols.

Pineapple waste as a source for dietary fiber product

- There are a lot of pineapple plantation in Malaysia
- Pineapple waste is used as an animal feed and fertilizers
- 80% from the pineapple industries is waste

Pineapple waste will use as a source of dietary fiber product Instead as an animal feed

SIGNIFICANCE OF THE RESEARCH

Produce the variety of supplement in market

Produce a product that give a lot of advantages to health of the digestive system

Nation's economy has a high potential to enhance if the usage of pineapple waste is broadly recommended