

QUANTITATIVE ANALYSIS
OF
POTASSIM SORBATE
IN PROCESSED FOODS

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Processed meats

- such as bacon, sausages and ham– do cause cancer , according to the World Health Organization(WHO).



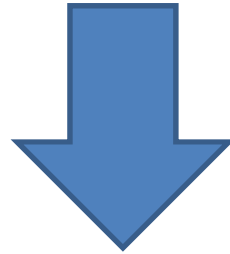
What is Potassium Sorbate($C_6H_7KO_2$)?

- It is a preservative.
 - preserve food from mold and bacteria.
- It is in processed foods.
 - <example>ham, cheese, sausage, boiled fish paste
- Nitrite + Potassium Sorbate
 - a Carcinogen



Back Ground

Is it safe for humans?



Goal

To do a quantitative analysis of potassium sorbate in processed foods

Method

- Cutting food



- Making a test solution



- Colorimetric analysis



This is **our result** of the amount
of potassium sorbate in 10 g food

Experimental Value

Actual Value

boiled fish paste

0.78 mg



7~14 mg

wiener

0.74 mg



12 mg

Why???

- Cutting food



- Making a test solution



- Colorimetric analysis

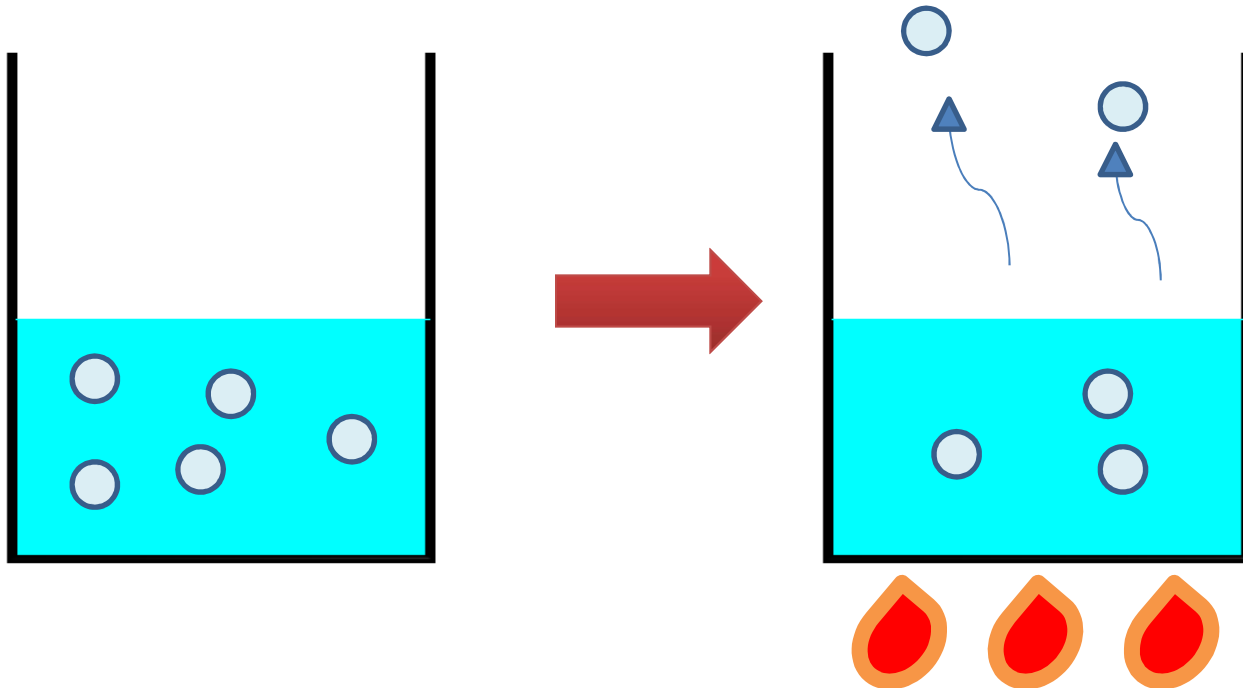
We tried 3 method for extracting potassium sorbate($C_6H_7KO_2$).

The methods were

1. Evaporation
2. The cut size of boiled fish paste
3. pH

Evaporation 1

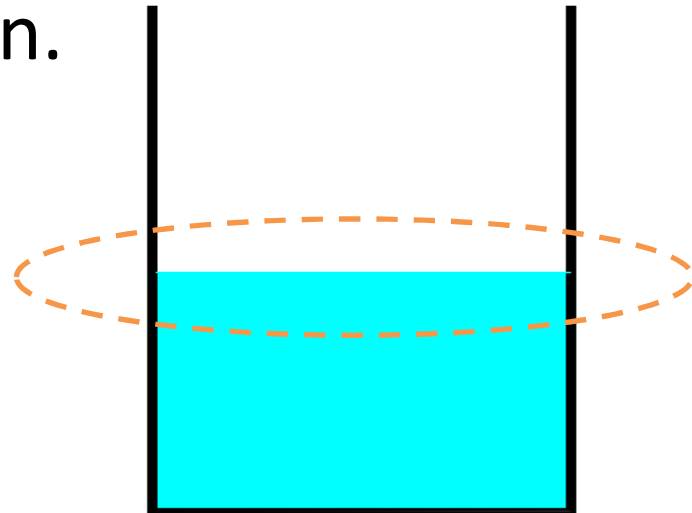
Does potassium sorbate($\text{C}_6\text{H}_7\text{KO}_2$)
evaporate by heating on extraction ?



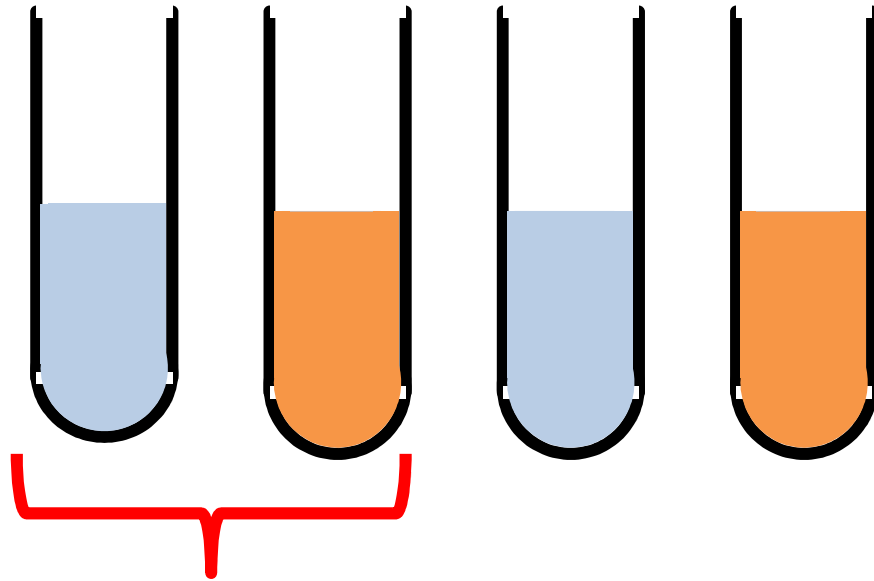
How to make the test solution

1. Dice 10g of food.
2. Put it into 25 mL of water.
3. Warm the beaker in hot water at 60 °C.
4. Scoop up the clear layer at the top.

This is the test solution.



Method 1



heating



quantitative analysis

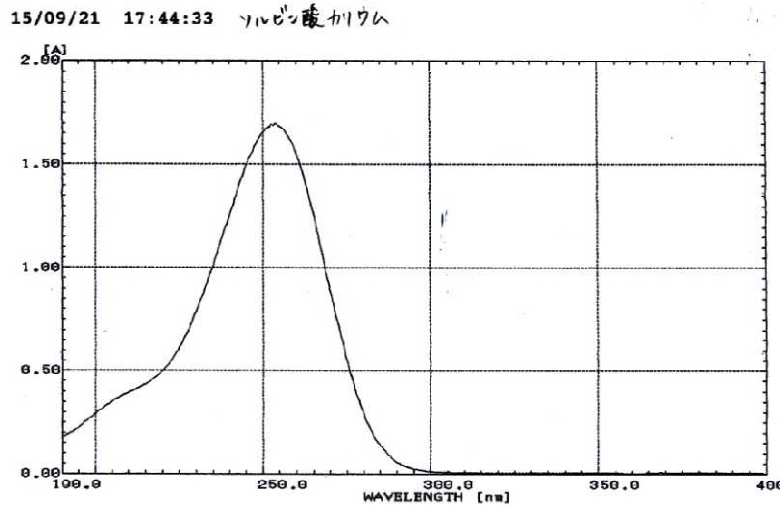
pure water

pure water
+
potassium
sorbate

Method

Measure the peak wavelength
of the spectrum.(→252 nm)

And measure absorbance of 252 nm.



spectrometer

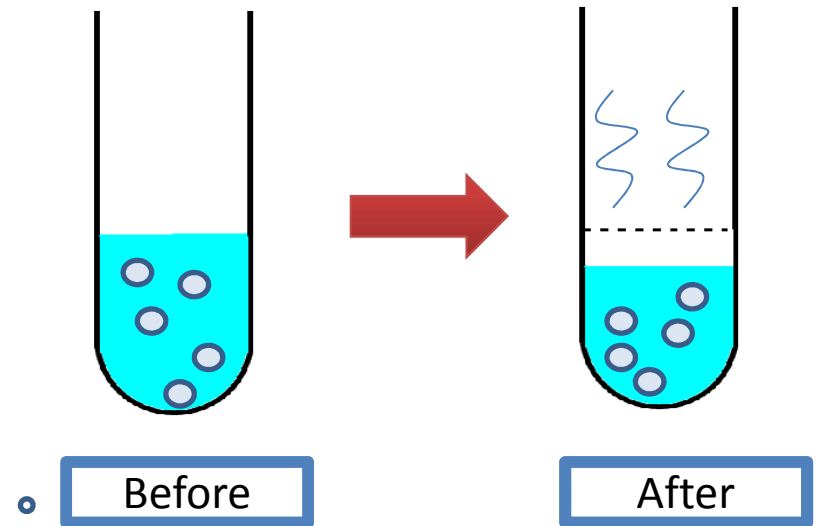
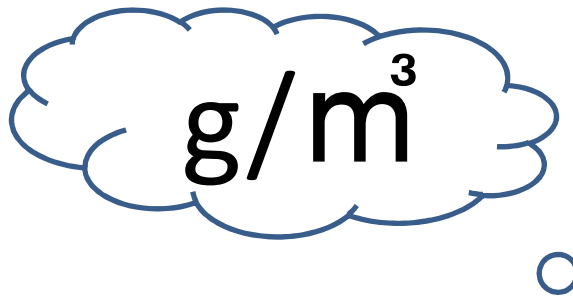
Result 1

Absorbance at 252 nm

	ABS
pure water	0.00
pure water	0.02
potassium sorbate	1.72
potassium sorbate	1.74

Consideration 1

- We think the concentration of potassium sorbate rises because water evaporates from heating.
- Potassium sorbate doesn't evaporate.

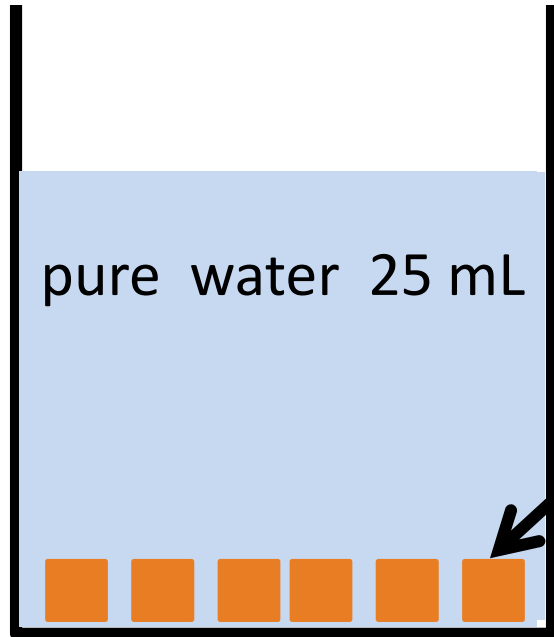


the cut size of boiled fish paste 2

Does the cut size of boiled fish paste affect the extraction of potassium sorbate?



Method 2



boiled fish paste(10 g)

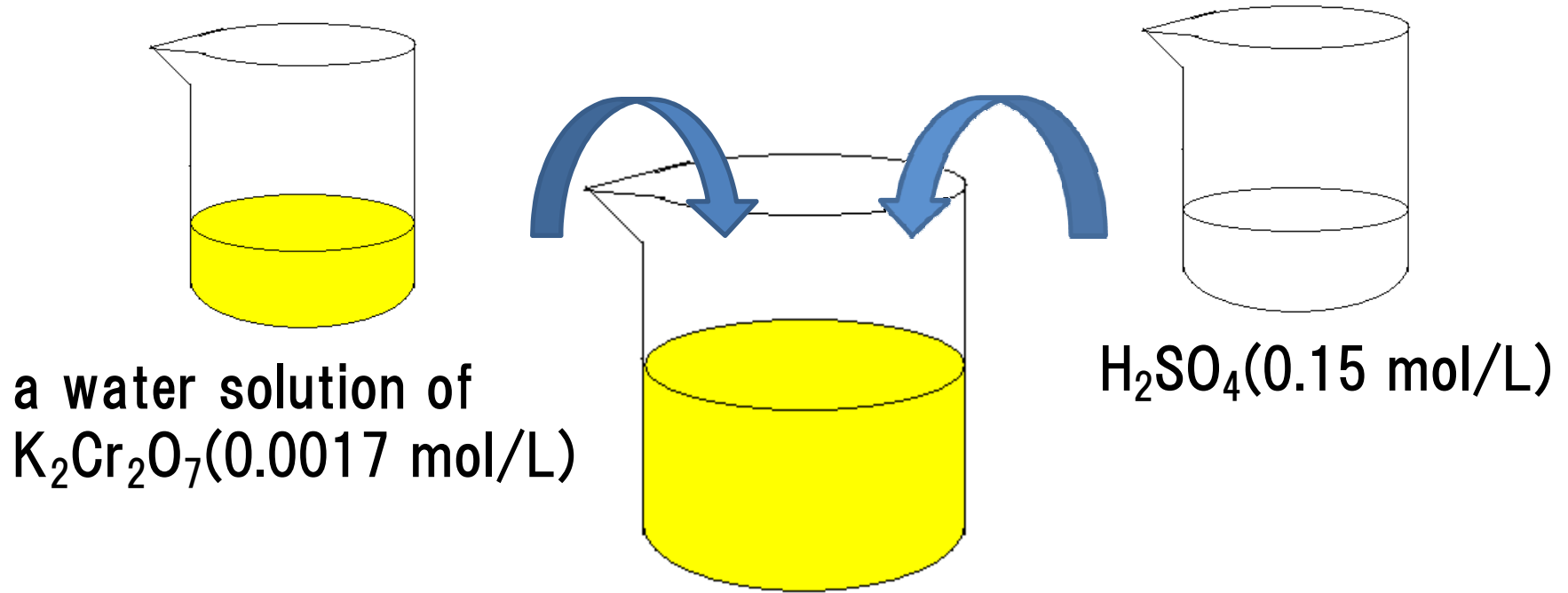
- 10 mm³
- 5 mm³
- mash

extract ↓ heating 60°C 20 minutes

colorimetric analysis

Colorimetric Analysis:

Reagent A(an oxidizer)



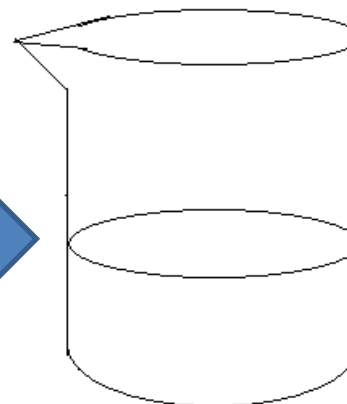
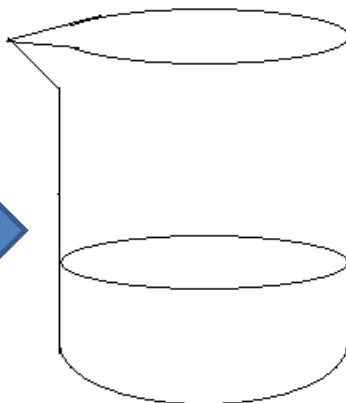
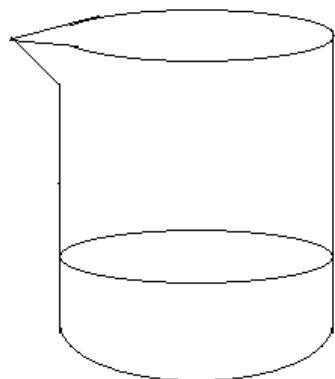
Mixture by volume for 1:1

Colorimetric Analysis: Reagent B(Color fixative)

10 mL of NaOH(1.0 mol/L)

11 mL of HCl(1.0 mol/L)

0.50 g of $\text{C}_4\text{H}_4\text{N}_2\text{O}_2\text{S}$
+20 mL of pure water



At last, add pure water to 100 ml

Colorimetric Analysis:

Final step

- ① 2 mL of a test solution + Reagent A(a oxidizer)
→ boiled for 5 minutes at 60 °C**
- ② The solution + Reagent B(Color fixative)
→ boiled for 10 minutes at 60 °C**
- ③ After that, measure absorbance of 532 nm.**

Result 2

Absorbance at 532 nm

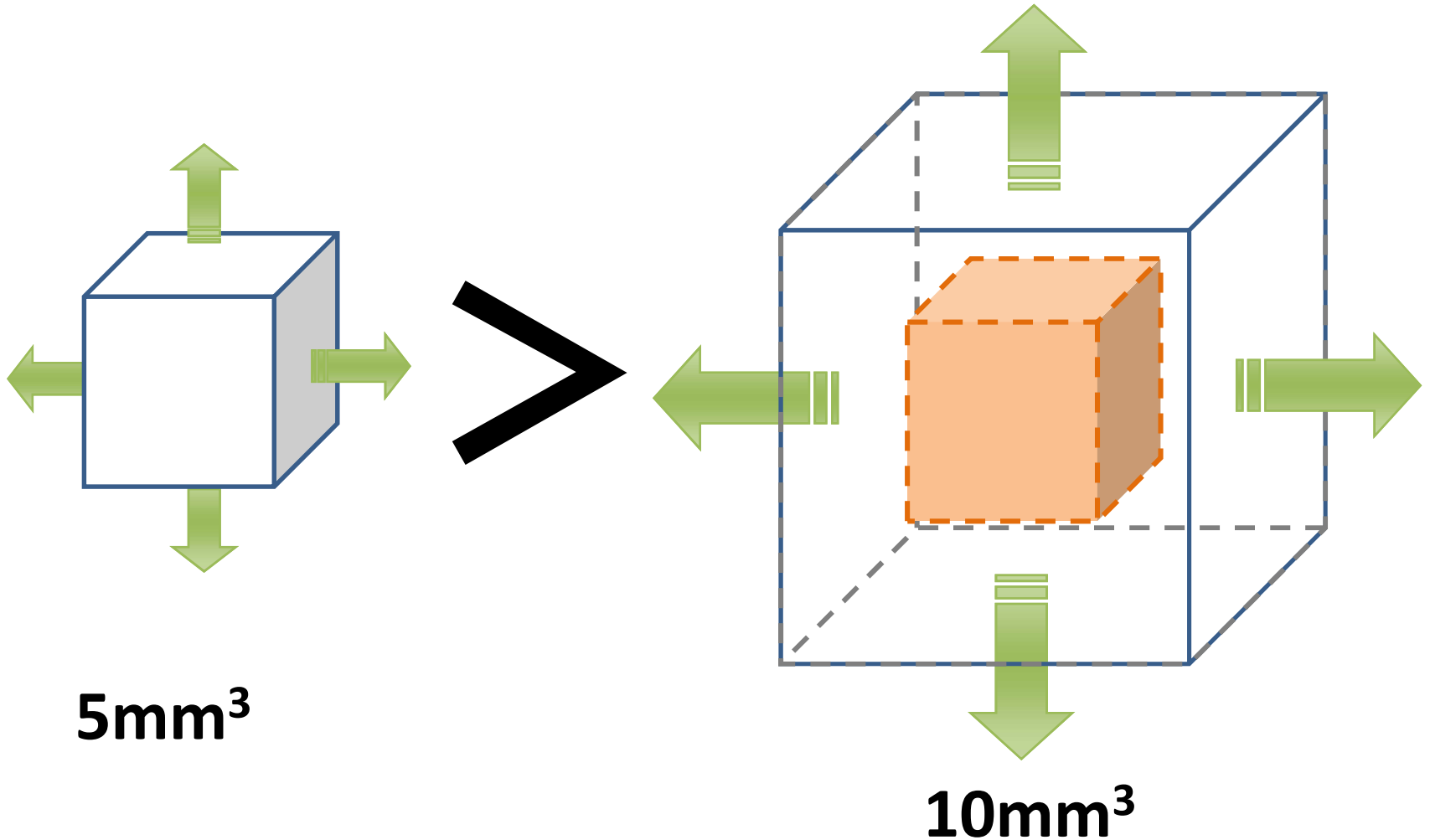
	ABS
Pure water	0.00
5 mm ³	2.39
10 mm ³	2.35
mash	2.01

Abs of Mash is lower than the 5 mm³ cubes .

Discussion 2

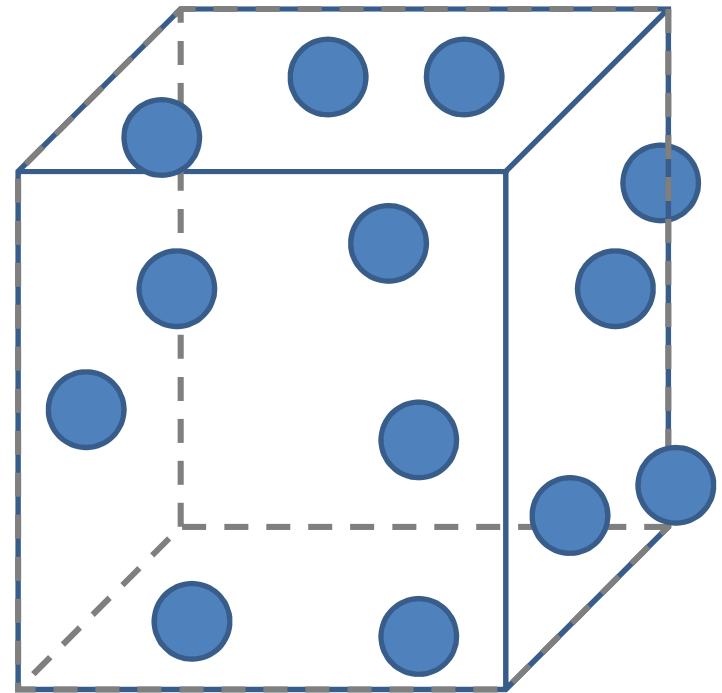
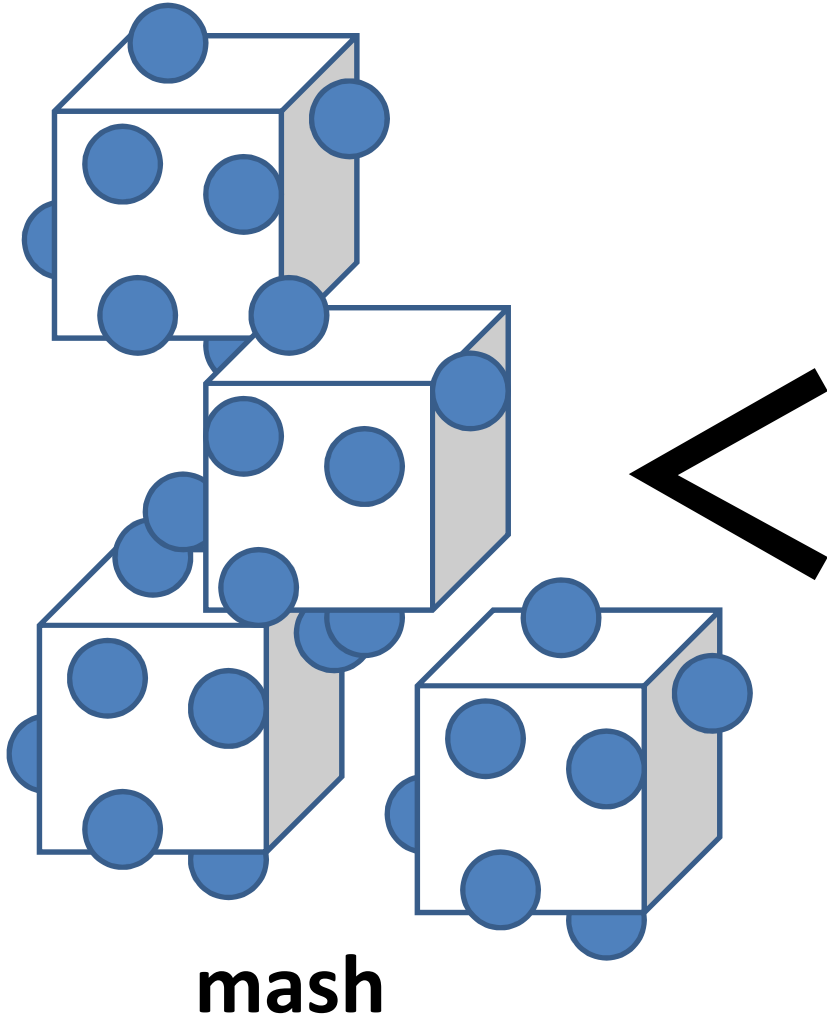
- Mash can't extract potassium sorbate as well as 5 mm³.
- We think there is a best cut size of boiled fish paste for extracting potassium sorbate.

Discussion: 5mm^3 and 10mm^3 potassium sorbate extraction



Discussion: mash and 5mm^3

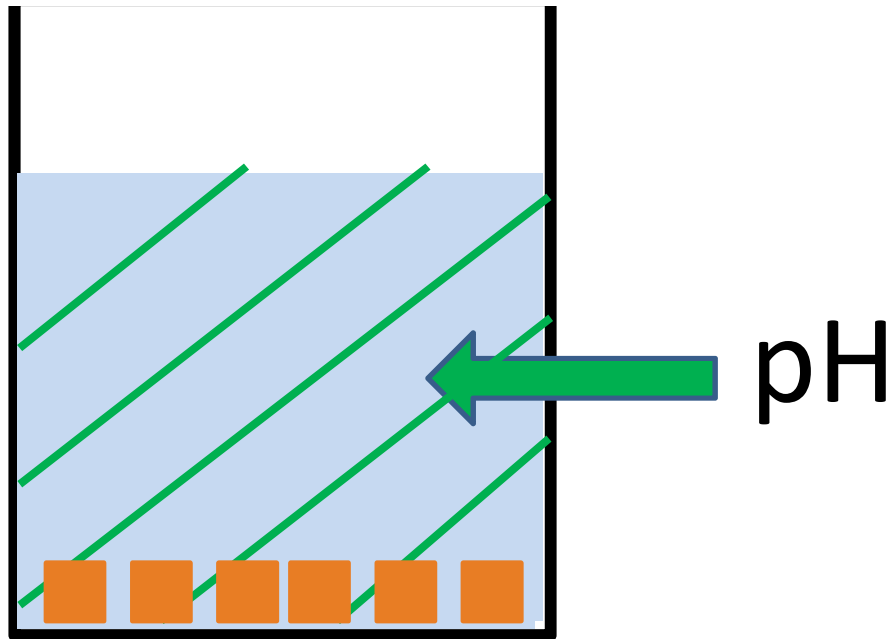
potassium sorbate extraction



5mm^3

pH 3

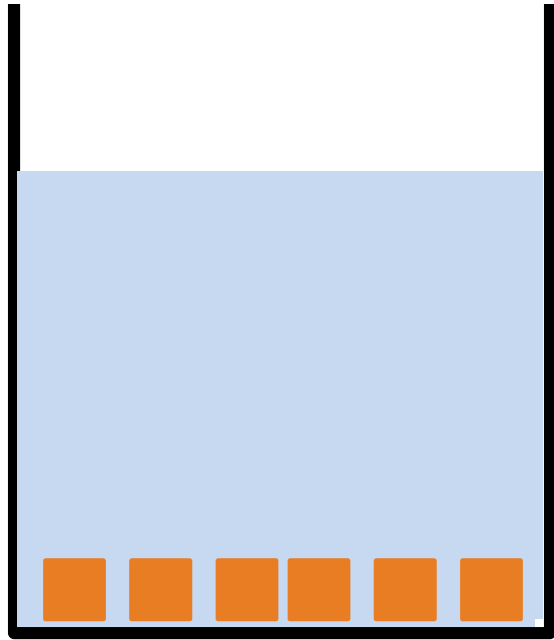
Does pH affect extraction of potassium sorbate?



pH 3

- low pH → Decomposed molecules decrease.
→ Absorbance is lower.
- high pH → Decomposed molecules increase.
→ Absorbance is higher.

Method 3



pure water 22.5 mL
+
buffer solution 2.5 mL
+
boiled fish paste(5mm³)
10 g

extract ↓ heating 60°C 20 minutes

colorimetric analysis

Result 3

Absorbance at 532 nm

	1 st time	2 nd time
	1/10	
pH 4.1	0.30	0.45
pH 6.82	0.26	0.36
pH 9.18	0.27	0.38
Steamed fish paste and Pure water (pH 6.5)	0.34	0.49
Pure water	0.00	0.00

Consideration 3

There is little difference because of pH.

→pH doesn't affect the extraction.

Conclusion

- Heating
- Size
- pH

Do not affect extraction of potassium sorbate very much.

Future work

- Reconsider extraction method of Potassium Sorbate .
- Do ultraviolet quantitative analysis.

Bibliography

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