

# Synthesis of biodegradable plastic of Nikawa

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Kobe Municipal High School of Science and Technology

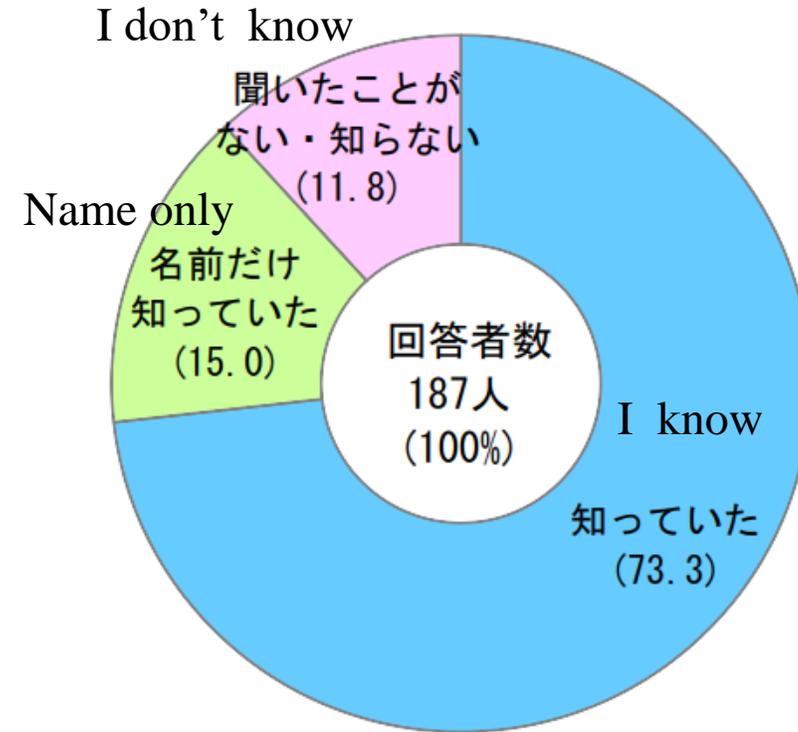
# Introduction

## Agricultural damage in Hyogo

(Unit: thousand yen)

獣種	被害	平成28年度	平成29年度	平成30年度	令和元年度	令和2年度
イノシシ	農業被害	195,130	182,548	220,091	182,903	181,862
シカ	農業被害	122,109	106,073	155,537	118,802	129,262
	林業被害	60,285	69,664	64,743	35,744	20,368
アライグマ	農業被害	58,952	56,604	54,909	49,613	43,226
サル	農業被害	5,761	5,761	4,944	4,170	2,515
その他獣種	農業被害	18,618	18,212	17,044	13,089	22,438
	林業被害	-	-	3,117	3,217	720
鳥類	農業被害	70,061	63,309	58,854	84,984	65,474
農業被害計		470,631	432,507	511,379	453,561	<b>444,777</b>

## Awareness of gibier

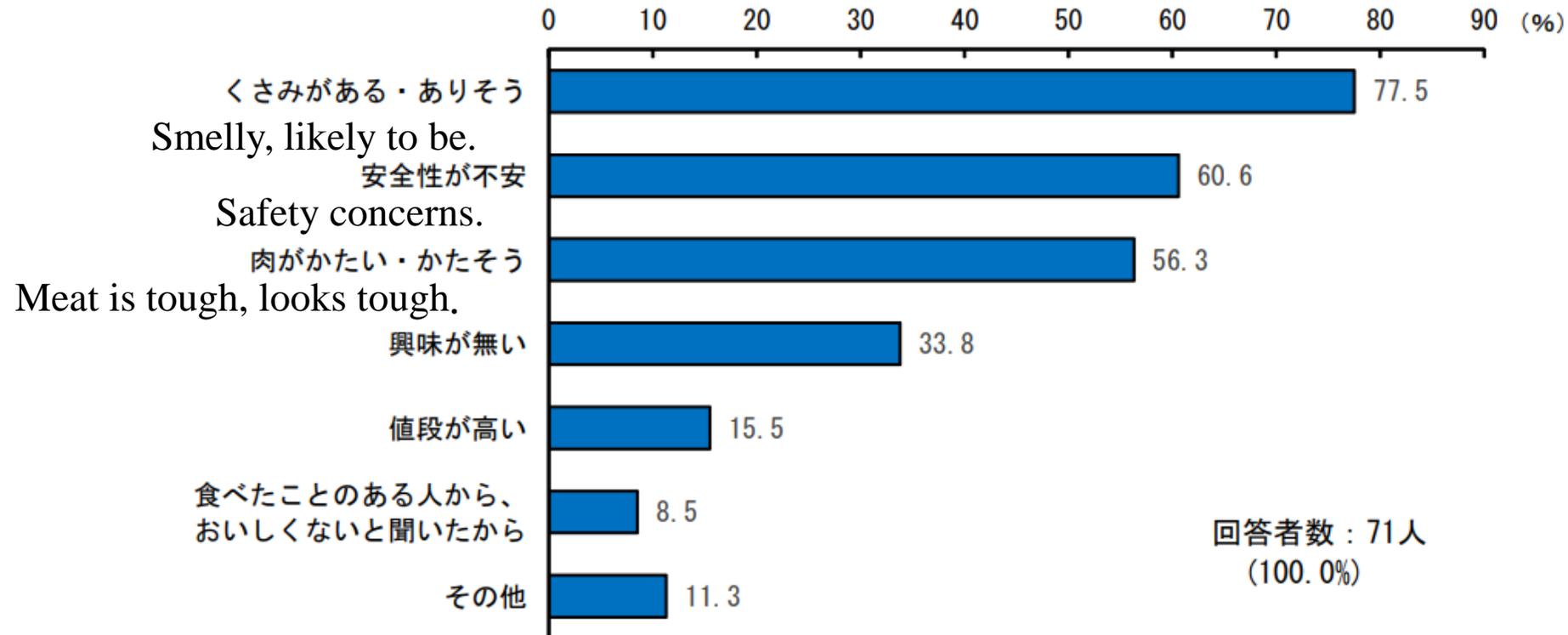


1) "Hyogo Prefectural Government, Agricultural and Forestry Damage Caused by Wild Birds and Animals, FY2020 Edition", 18 May 2022. <https://web.pref.hyogo.lg.jp/nk27/nourinngyohigaitoukei.html> (reference2022-05-19)

2) "Statistics on Agriculture, Forestry and Fisheries: Survey on Consumers' Attitudes and Intentions towards Wild Game Meat", 1991, 1, 23, [https://www.maff.go.jp/kanto/to\\_jyo/networkmonitorjigyo/attach/pdf/index-1.pdf](https://www.maff.go.jp/kanto/to_jyo/networkmonitorjigyo/attach/pdf/index-1.pdf)(reference2022-05-18)

# Introduction

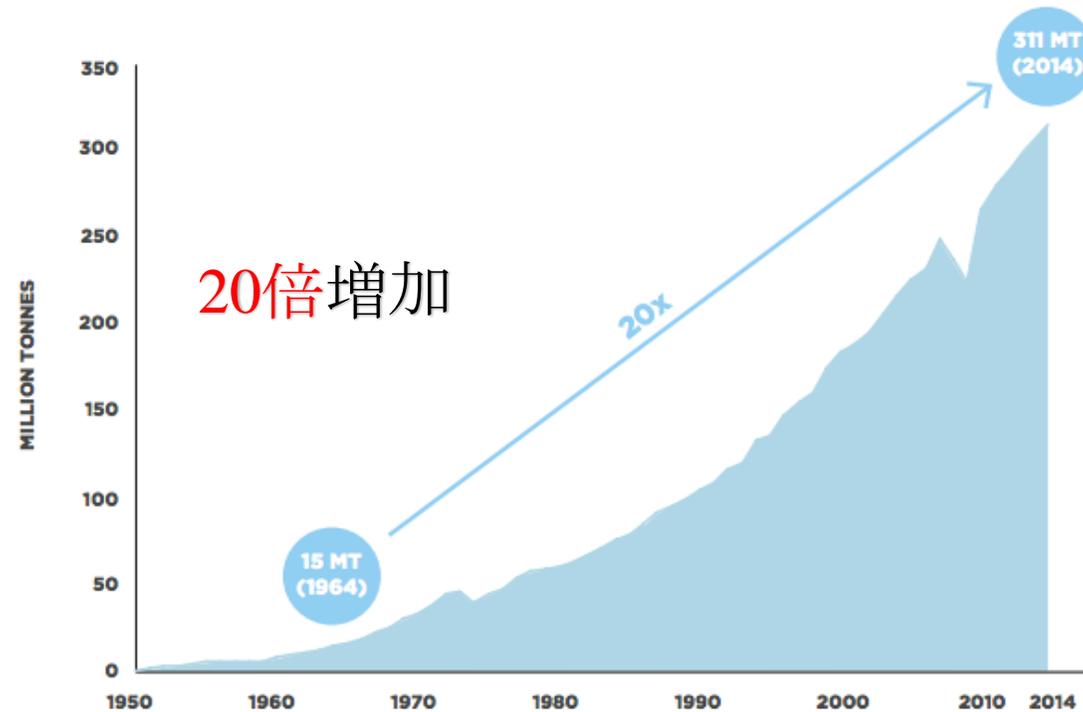
## Image of gibier.



# Introduction

## Trends in the production of plastics

Figure 1: Growth in Global Plastics Production 1950–2014



Note: Production from virgin petroleum-based feedstock only (does not include bio-based, greenhouse gas-based or recycled feedstock)  
Source: PlasticsEurope, Plastics – the Facts 2013 (2013); PlasticsEurope, Plastics – the Facts 2015 (2015).

# Future Plan

## Collection of plastics



5) "PILOT Terra Recycle LOFT Recovery and Recycling Program  
Start recycling pens 2022." [https://www.loft.co.jp/news\\_release/47177620939af8334a804f20f9c207957e0312b1.pdf](https://www.loft.co.jp/news_release/47177620939af8334a804f20f9c207957e0312b1.pdf) (ref 2022-06-01)

# Introduction

- What is Nikawa
- • Gelatine made by boiling animal skins, tendons, bones and connective tissue in water, then concentrating, cooling and coagulating the solution. It is mainly used as an adhesive and painting material.



6) "Minowa Lacquer Co.  
<https://urusiya.ocnk.net/product/765>(reference2022-05-07)

7) "Asahiyo Chemical Co.  
[https://www.asahi-gelatine.co.jp/cn18/sanzenbon\\_j.html](https://www.asahi-gelatine.co.jp/cn18/sanzenbon_j.html)(reference2022-05-07)

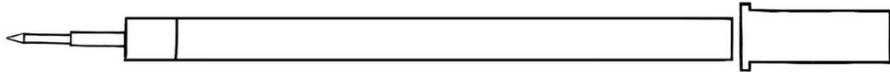
# This Work

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## Environmentally friendly pens



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# Method

## < Experiment 1. > Three-point bending test



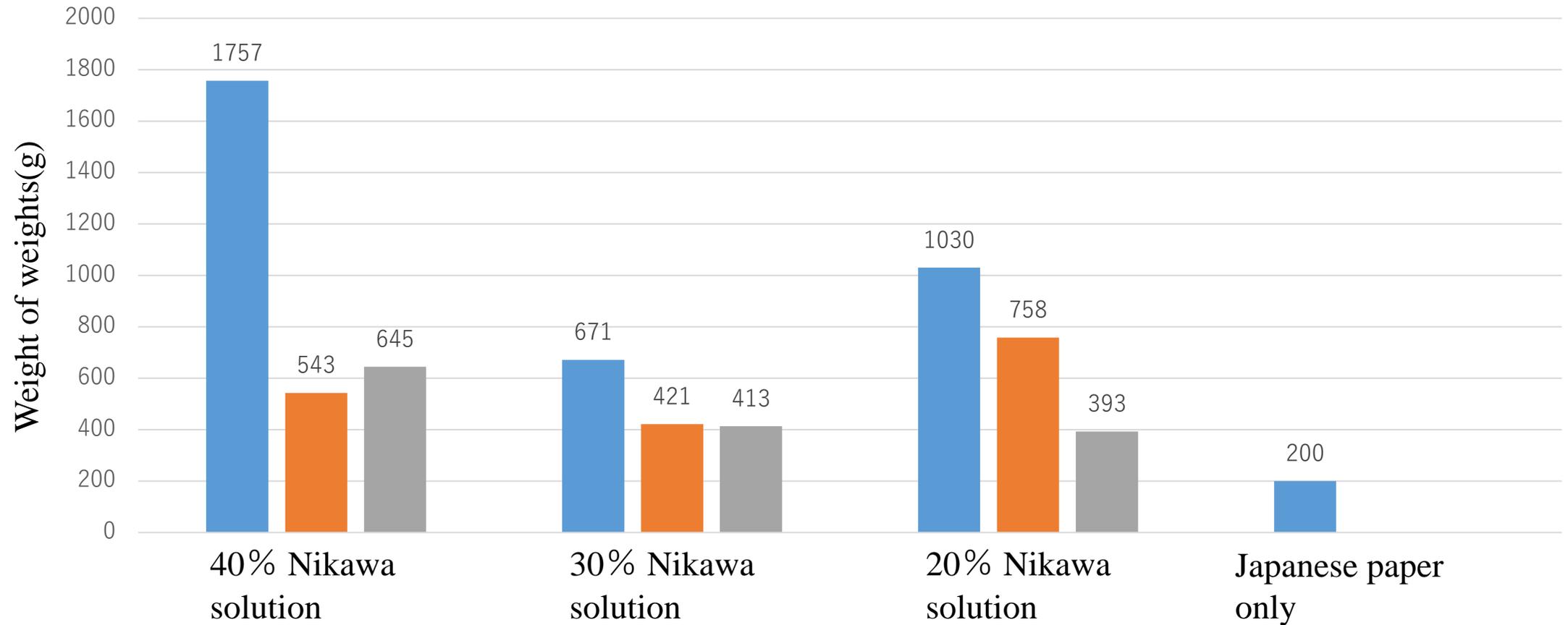
# Method

## < Experiment 1. > Disassembly experiment

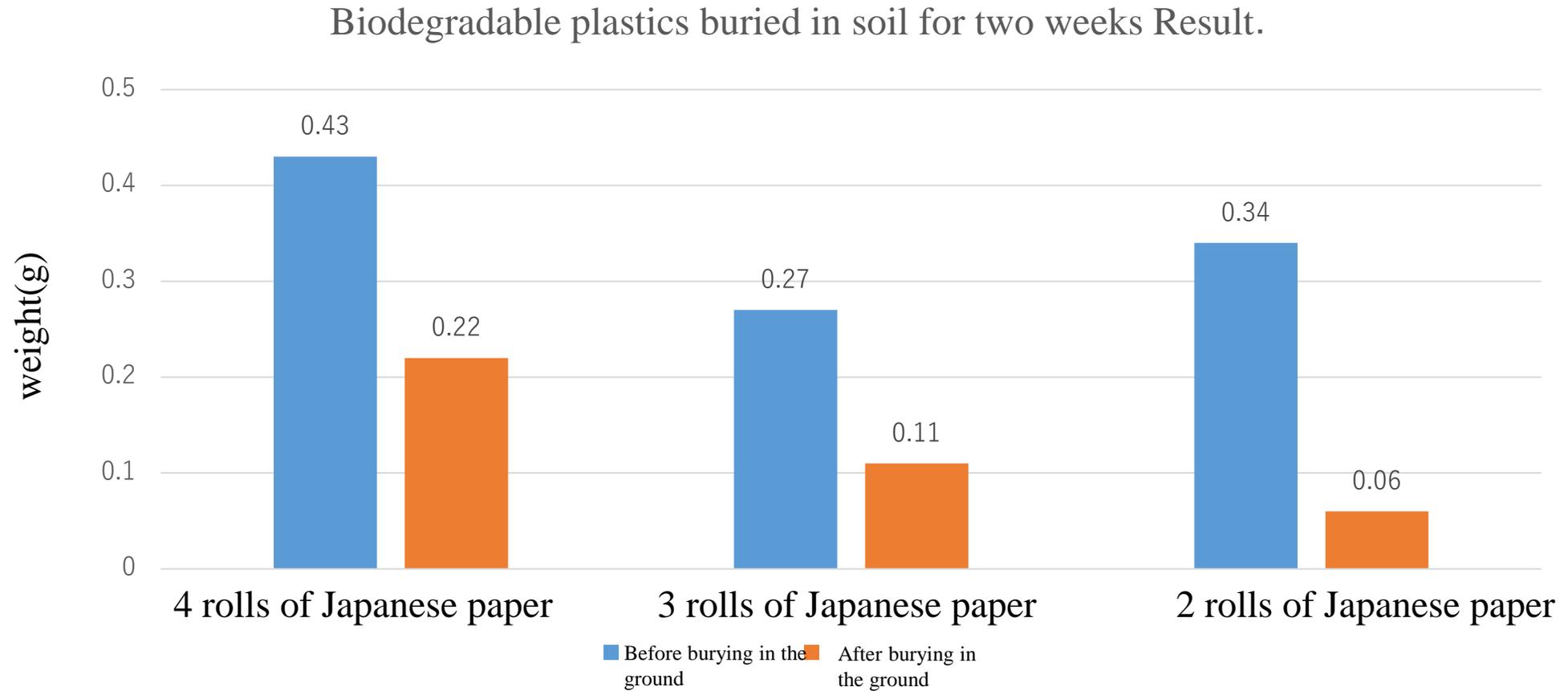


# Experiment 1 Graph of results

Biodegradable plastics Graph of average durability

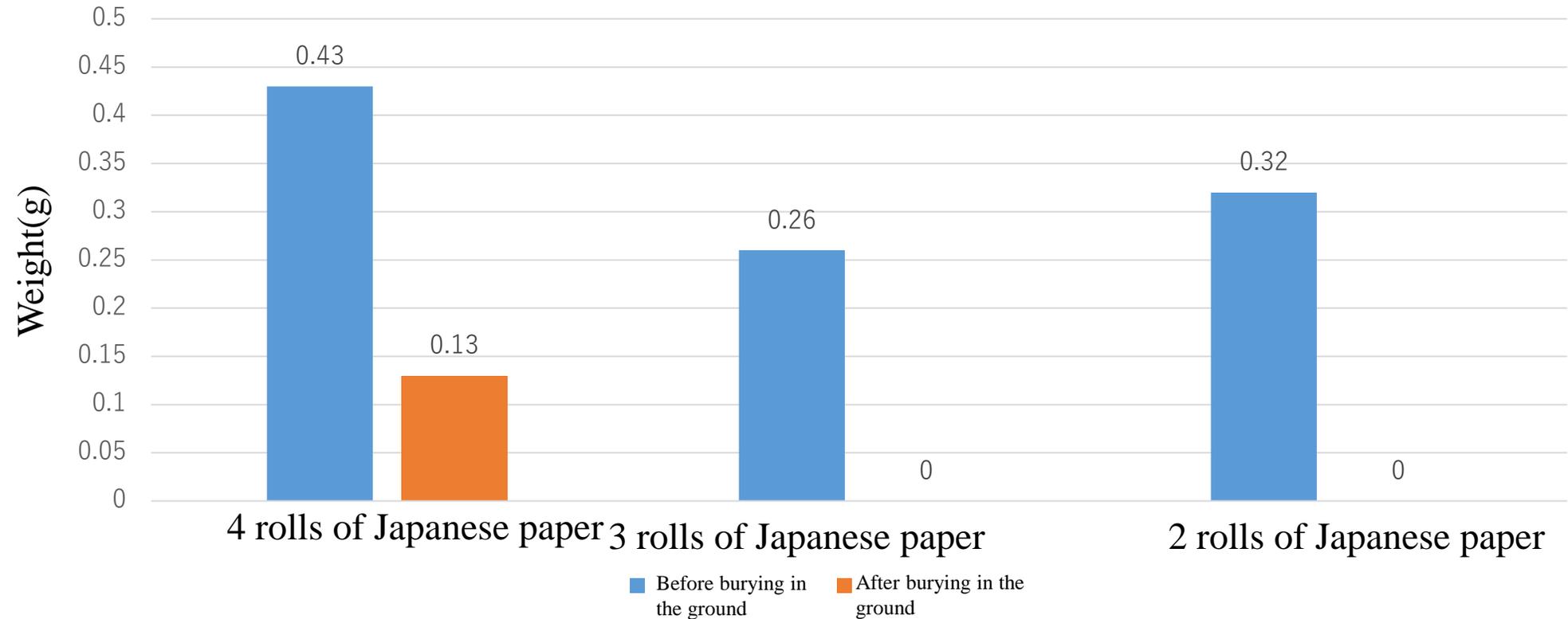


# Experiment 2 Graph of results



# Experiment 2 Graph of results

Biodegradable plastics buried in soil for two weeks Result.



# Discussion

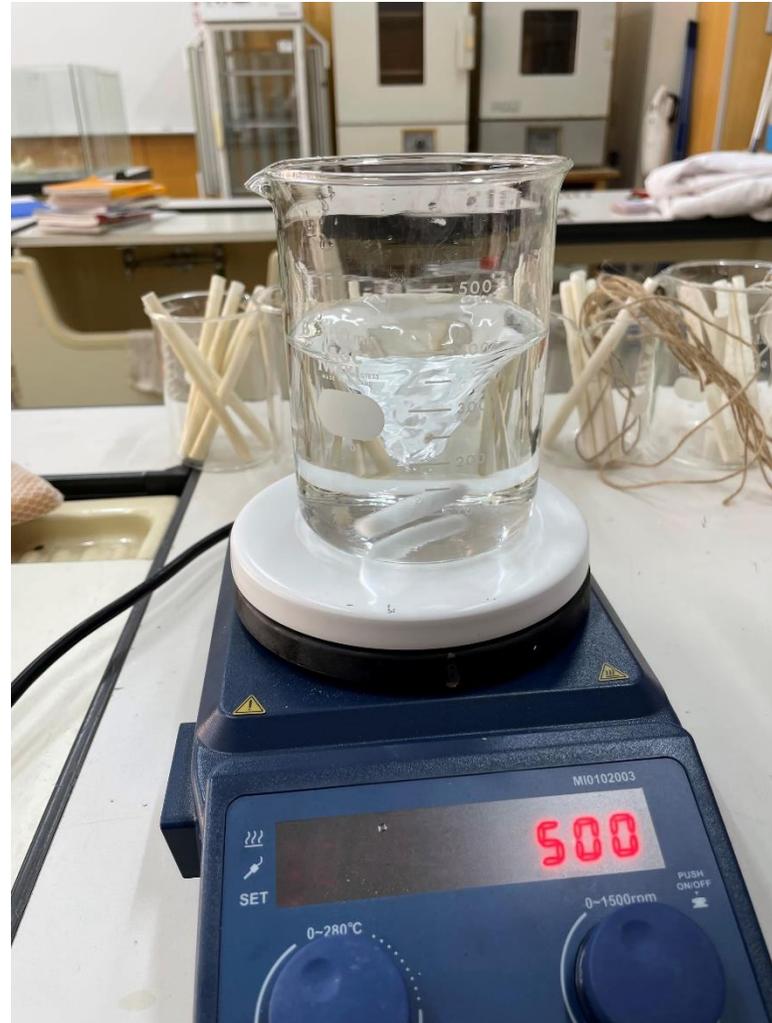
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Higher concentrations of Nikawa and a higher number of windings were considered to be stronger.

We thought that it would decompose in the sea and that it would decompose faster than in the ground.

# Future Plan

Degradation experiments with seawater using magnetic stirrers.



# References

- 1) “Hyogo Prefectural Government, Agricultural and Forestry Damage Caused by Wild Birds and Animals, FY2020Edition”, 18 May 2022.  
<https://web.pref.hyogo.lg.jp/nk27/nourinngyouhigaitoukei.html> (reference2022-05-19)
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- 3) "Statistics on Agriculture, Forestry and Fisheries: Consumer attitudes and intentions regarding wild game (wild game meat)", 1991, 1, 23,  
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- 4) PLASTICS JAPAN.com Marine plastic litter problem (Report 1) 16 Jul 2017.  
<https://plastics-japan.com/archives/2875/amp>(reference2022-05-19)
- 5) “PILOT Terra Recycle LOFT Recovery and Recycling Program Start recycling pens 2022.”[https://www.loft.co.jp/news\\_release/47177620939af8334a804f20f9c207957e0312b1.pdf](https://www.loft.co.jp/news_release/47177620939af8334a804f20f9c207957e0312b1.pdf)(ref 2022-06-01)
- 6) "Minowa Lacquer Co.  
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- 7) "Asahiyo Chemical Co.  
[https://www.asahi-gelatine.co.jp/cn18/sanzenbon\\_j.html](https://www.asahi-gelatine.co.jp/cn18/sanzenbon_j.html)(reference2022-05-07)