

TASMIMOPANAS : Modified Paper Using Waste of Pineapple as Purifier of Waste Cooking Oil

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Abstract

Cooking oil was necessary of household to used when processed food ingredients. Waste cooking oil was contained free radicals can potentially oxidize organs. This problem overcome with rice straw and waste of pineapple which waste cooking oil was recycled by them. The utilization cellulose component on rice straw and waste of pineapple as natural active carbon can helped this problem. The absorption of substances in waste cooking oil used paper from rice straw which heat together with Na₂SO₃ solvent while grinding processed with waste of pineapple to made pulp.

Keywords: waste of pineapple, cooking oil, pulp

1. INTRODUCTION

Cooking oil is a necessity of household which to use when process food ingredients. Cooking oil increases in term consumption and price that waste cooking oil increases (Ramdja et al, 2010). This problem can be overcome with rice straw and waste of pineapple which waste cooking oil is recycle by them. Rice straw is a biomass waste contains fiber and cellulose which is not use well (nasution, 2010). Besides, waste of pineapple also one of waste which contains fiber Larrauri et al, 1997.

Pineapple have consume directly and also to make a product in industry such as beverage products, pineapple syrup, foods that contain pineapple scents, and etc. The process to make product which produces waste. The utilization cellulose component on rice straw and waste of pineapple as natural active carbon can help this problem. The absorption of substances in waste cooking oil is uses paper from rice straw

which heat together with Na₂SO₃ solvent while grinding process with waste of pineapple to make pulp. It will be more beneficial for the community and can utilize rice straw and waste of pineapple to be more economical.

Waste cooking oil used in several time which repeatedly., that cooking oil was occurred degradation reaction (Yustinah, 2011) therefore it was decreased the quality of cooking oil. Waste cooking oil has dark color, rancid smell, and triggered negative effect on body health (Pakpahan et al, 2013). Waste cooking oil was contained free radicals can potentially oxidize organs. The dark color of waste cooking oil caused by oxidative damage. The molecular bond between carbohydrates and molecules caused of dark color and thickens in cooking oil, the bond between these molecules was called the Maillard Reaction (Suroso, 2013). Waste cooking oil was contained carcinogenic substances that triggered cancer in the body (Pakpahan et al, 2013).

Rice straw was biomass waste which contained lignocellulosic fiber. Lignocellulosic contained fiber and lignin in rice straw which has consisted carbohydrate polymers of cellulose and hemicellulose (Nasution, 2012). Cellulose was structural component of cell walls which possessed by green plants and it used in paper pulping (Lwako et al, 2013). The several methods used for paper pulp which included mechanical, heating, and chemical (Lwako et al, 2013). Chemical methods to made pulp included Kraft, sulfite, soda and organosolv (Lwako et al, 2013). See Table 1. This method used for reduced levels of lignin and hemicellulose which contained in plants. Cellulose contained in straw had hydroxyl group which reacted with reactive dyes which would be absorbed and dye cellulose fiber (Pakpahan et al, 2013).

Table 1.
Chemical Methods For Pulping Commonly Used

Chemical Pulping	Methods Chemicals Used	Properties of Isolated Pulp	Common Uses of isolated Pulp
Sulphite	Sulphurous acid/ sodium sulphite	High flexibility and requires very little bleaching	Used in making paper for special purposes
Kraft/ Sulphate	Combination sodium hydroxide and sodium sulphide	Strong, low brightness (dark brown)	Making boxes, paper bags and wrapping paper. Can also be used for writing paper and paperboard when bleached
Soda	Sodium hydroxide and anthraquinone	Have properties similar to those of sulphite.	Ideal for all paper uses
Organosolv	Organic solvents e.g Ethanol	Much of the properties are still being tested and evaluated	Preliminary results suggest possible application in all aspects of paper uses.
Biopulping	Involves the use of white fungus K14	Increased tear index, low kappa number and other properties are still under investigations	Results suggest possible uses in all aspects of paper

Source: Lwako KOM, Joseph BK, dan Baptist KJ.

Pineapple is one of the tropical fruits that has fiber with antioxidant activity (AA) of 86.7%. AA is a bioactive component found in dietary fiber (Larrauri et al, 1997) so that it can neutralize free radicals (Putra et al, 2013) Pineapple has the ability as a natural activated carbon which acts as an adsorbent to purify

waste cooking oil. To remove impurities and toxic substances in used oil (Putra et al, 2013). With the advance of technology and science, the pineapple pulp can be used as waste cooking oil adsorbent. The composition contained in pineapple is listed in table 2.

Table 2. Content of Pineapple (Source: FatSecret API Platform)

Nutritional information on pineapple fruit per 100 gram	
Fat	0,12 g
Saturated Fat	0,009g
Polyunsaturated Fat	0,042g
Single Saturated Fat	0,014g
Cholesterol	0 g
Protein	0,54 g
Carbohydrate	12,63 g
Fiber	1,4g
Sugar	9,26g

2. RESEARCH METHODOLOGY

A. Case Study

The problem of waste cooking oil usually found in both households and industries that use cooking oil as the process of making a product. Waste cooking oil disposed without treatment so that can cause of environment problem (waste) and cause cost inefficiency. This problem is the basis of this study to be able to reduce environmental waste and improve the cost efficiency for housewives and industry players.

B. Materials and Tools

The materials and tools used to make Tasmimopanas: modified paper using waste pineapple are chemical electric stove with

magnetic stirrer, oven, Chemical measuring cup, beaker glass, blender, Traditional screen printing, sodium sulfite, waste of cooking oil, aquades, strach flour, rice straw, waste ofpineapple.

C. Made Straw Paper Pulp

In this step, 50 grams of rice straw cut into small pieces with a size of approximately 1 cm (Figure 1), Then, 4 gram of sodium sulfite prepared in beaker glass with water. And, rice straw put in beaker glass where sodium solvent had prepared. They were heated by chemical electric stove with magnetic stirrer for an hour at temperature 160⁰C (Figure 2). After that, rice straw washed with aquades (Figure 3) before blent rice straw mechanically by blender. Then, Rice straw was refined by blender (Figure 1).



Figure 1. refine rice straw with a blender

D. Made Natural Active Carbon

Natural Active Carbon from Waste of Pineapple was madeby followed this step (Figure 6):

- Drying: 0,5 kg waste of pineapple had washed before oven dried with temperature 160⁰C for 60 minutes to form carbon or dried.
- Refining: The carbon-shaped from waste of pineapple refined by blender

until it was become powder (Figure 2).

E. ModifiedPulp Paper

On this step, straw paper pulp and powder-shaped natural active carbon from waste of pineapple was modified by blender after strach flour had put with ratio 1:1. After they mixed it, the pulp molded by Traditional screen printing.

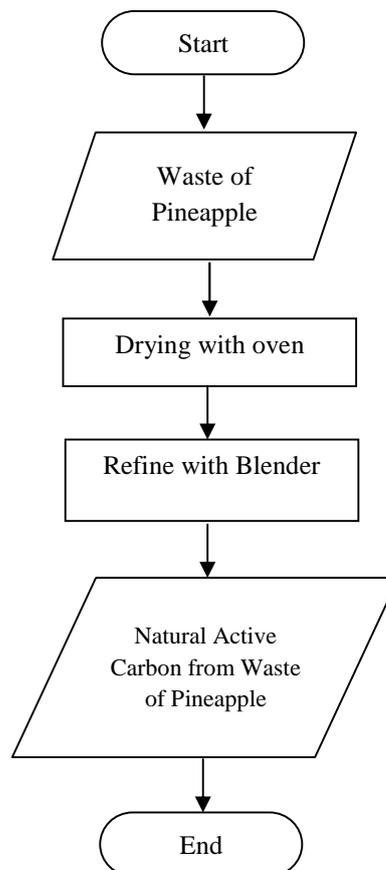


Figure 2. Natural Active Carbon making process

3. RESULT AND DISCUSSION

This study had result natural activated carbon from waste of pineapple. We used waste of pineapple because it potentially. The pineapple was contained antioxidant activity (AA) of 86.7% and 12,36 gram carbohydrate. Which the result of Powder-shaped Natural ActiveCarbon from waste of pineapple (Figure

3). The Chemical method with Sodium Sulfite (Na_2SO_3) used for modified paper which this method was reduce leveled of lignin in rice straw and sulfite method used for special purposed. This method did rice straw put in beaker glass where sodium solvent had prepared. They were heated by chemical electric stove with magnetic stirter for an hour.



Figure 3. Powder-shaped Natural ActiveCarbon from waste of pineapple



Figure 4. The Pulp molds by Traditional screen printing

So that, this method has affected for pulp of tasmimopanas: modified paper used waste of pineapple produced (Figure 4). If the heating process has been carried out, Rice straw washed with aquades. Then, rice straw refined mechanically before it was molded by traditional screen printing (Figure 9). After that, the waste cooking oil filtered used with tasmimopanas. The result obtained was deficient, because the leveled permeability and thickness of paper was deficient that needed considerable time. But, the the waste cooking oil filtered has result changed dark color be more brighter. And the quality and hygiene testing shall do it for next study

4. CONCLUSION

The result of this study is being deficient because the level of permeability and thickness of paper. It is cased time consuming for filtering process. However, the waste cooking oil filtered by this modified paper show the change on color. The dark cark color has been more brighter. The quality and hygiene testing will be conducted on next study.

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