Making recycling paper from raw waste

 \sim Recycle raw waste and make material-cycle society \sim

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Abstract This study aims to make raw waste more useful. Therefore, we've decided to make paper from raw waste such as vegetables and fruit familiar to Japanese like cabbage and persimmon. The result was that the paper we made was all good in quality, furthermore the paper made with tea leaves was the best in quality. There are, however, still many problems with the texture and the strength. So we will continue making better paper from raw waste.

Background and Aim of research	Experiment 2 < Evaluation>	C. Smell					
Research background	A. Roughness of surface	<u>1</u> .	<u>1. Sensory survey</u>				
the current problems of raw waste	Method		Sample paper	2	3	5	6
 (1)Shortage of landfill. (2)Soil and water pollution. 	We put the paper on the machine, measure the surface	S	nell Smell remains	No effect	Reduced a little	Reduced a lot	Reduced a lot
3 Decreasing combustion efficiency in incinerators.	roughness of them 3 times, and showed the average value on the graphs. The wave form shows the humpy of the paper						

nature of the raw waste

1) The proportion of water in raw waste is very high. (2) Various states and kinds of waste are collected and it's difficult to make use of them as resources. (3) It smells unpleasant.

recycling the raw waste

(1) We can expect big improvement of shortage of landfill. (2) The amount of CO2 will decrease in burning waste and we can save fuel.

What are these made into?

Our idea is that we make recycling paper from raw waste . The reason is that paper is made of wood's dietary fiber and we think raw waste may have a lot of dietary fiber available to making paper.

\Rightarrow Purpose of this study

To find the way to recycle raw waste as material of paper.

<Making sample> **Experiment 1**

Material of paper (Amount of insolube dietary fiber/100g)

cohear drugd porsing kiwi purple wheat poor

Roughness (wave forms) 2. Roughness (Graph)







2. Consideration

When we add tea leaves and percarbonate to the paper, we can reduce the raw garbage smell a lot. Therefore, we think that tea husk and sodium percarbonate is valid material for reducing bad smell.

Conclusions

The paper added used tea leaves were stronger than other paper. Reason : The amount of insoluble dietary fiber in it was much larger than other materials.

 \rightarrow The insoluble dietary fiber made the paper stronger.

The paper sodium percarbonate is added into showed good results in tensile strength.

The amount of sodium percarbonate(5g or 2g)

- 5g shows good effect in penetration strength. (sheet5)
- 2g shows good effect in smoothness of surface. (sheet6)

Surface roughness will improve by changing the way to make paper and tools.

When we alkalize raw waste, paper which have less insoluble dietary fiber can't bear. And they come apart when they dried.

Papers we made



e	radish	on	KIWI	sweet poteto	wneat	pear	fruit	husk	
1.4	17.1	12.7	1.5~3.0	3.1	3.6	0.7	2.3~4.0	43.5	

How to make Sample paper

- 1. Crash each 10g materials in the list above with 100g water by blender for 3 minutes.
- Pour 1 into paper-making tool and dry by dryer for 10 minutes. Then put them on a place with lots of sunlight well-ventilated for several days.



Sample sheet

 Rough and smells unpleasant. It is too soft to make fold line.

• It is thicker than the usual paper

Hypothesis : By adding things into the paper will its smell be reduced?

Sheet 1 : 20g of kitchen bleach. Sheet 2 : charcoal.

Hypothesis : Will the condition of dietary fiber have something to do with the strength?

Sheet 4 : 5g of sodium percarbonate and simmer for 20 minutes.

3. Consideration

Sheet3 has the least uneven surface. **Sheet5** and **sheet6** have uneven surface, because sodium percarbonate derived much fiver.

B. Thickness • Penetration Strength • Tensile Strength

Method

[Thickness] Use a micrometer. [Penetration strength] Penetrate the fixed paper and Measure. [Tensile strength] Set the paper on a hanging scale, add a weight and measure how much weight tear the paper. XWe measured twice and graphed the average.



Penetration Strength (Kg)





Sheet6

trees.

《References**》**

organization.

Basic paper



Future work

Acknowledgments • References

On this reserch, we have to thank Mr. Kirimura, the professor of

Classification and charactalistic of dietry fiber | Otuska Pharmaceutical

[The comparison between tea versus vegetables in terms of nutritional components]

Sachiko. Nomura Manami. Mononobe Takayoshi. Matsuo

The department of the fruits tree industry in the national agriculture and food research

faculty of agriculture at Univ. Miyazaki, Foodaly in Kirishima, the

distribution center of shredded radish, the fruits and vegetables

https://www.otsuka.co.jp/health-and-illness/fiber/about/type/

From now on, firstly, we want to make paper with other wastes, such as plant roots which are disposed as industrial waste expect for raw waste. Secondly, in terms of paper color, we will have to decolorize by higher alkaline concentration.

Thus, better paper will be made and the cycle, making paper from raw waste will be established. Eventually, we want to prevent you from cutting

dealer of Mr. Sono and Inc. SunA.



1. Comparison in the graph **2.** Consideration

[Thickness] The sample sheet was the thinnest.

> [Penetration strength] There was not the big difference.

[Tensile strength]



XSupplement In **Sheet 1**, the material did not harden and dried in pieces, therefore it did not become paper.

Sheet 4 did not become paper when dried because of a lot of contained water.

<u>Sheet 5</u> : 5g of sodium percarbonate to 10g tea leaves. Then boil for 20 minutes. **Sheet 6**: Change the amount of sodium percarbonate to 2g and make it in step Sheet

