Making Fertilizer from Aquatic Waste to Promote a Regional Circular Model

1. Introduction

·Proposing the way to process and utilize aquatic waste easily for everyone.
·Aiming for creating regional circular model towards sustainable society.

2. Social Problems

How can we utilize aquatic wastes?

Methodology

Conducted an interview to fishing ports and companies processing aquatic waste

Results

Waste from fishing ports: Kushiro 150t、Yaizu 500t
Amount collected by companies: Varies by seasons、relying on overseas imports
Wastes collected domestically are used as feed

Limitations

・Cost too much → Support is needed
・Stable collection of waste is desirable

3. Hypothesis

Fertilizer made from fish scales or crab shells can accelerate growth of plants.

4. The Effects of Aquatic Waste on Plants

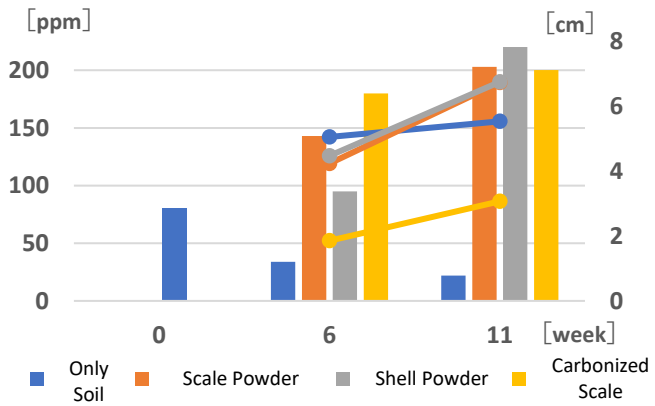
Methodology

① Powder or carbonize aquatic waste collected
② Mix them into soil as fertilizer and grow KOMATSUNA
③ Monitor changes in soil acidity and nitrate ion concentration
④ Measure diameter of grown leaves from the 4th week

Result① Transition of pH and Nitrate Ion Concentration in Soils

▼No significant difference on pH of soils.

▼The concentration of nitrate ion decreased in the pot with only soil over time, while it increased up to about 200ppm in every pots with fertilizer.

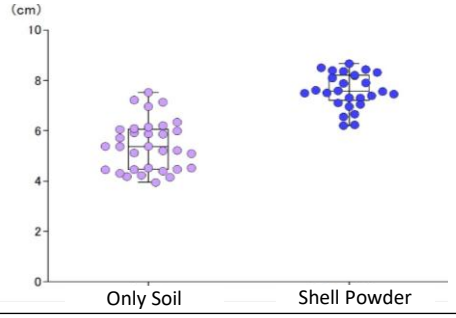


Result② The Diameter of Leaves

▼KOMATSUNA grown in soil with crab-shell powder rapidly grew, overtaking the growth of KOMATSUNA grown in only soil by week 11.

【Growth progress in Week11】
Left: Only soil
Right: With shell powder

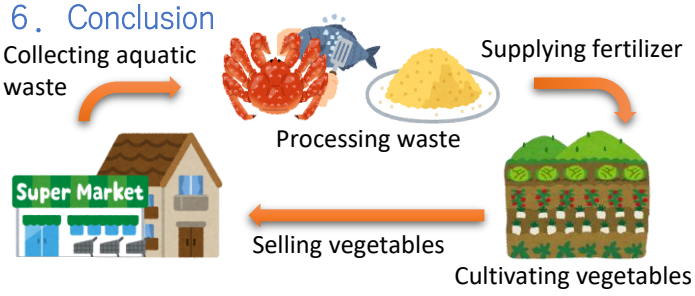
▼The results of the Mann-Whitney U test showed significant difference in the growth of KOMATSUNA grown in only soil compared to those in soil containing crab-shell powder during the 11th week ($P=1.98^{E-13}$、$\alpha=5\%$)



5. Discussion

▼Fish scales and Crab shells are effective at increasing nitrate ions concentrations in soil.
▼Large amounts of nitrate ions were also detected in soil containing carbonized scales, suggesting that only the surface was carbonized while proteins remained intact inside.
▼Carbonized scales may inhibit the absorption of nitrate ions by plants and suppress growth, making them unsuitable for use as fertilizer.

6. Conclusion



If local governments participate in collection and distribution, more effective resource utilization can be expected.

7. References

1) 西條ら(2014).「魚のうろこの成分と活用法」 https://jonan-hs.tokushima-ec.ed.jp/file/2391. 2026年1月23日.

2) Basim A and Roaa E. (2019). **EFECT OF ADDING FISH SCALES IN AGRICULTUAL SOILS AND SOME CHARACTERISTICS OF VIGNA RADIATA L** *Plant Archives*, 19, 1041-1043.

Alternative Cushioning Material for Logistics

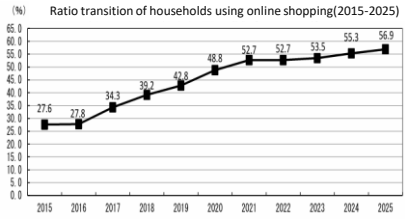
Kei Sato, Yuma Takeuchi, Atushi Ino, Keisuke Nakamura

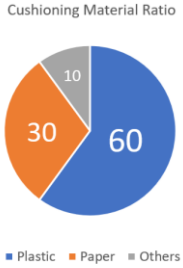
1 - 1 .Background

- Utilization rate of online shopping is increasing.
- Consumption of plastic waste is increasing as well.

⇒**It causes a lot of plastic wastes.**

⇒**Harms the environment.**





- Therefore, **we made some completely new cushioning materials made with paper**.
- We first used friction caused by paper to fix the content.(produced when books' pages are stacked to each other.)

1 - 2 .Cushioning Materials

Original Ones

Name: **HPKKPK**
Description: A cushioning material that its structure is almost the same as two books combined to each other.

Name: **KKPK**
Description: Almost same as the HPKKPK but paper is folded in a zigzag pattern.

No image

Name: **UKPK**
Description: Almost same as the KKPK but applied the structure of belt to fix the content.

Name: **ATKP**
Description: Smaller version of the UKPK.

Current Ones

Name: **bubble wrap**
Description: A plastic cushioning material that contains air inside every bubble.

Name: **air pillows**
Description: A plastic cushioning material that looks like a pillow. It also has air inside it.

Name: **crumpled paper**
description: A cushioning material made with crumpled paper.

※Paper cushioning materials are made with 20 pieces of paper.

2-1.Experiment①

Drop Experiment

1. Activate smartphone's acceleration sensor and put it inside of a cardboard box with each cushioning material.
2. Drop the box 5 times.
3. Compare the average of impact force.

2-2.Experiment②

Vibration Experiment

1. Activate smartphone's acceleration sensor and put it inside of a cardboard box with each cushioning material.
2. Vibrate the box with a massage machine for about 30 seconds. (repeat 5 times)
3. Compare the average of vibration force.

3. Results

- Best impact force resistance :**HPKKPK**
- Best vibration force resistance :**ATKP**
- Original cushioning materials showed about the same or greater resistance comparing to the current materials.

⇒**They can be an alternative!**

Drop Experiment

	Records [m/s²]
HPKKPK	**89.388**
KKPK	150.227
ATKP	154.863

original ones

	Records [m/s²]
Crumpled paper	209.627
Bubble wrap	183.479
Air pillow	**134.516**

current ones

Vibration Experiment

	Records [m/s²]
HPKKPK	3.999
KKPK	4.222
ATKP	**2.659**

original ones

	Records [m/s²]
Crumpled paper	4.426
Bubble wrap	**4.174**
Air pillow	6.155

current ones

4. Future Research

- Change the box size.
- Compare the **cost** of cushioning materials.

Reference

Nakamura, S. (n.d.).Kami no shurui・maisuu ni yoru masaturyoku no hennka [Changes in frictional force due to paper type and number of sheets.]

Investigating the Usefulness of Potato Toxins

1.Introduction

As concerns about the safety of chemical pesticides

↓

the use of natural agents is gaining attention

↓

the repellent effect of solanine was examined.
(solanine is a potato toxin)

2-1. Hypothesis

Insects tend to avoid solanine.

3-2. Verification by Increasing the Concentration

Materials

Potato sprouts, pure water, banana, cups

Method

①About 10 mL of pure water was added to 5 g of finely crushed potato sprouts using a mortar, and the mixture was filtered.
②About 5 g of banana pieces were placed in two paper cups. Pure water was added to one cup, and 3 mL of Solution ① was added to the other.
③Ants were placed in each cups and their reactions was observed after 5 and 10 minutes.
④After 15 minutes, the ants were removed from the cup and their reaction was observed.

Results

	5 m	10 m	15m
Pure water	Moved	Moved	Moved well
Solanine solution	Hard to move	Didn't move	Hard to move

The insect-repellent effect of the solanine solution was observed, but its effect as an insecticide was weak.
⇨It was considered that increasing the concentration might produce a stronger effect than mere repellency.

3-1. Hypothesis

If the concentration of solanine is increased, its insect-repellent effect will also increase.

2-2. Repellent Effect of Solanine

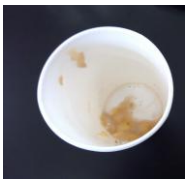
Materials

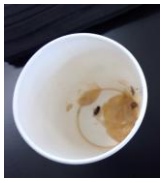
Potato sprouts, pure water, petri dishes

Method

①finely crush 10g of potato sprouts with a pestle, add about 10mL of pure water,and filter the mixture
②-1. put 5g of banana piece into a paper cup and add 3mL of pure water
②-2. put 5g of banana piece into another paper cup and add 3mL of the solution of ①
③place the paper cups outdoors for 30 minutes and observe the differences in the number of insects attracted were observed

Results





Pure water	Solanine solution
No insects came to the cup	They gradually stopped moving

its effect as an insecticide was weak.
⇨The observation was too short and the experiment was conducted in winter, so there were few insects outdoors

4. Conclusion

The solanine solution has an insect-repellent effect
⇨It may possibly be used as an insecticide.
Correct results couldn't be obtained even when the concentration of solanine was increased.
⇨Conduct experiments over a longer period of time, or conduct them under conditions in which insects can be observed for a longer time.
Examine practical methods, such as spraying the solution directly onto insects.

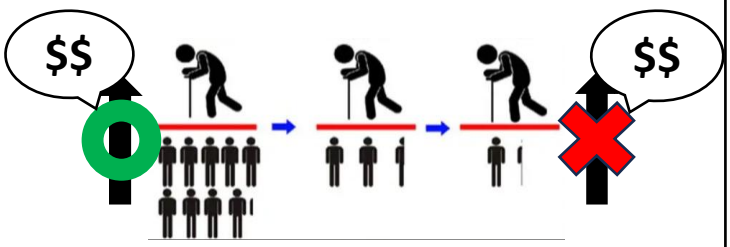
5. References

1）土壌微生物と物質循環：1.物質循環に起因した農業・環境問題と土壌微生物
2）ソラニンへの忌避効果および環境への負荷の検証

Use of Artificial Intelligence to Increase Wealth

1－1． Introduction

Problem Pension benefits will decrease in the future. Securing money before our retirement years is necessary.



We explored ways that allow everyone to start investing and focused on artificial intelligence

1－2． Our Question

Can AI predict stock prices?

2． Research Methods

- Microsoft
- Mitsubishi UFJ Financial Group
- NVIDIA
- TSMC
- Tokyo Electron

Method①

ChatGPT and Copilot predicted the stock prices three months ahead

Method②

ChatGPT and Copilot predicted the stock prices one week ahead every week

We recorded the stock prices every day and checked how close the predictions were

Results of ①

Rank	Name	%
1	Microsoft	2.4%
2	Tokyo Electron	2.5%
3	Mitsubishi UFJ	5.9%
4	TSMC	13.9%
5	NVIDIA	15.6%

[redacted]

Results of ②

Rank	Company	%
1	Mitsubishi UFJ	1.5%
2	NVIDIA	2.1%
3	Microsoft	2.7%
4	TSMC	3.6%

4． Discussion

① : The results were divided into precise and imprecise groups
NVIDIA and TSMC： Stock prices change frequently
Microsoft, Mitsubishi UFJ, Tokyo Electron : Stock prices are relatively stable

→**AI's long term stock predictions are more likely to be correct for companies that have stable stock prices**

② : All companies had predictions that were very close to the actual values.

→**short term predictions are more likely to be accurate than longer ones** (less movement)

5． Conclusion

- AI was able to predict the stock prices of relatively stable companies, regardless of the prediction length
- AI performed better at short-term predictions

We should use AI only as a reference

6. Future Research

- Longer predictions (6 months, 1 year, etc.)

Crayons Made from Vegetables

1. Introduction

Conventional crayons cannot decompose.
➡ Make biodegradable crayons by using vegetables.

The research in Kyushu University showed crayons can be made from vegetables.
➡ **How about inedible parts ?**

2. Purpose

To make biodegradable crayons from inedible parts of vegetables.We named this “frayon”.

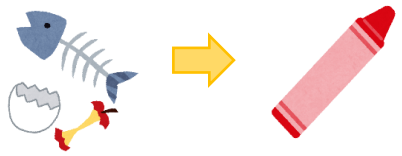


Figure 2

3. Material and method

①Dry vegetables and grind into powder.
②Liquefy beeswax and add rice oil and vegetable powder.
③Mix them together in a bowl.
④Pour the mixture into mold and make it harden.
⑤Test how we can draw pictures by this frayon.

4. Experiment 1

We made crayons by using peels of potatoes based on previous research.

〈Material〉

Beeswax	3.5g
Rice oil	1.5g
Potato powder	Teaspoon 1

〈Results〉

Poor color developmented.
Crayons fell apart.
The texture was rough.

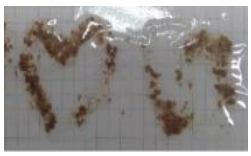


Figure 2

〈Consideration〉

Powders were too rough and oil was not enough.

Experiment 2

From the perspectives of color intensity and evenness, we investigated the proper amounts of beeswax and oil using paprika powders.

〈Material〉

Beeswax
Oil
Paprika powder Teaspoon 1

〈Results〉

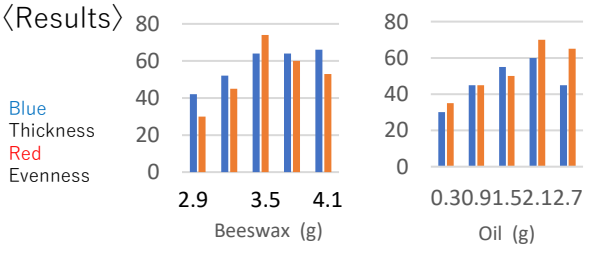


Figure 3 Figure 4

〈Consideration〉

The proper amounts were 3.5g of beeswax and 2.1g of oil.

Experiment 3

We made crayons by using vegetable peels.
The powder was finely refined after receiving the results of experiment 1.
Using the best amount of beeswax and rice oil examined in experiment 2.

〈Material〉

Beeswax	3.5g
Rice oil	2.1g
Food powder（carrot、lettuce）	Teaspoon 1

〈Result〉

Figure 5

Figure 6

〈Consideration〉

By finely refining the powder and changing the amount of beeswax and rice oil, we made a crayon that can draw smoothly.
The color quality varies depending on the vegetable.

Experiment 4

We confirmed that the crayons we made by experiment 2 decomposed in the soil.

〈Material〉

soil, crayon

〈Result〉

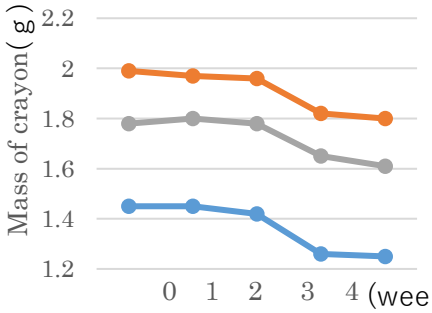


Figure 7

〈Consideration〉

Because the mass and quantity of crayons have decreased, the crayons were decomposed by the soil.

5. Conclusion

・The best amount for making crayons was 3.5g of beeswax, 2.1g of rice oil.
・Quality of crayons depend on ease of drying and grinding.
・From now on, we would like to do more research to increase the color variation in crayons.

6. Reference

九州大学農業研究活動団体　QSIP
mizuiro.inc　We tried making crayons from vegetables.
https://shop.mizuiroinc.com

The Effect of Food Stickiness on Pancake Volume

Yuki Kato

Introduction

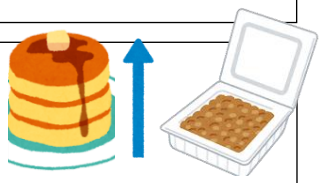
There are many people in the world who have a limit due to allergies or religious reasons.

↓

We aim to create fluffy pancakes by using sticky substances delivered from natural foods so that everyone can eat.

Experiment①

Add sticky substances of natto



Hypothesis

By adding the sticky substances of natto, the natto pancakes have more air bubbles than normal ones. Therefore, the natto pancakes will become fluffier and higher than normal ones.

Material and Method

Material (one pancake)

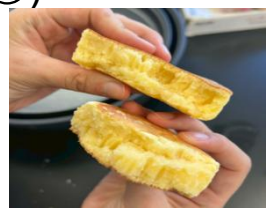
- Milk : 2.5g
- Cake flour : 25g
- Sugar : 15g
- Egg white : 1
- Egg yolk : 0.5
- ＊Natto : 1 pack

Method

1. Put egg yolk and 7.5g of sugar into a bowl.
2. Put natto and milk into a beaker and mix them. Remove the natto beans and make 25g of natto milk.
3. Add flour, the egg yolk mix, and the natto milk, then mix well.
4. Add sugar (2.5g×3 times) to the egg whites and make meringue.
5. Mix step 3 and 4, and it bake on a hot plate.
6. Finally, measure the height of the souffle pancake with a ruler.

Results (Experiment①)

normal



natto

(cm)	1	2	3	4	5
Normal	1.5	1.5	2.1	2.3	2.6
Natto	1.2	1.5	1.9	2.8	2.6

The natto souffle pancake had a denser and a heavier texture. In terms of height, there was no clear difference between normal pancakes and natto pancakes.

For these reasons, the sticky substances of natto doesn't work well with meringue.

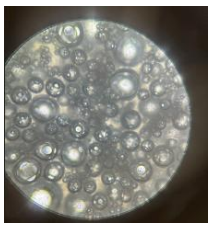
↓

To compare thickness more fairly, we focused on observing the air bubbles.

Experiment②

Microscopic observation

Meringue



Natto meringue

The air bubbles in the natto meringue were covered with membranes.

We think that these membrane may have restrained the expansion of the bubbles, so the natto pancake could have been limited the rise of it.

Experiment③

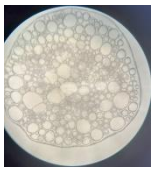
Add three other sticky foods

Japanese yam **Nameko mushroom** **Okura**

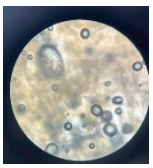
Nagaimo→Grated and mixed with milk

Nameko mushroom and Okura→Minced and mixed with milk

Results (Experiment③)



Nagaimo



Nameko mushroom

Okura

Nagaimo→Many air bubbles, similar to normal meringue

Nameko mushroom→Few air bubbles and a thick texture

Okura→Large air bubbles scattered

Because the air bubble conditions of nagaimo and okra are similar to those of normal meringue, we consider they make pancakes fluffier and higher.

Conclusion and Future Prospects

Adding the sticky substances of natto doesn't necessarily increase the rise of souffle pancakes.

Due to time limitations, we couldn't make souffle pancakes with nagaimo, nameko, and okra, which will be addressed in the future research.

In addition, we couldn't evaluate the taste in this experiment, so we would like to study both the rise and flavor in the future.

Reference

- How to use sticky substances to make pancakes rise
- The relationships between pancake volume and sticky substances

The Influence of Earthquake-Resistant Foundation Structures

1 .Introduction

Earthquake safety measures
・earthquake-resistant structure
・vibration-controlled structure
・seismic isolation structure

Use **seismic isolation structure** to reduce shaking of furniture

2 .Reproduction experiment

Reproduce seismic isolation structure(laminated rubber) to experiment with seismic isolation devices.

＜Method＞

①stack stainless steel plate and natural rubber in layer

②attach a cup on ① and put a weight inside it

③shake ② back and forth by hand for 1.5 seconds at a width of 30cm

＜Hypothesis＞

The cup would be seismically isolated.

＜Result＞

The cup wasn't seismically isolated, but the shaking of the weight is reduced.

3 .Experiment method

Why is the shaking of the weight reduced?

＜Method＞

①prepare six types of devices with a thickness of 2cm

②attach cups on the devices and put paper and weights inside them.

③shake ② like reproduction experiment and compare the start of the weight shaking.

Ⅰ.Installation surface area

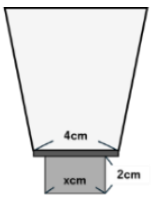
Does a smaller area result in less shaking?(compare A, B, C and D)

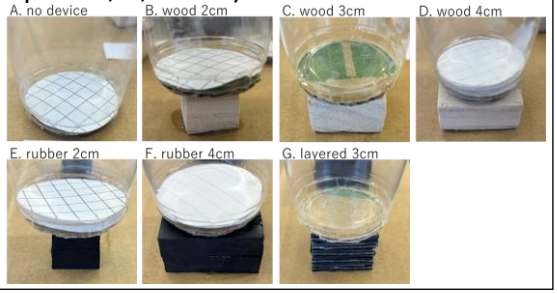
Ⅱ.Device material

Does the rubber reduce shaking?(compare A, B, D, E, and F)

Ⅲ.Layered structure

Does the layer structure of rubber and acrylic, attached with double-sided tape, reduce shaking?(compare A, C, and G)

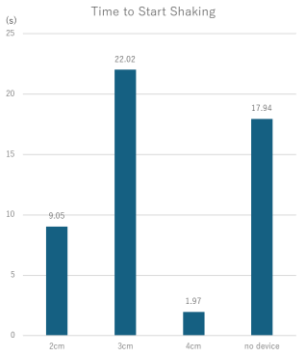




4 .Result

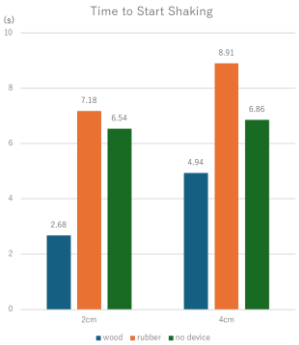
Ⅰ. Installation surface area

3cm is the best.



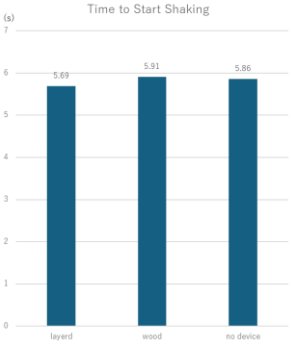
Ⅱ.Device material

Rubber is the best.



Ⅲ.Layered structure

No difference is seen.



5 .Discussion and Conclusion

・Shake the device by hand⇒human factors

Ⅰ. No relationship between installation surface area and shaking

Ⅱ. Rubber influence the extent of shaking ⇒elastic force reduces shaking

Ⅲ. Attach in layer with double-sided tape⇒increased adhesive strength and no influence

⇒Device material is one of the factors

6 .Future Research

Other factors

・How to remove human factors

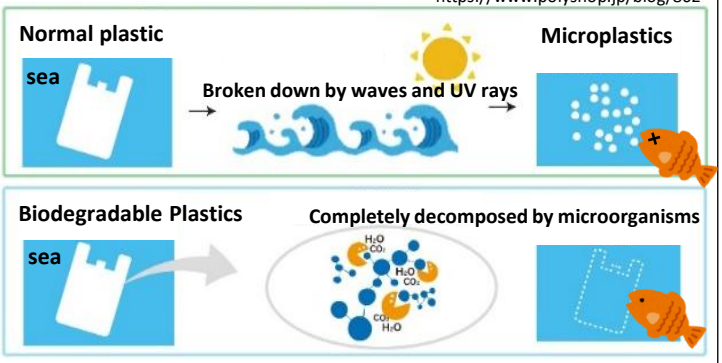
・Mass ration of device to the weight

・Individual differences when creating the devices

Properties of Biodegradable Plastics

1－1. Introduction What is Biodegradable plastic？

https://www.polyshop.jp/blog/862



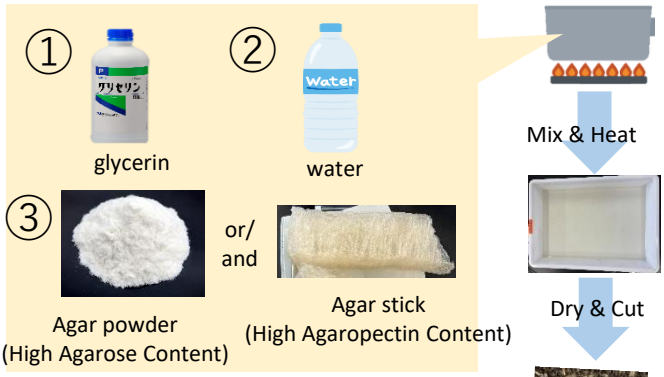
We aim to create biodegradable plastic that is strong and decomposes easily.

1－2. Hypothesis

Depending on the Agarose and Agaropectin content

①Decomposition speed differs ②Strength differs

2. Method（Making Biodegradable Plastics）



A：Agar Powder **B**：Agar Stick
C：Agar Powder + Agar Stick

3－1. Result 1 Decomposition Speed

- Bury the plastic in sterilized and unsterilized soil.
- Compared the mass changes for 7 weeks.

Mass Change(g) = **Mass Change in Unsterilized Soil (with microorganisms)(g)** − **Mass Change in Sterilized Soil (no microorganisms)(g)**

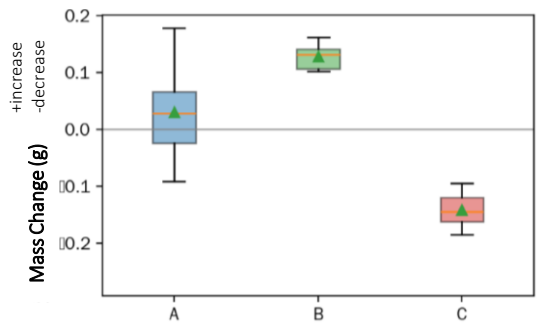


Figure 1 Mass Change by Composition (Week 7)

n=6, 6, 6, p=0.00146, Kruskal Wallis Test

Sample C is significantly more biodegradable.

3－2. Result 2 Strength Comparison

- Fix the plastic between two plates and hung a 2kg weight
- Measured the time until it breaks

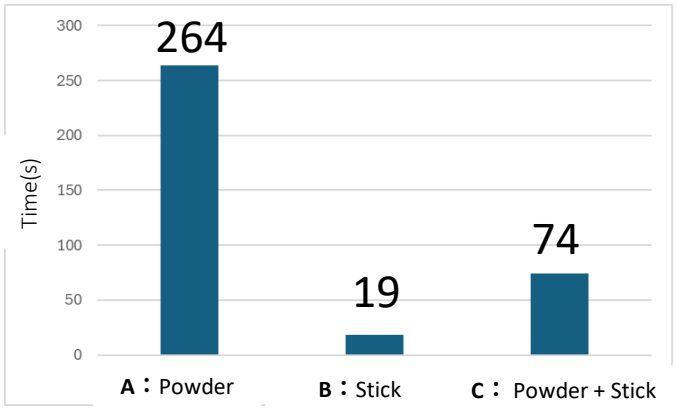


Figure 2 Comparison of Time to Break

n=4, 4, 4

Sample A is the strongest.

4. Conclusion and Discussion

	A:agar powder	B:agar stick	C:agar powder +agar stick
decomposition	slow	slow	fast
strength	high	low	low

- Mixed agar (powder + strip) decomposes the fastest.
- Agar powdered is the strongest.

We can choose the best agar mixture depending on the purpose

5. Future Research

- Longer observation until the plastic disappears completely
- Test how quickly it breaks down in seawater and freshwater

6. References

Studies on the Utilization of Agar (Part 7): Hydrolysis Rates of Agarose and Agaropectin
https://www.jstage.jst.go.jp/article/nogeikagaku1924/43/9/43_9_621/_pdf/-char/ja

Separation of Agarose and Agaropectin from Agar
https://www.jstage.jst.go.jp/article/nskkk1962/17/12/17_12_575/_pdf/-char/en

Studies on Biodegradable Plastics (Part 2)
https://www.tsukuba.ac.jp/community/students-kagakunome/shyo-list/pdf/2012/jrhigh/3.pdf

Recipe for Agar Bioplastics - Living Station

The Causal Relationship between Basketball Stats and Growth

[redacted]

1. Introduction

〈Issues〉

Players' Ability Calculation Formula

・EFF (Efficiency)

→ cannot predict player's growth

・PER (Player Efficiency Rating)

→ difficult to utilize in high school

〈Goal〉

Create a formula to predict growth based on first-year players' stats

2. Experiment

〈Source of the Data〉

Stats for players who participated in the "B.LEAGUE U18 REGIONAL LEAGUE 2021~2024" for three consecutive years during their first and third years

〈Experimental Procedure〉

①：Conduct a survey of top domestic basketball schools to predict growth-related stats

②：Determine a formula for calculating players' abilities suitable for high school basketball

③：Investigate the correlation between the statistical values predicted in ① and growth: the difference between the players' abilities calculated in ② for the third year and the first year.

3. Experimental Results

①Survey Results

High	PTS (Points)
↑	Height (in players' first year)
Importance	TOT (Total Rebounds)
	TO (Turnover)
↓	AS (Assists)
Low	ST (Steals)

②Determined Formula

(players' abilities) =
(PTS) + 0.379 * (AS) + 1.3 * (BLK) + 2.3 * (ST) + 1.2 * (oREB) + 0.891 * (dREB) - 1.6 * (TO) - 0.884 * (2Pmiss) - 0.774 * (3Pmiss) - 0.7 * (FTmiss)

※Each coefficient represents the PTS conversion value of the stats.

③Correlation

Correlation with first-year statistics

stats	correlation coefficient	P-value
PTS	0.391	0.225
Height	0.737	0.001
TOT	-0.059	0.886
TO	-0.183	0.795
AS	0.941	0.122
ST	0.514	0.618

4. Analysis

〈P-value < 0.05, Significant Stats〉

・There is a strong positive correlation between height in the first year and growth

→Stats that tall players tend to excel at are important

〈Non-Significant Stats〉

・The correlation coefficient for AS is extremely high
・The P-value for AS is not too large
・The AS coefficient in the formula we determined is small.

→AS is highly likely to affect growth

No significant results were obtained for the other statistics

5. Conclusion

・It was found that players who were taller in their first year tend to grow more over the three-year period.

・It was also anticipated that players with higher AS in their first year tend to show greater growth.

・No significant correlations were observed with other stats.

・In the future, I would like to conduct analyses using position-specific ability calculation formulas for each player.

6. References

"Explanation and Issues with the Player Efficiency Rating (EFF), and the Player Efficiency Ratio (PER) as a Complement", Last accessed: Feb 15, 2026, <https://www.tmotarena.com/column/column_200925.html>

B.LEAGUE Official Website, Last accessed: Feb 15, 2026, <https://www.bleague.jp/u18/>

The Effect of Towel Material on Bacterial Growth

1－1．Introduction

Towels are used every day to wash hands and faces or to wipe sweat. Even if they look clean, bacteria can grow on them. I started this research to find materials that keep towels cleaner and help our lives more healthily.

1－2．Hypothesis

Cotton → absorbs water easily, so bacteria grow easily
Polyester → dries quickly, so bacteria do not grow easily

2．Experiment 1　Towel Material and Bacteria Growth

Materials

・Towels
A･･･100％cotton
B･･･70％cotton/30％polyester
C･･･100％polyester
・Bacteria･･･dirty water（about 1g of dust, sand and dead skin cells mixed in 10ml of water)

Method

1.Prepare pure water and dirty water for a control experiment.

2.Put 60$\mu\ell$ on each towel.

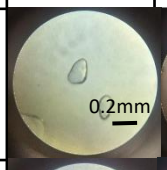
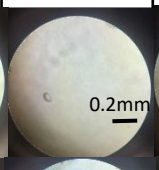
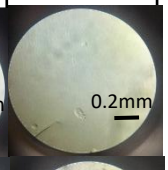
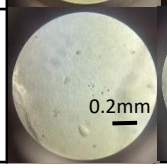
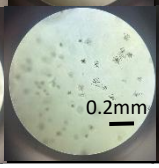
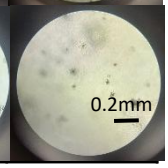
3.Cover them and leave at 25℃ for 1 day.

4.Spread the towel on agar plates.

5.Cover them and leave at 25℃ for 3 weeks.

6.Observe how the bacteria spread.

Results

	A cotton	B Cotton polyester	C polyester
Pure water			
Dirty water			

In dirty water, samples B and C with polyester show more bacteria than A.

To check if factors other than the materials affected the results, we also studied the waving structure.

3．Experiment2　Bacteria growth on polyester

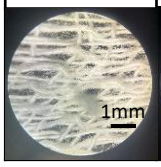
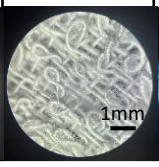
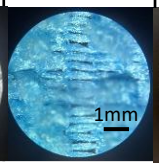
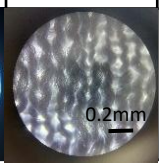
Materials

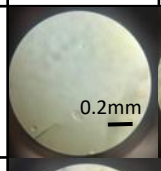
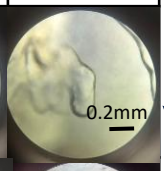
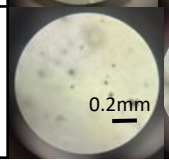
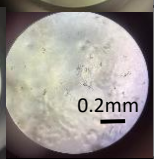
・towels : samples A, B, C from Experiment 1 and D (the same as C but different waving structure)
・Bacteria (the same as Experiment 1)
・Microscope

Method

Observe each fiber under a microscope, then compare bacteria growth on samples C and D with different waving structures.

Results

A cotton	B Cotton polyester	C polyester	D polyester
			

	C polyester	D polyester
Pure water		
Dirty water		

C shows more horizontal threads than D.

There was little difference in bacteria growth. →It is not due to fiber weaving.

4．Discussion・Conclusion

Our hypothesis and results were different, so I looked into the reason. According to references, the cotton and polyester used in this experiment have these properties.

	Static electricity	Oil - loving
cotton	×	×
polyester	○	○

Static electricity makes dust and sand stick.

Polyester comes from oil, so it easily attracts oil (dirt).

Towels with polyester may let bacteria from air and skin grow more.

5．Future Work

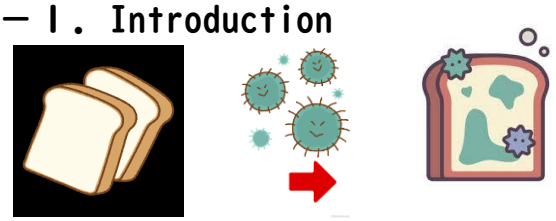
We want to try different ways to count colonies and study with other types of dirt.

6．References

Yoshiki Kitagata　Advantages and disadvantages of cotton and polyester
https://www.uniformnext.com/blog/archives/31904?srsltid=AfmBOoqUK4RprtkaXhmtVLpVx95Y3QHhrQVeBZT09Bwj5ZtaiL9hcWKn
GUNZE　Characteristics of polyester fibers
https://www.gunze.jp/kigocochi/article/1k202305-02/

The Effect of Differences in pH on the Growth Rate of Mold

1－1. Introduction

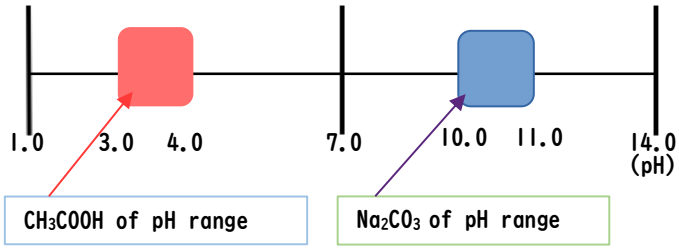


Mold grows easily at 30–40° C, 70–80% humidity, and pH 5.0–6.0. Food left at room temperature becomes inedible due to mold growth. This study investigates whether mold growth can be suppressed to preserve food longer.

1－2. Hypothesis

the effect of pH on mold growth

(Conditions: Temperature 30℃, Humidity 75%)



Mold grows most actively at pH 5.0–6.0. Adjusting pH to acidic or alkaline conditions may suppress mold growth.

2.Materials and Methods

Pancakes were made using acetic acid (acidic), distilled water (neutral), and sodium carbonate (alkaline). They were left at 25° C for one week and observed.

3. Results

Figure 1 Changes in the spread of mold

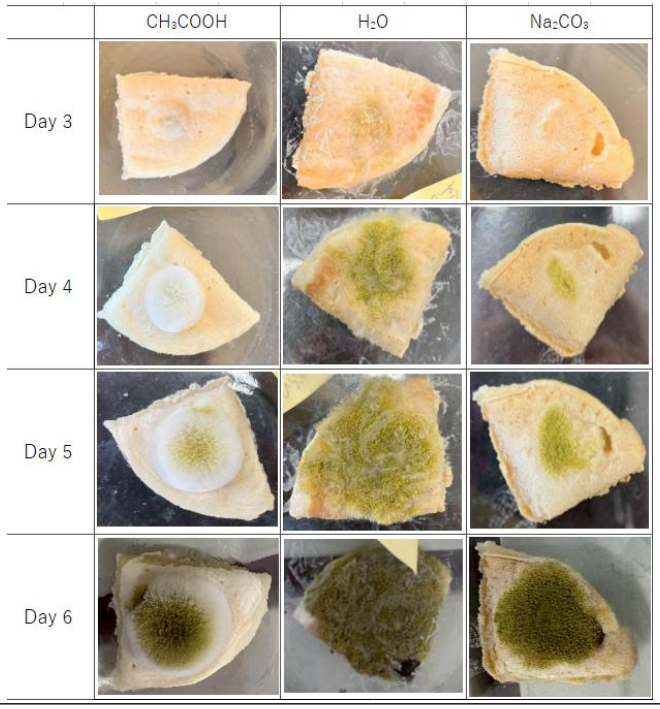


Figure 2 Mold Coverage on Pancake Over time

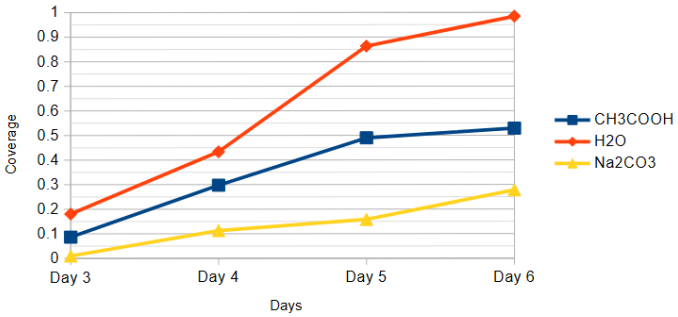
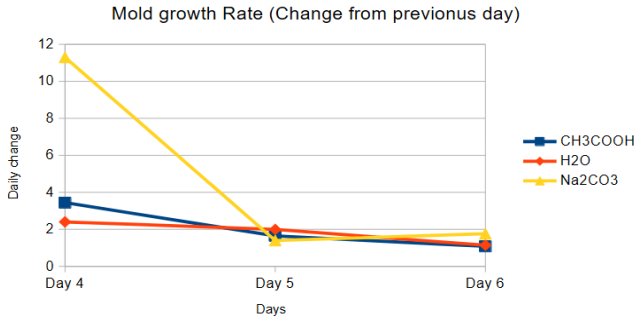


Figure 3



Mold growth varied depending on pH. The fastest growth was observed in pancakes made with distilled water, while growth was slower with acetic acid and slowest with sodium carbonate. Compared with distilled water, mold growth was reduced to about 1/2 with acetic acid and about 1/3 with sodium carbonate. The daily growth rates became similar by days 5 and 6.

4. Discussion

・Mold growth was more effectively suppressed under alkaline conditions than under acidic conditions.
→This suggests that pH strongly influences mold growth.
・This reaction occurs between cellulose and sodium carbonate. And the cellulose changed to alkaline cellulose.
・Suppression was most effective in the early stages.
→Therefore,it is important to take measures early.

6. References

1) S-iki UDAGAWA Shokuhinniokeru ShinnkinnOsenn Food-Borne Fungi and Biodeterioration
2) Hodges SB,Hass CAMaxon LR(1993):Relations of fishand terrapods Nature 363:501-502
3) Fukuokadaigakuhuzokuoohorichuugakukou(2010)saikinnoHP http://www.ohmoriod.jp/preen33.htm