

A solution to salt damage using bio-ethanol made from hornwort and wood chip.

Kobe Municipal High School of Science and Technology Science Technology Course

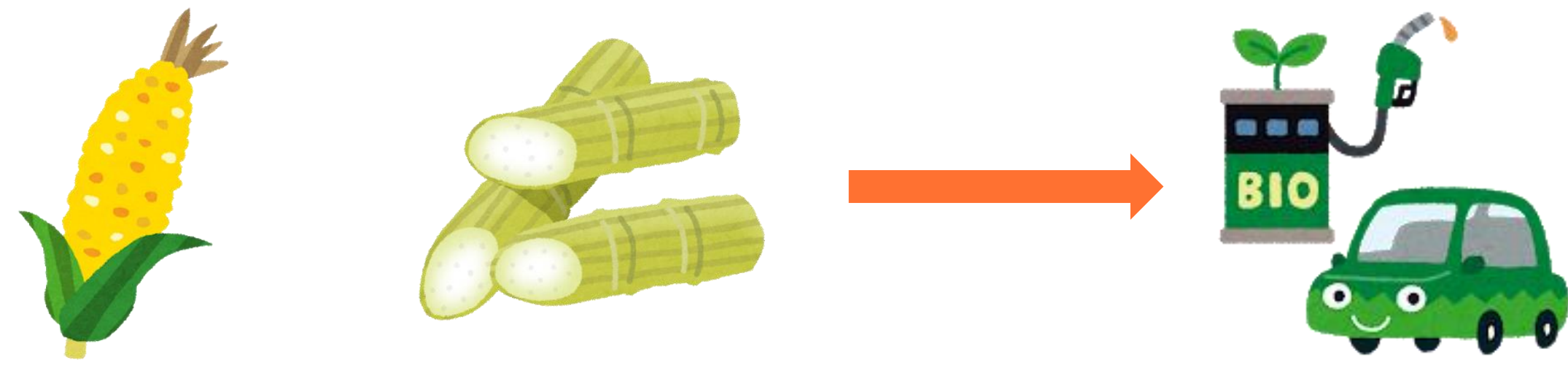
Hanami Komatsu, Kyoichiro Tatsumi, Kyohei Mitani, Rukito Mezdid

Introduction

Bio-ethanol : Ethanol made from plants.

Demand of bio-ethanol is rising as it can be used as replacement for fossil fuels.

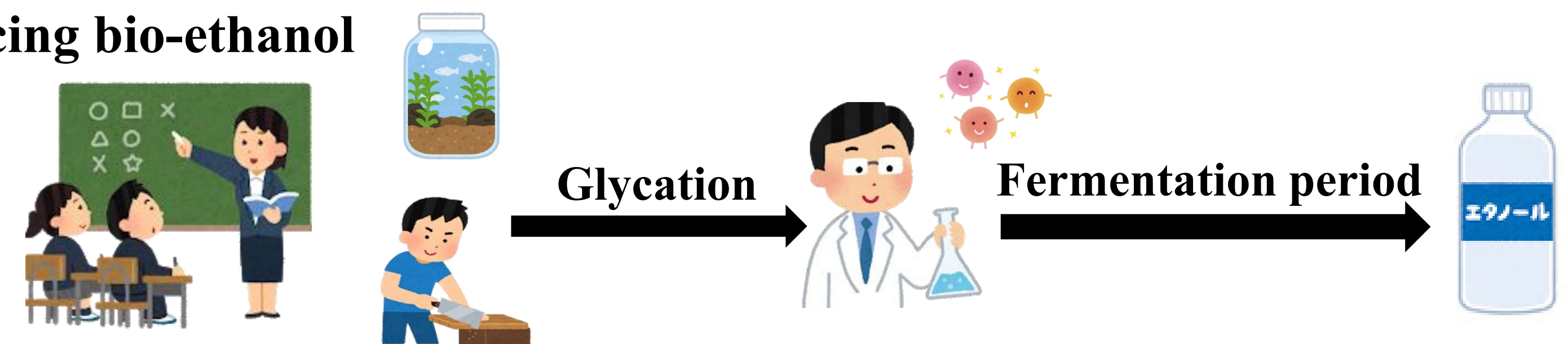
Main material : corn, sugar beet



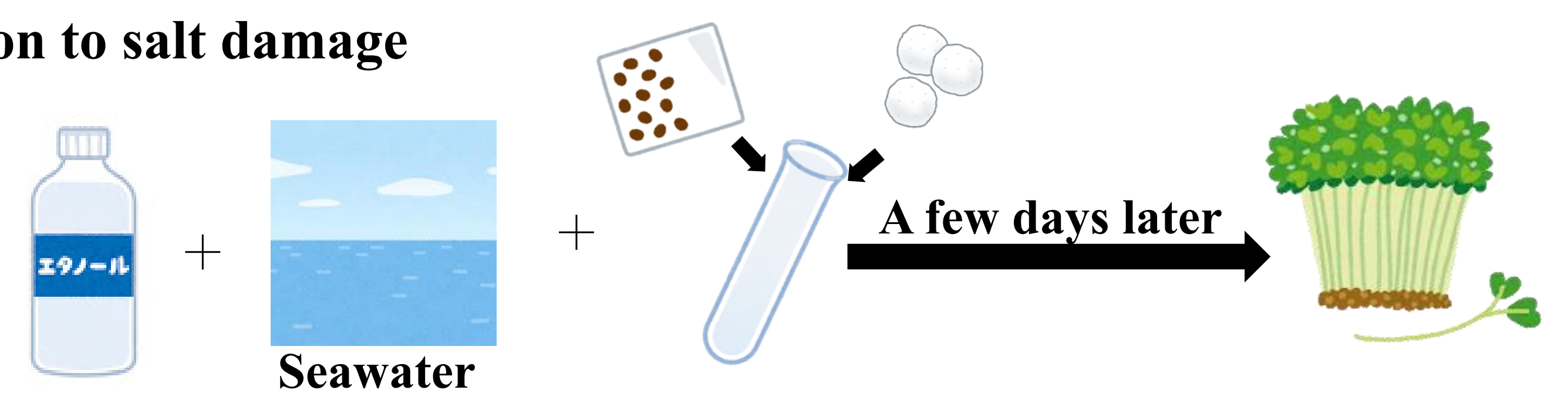
Salt damage : A damage caused when farmlands are eroded by seawater due to natural disasters such as Typhoons, Tsunamis and land subsidence.

Purpose

Producing bio-ethanol

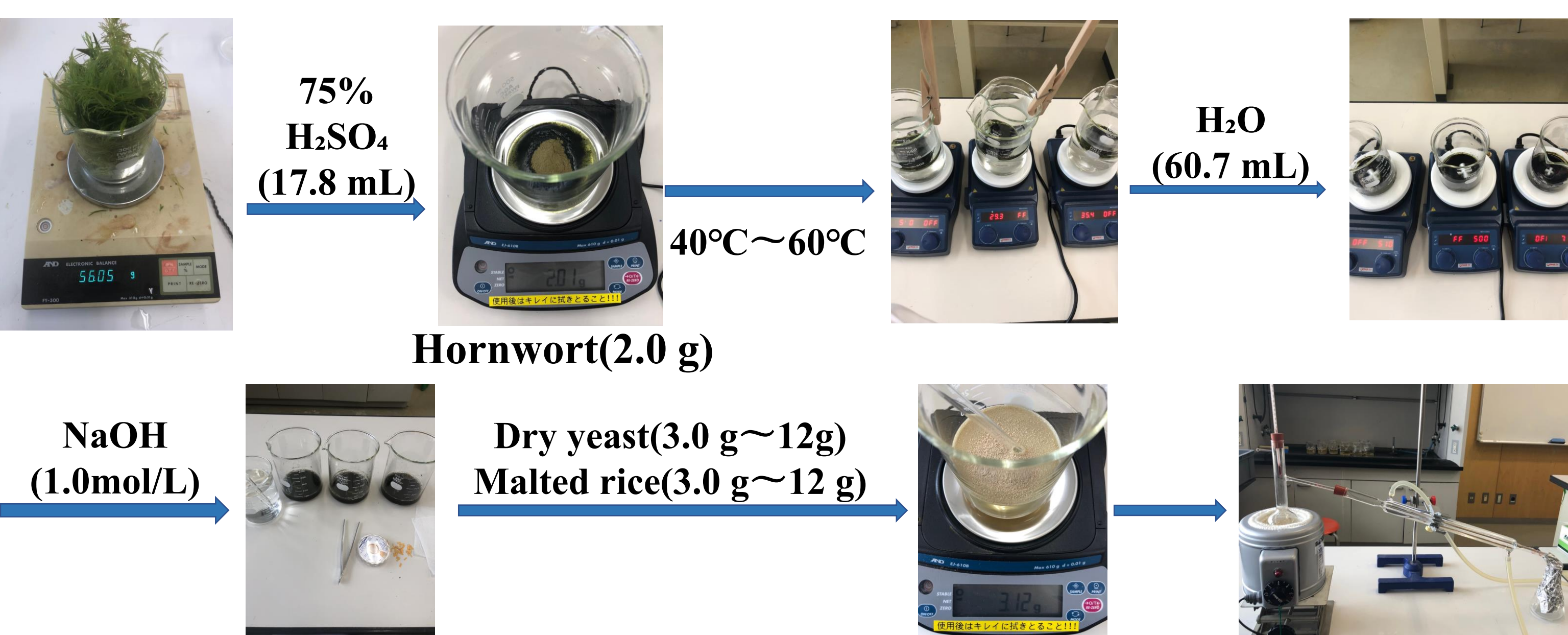


A solution to salt damage

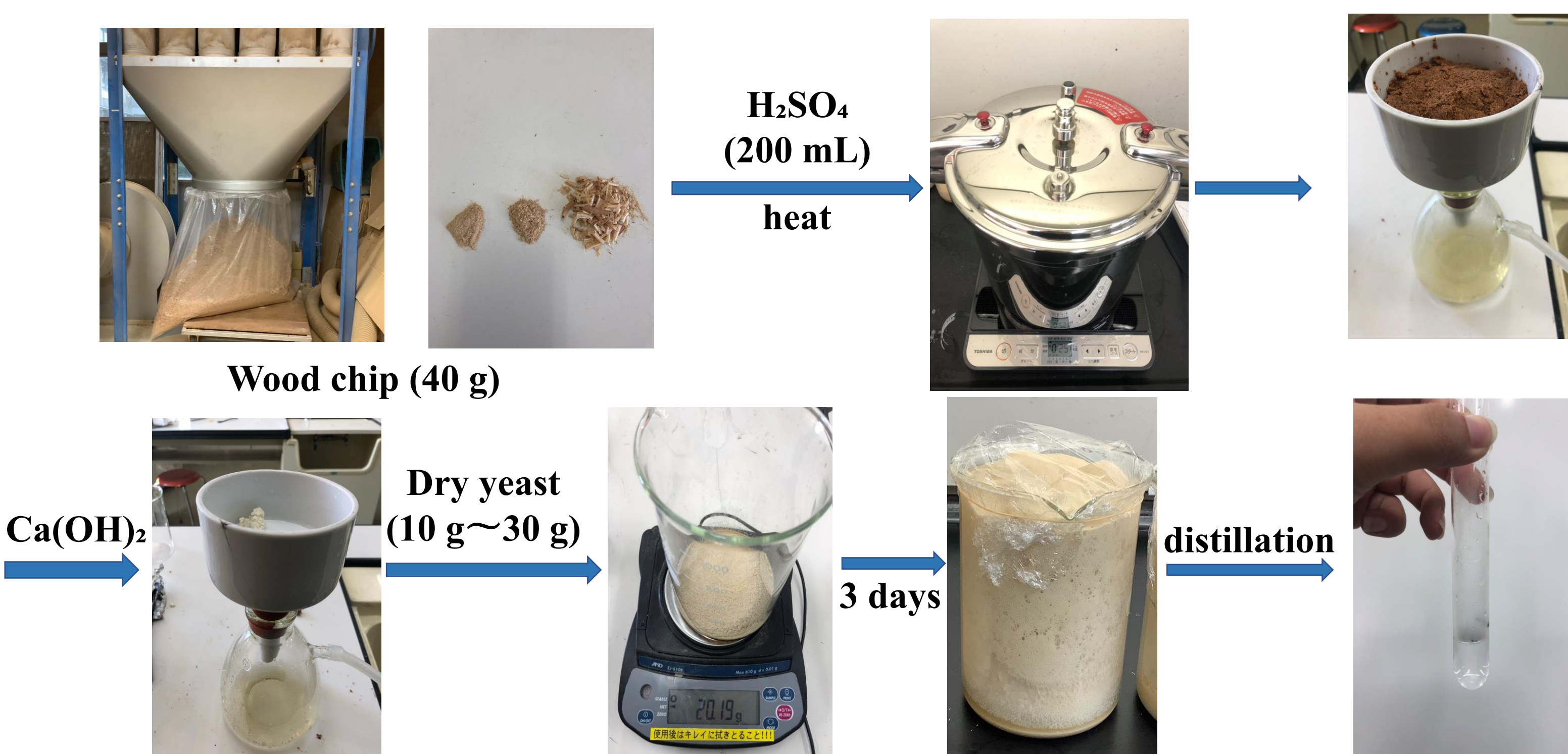


Experiment 1 & 2 Method

Experiment 1: Producing bio-ethanol using hornwort.



Experiment 2: Producing bio-ethanol using wood chips.



Experiment 1 & 2 Result

Table 1: Producing bio-ethanol using hornwort.

Entry	Fermentation period (Day)	Glycation time (min)	Glycation temperature (°C)	Malted rice (g)	Dry yeast (g)	Concentration (%)
1	7	60	40	3	3	26
2	7	60	50	3	3	22.5
3	7	60	60	3	3	26.5
4	14	60	40	3	3	28
5	21	60	40	3	3	29.5
6	28	60	40	3	3	27
7	7	50	40	3	3	8.5
8	7	110	40	3	3	26
9	7	120	40	3	3	29
10	7	20	40	8	8	25
11	7	30	40	10	10	24
12	7	40	40	12	12	26

Table 2: Producing bio-ethanol using wood chips.

Entry	Fermentation period (Day)	Glycation time (min)	Size ^{a)}	Number of uses	Dry yeast (g)	Concentration (%)	Amount (mL)
1	3	60	L	1	30	37	2.4
2	3	60	M	1	30	29	5.5
3	3	60	S	1	30	28	7.9
4	3	120	L	1	30	24	5.5
5	3	120	M	1	30	28	5.0
6	3	120	S	1	30	25	8.6
7	3	120	L	2	30	23	4.6
8	3	120	M	2	30	19	5.3
9	3	120	S	2	30	21	3.7
10	3	120	L	3	30	36	2.4
11	3	120	M	3	30	32	4.4
12	3	120	S	3	30	25	7.2

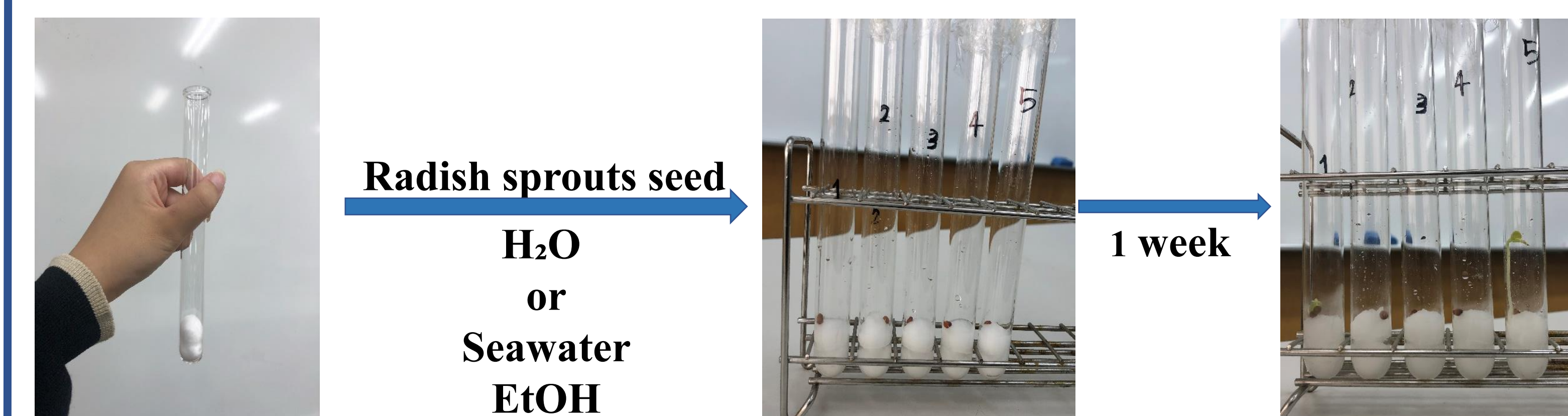
a) L: Large, M: Medium, S: Small

Experiment 1 & 2 Discussion

- Other disposed plants e.g. Weed, Fallen leaves
- May be used in primary and middle school classes
- Using other bases e.g. Ba(OH)₂, Pd(OH)₂

Experiment 3 Method

Experiment 3: A solution to salt damage using bio-ethanol.



Experiment 3 Result

Table 3: A solution to salt damage using bio-ethanol.

Entry	H ₂ O(mL)	Seawater(mL)	EtOH(mL)	Days(day)	Germination
1	4	0	0 ^{a)}	7	○
2	0	4	0 ^{a)}	7	×
3	0	3	1 ^{a)}	7	×
4	0	2	2 ^{a)}	7	×
5	0	1	3 ^{a)}	7	○
6	0	3	1 ^{b)}	7	×
7	0	2	2 ^{b)}	7	×
8	0	1	3 ^{b)}	7	○
9	0	3	1 ^{c)}	7	×
10	0	2	2 ^{c)}	7	○
11	0	1	3 ^{c)}	7	○

a) ethanol(0.3%), b) bio-ethanol(0.3%), c) bio-ethanol(0.5%)

Experiment 3 Discussion

- For practical use
- Using different crops e.g. Rice, Tree
- Uses in preventing environmental problems and disasters