

Stop the Change of Glutamic Acid

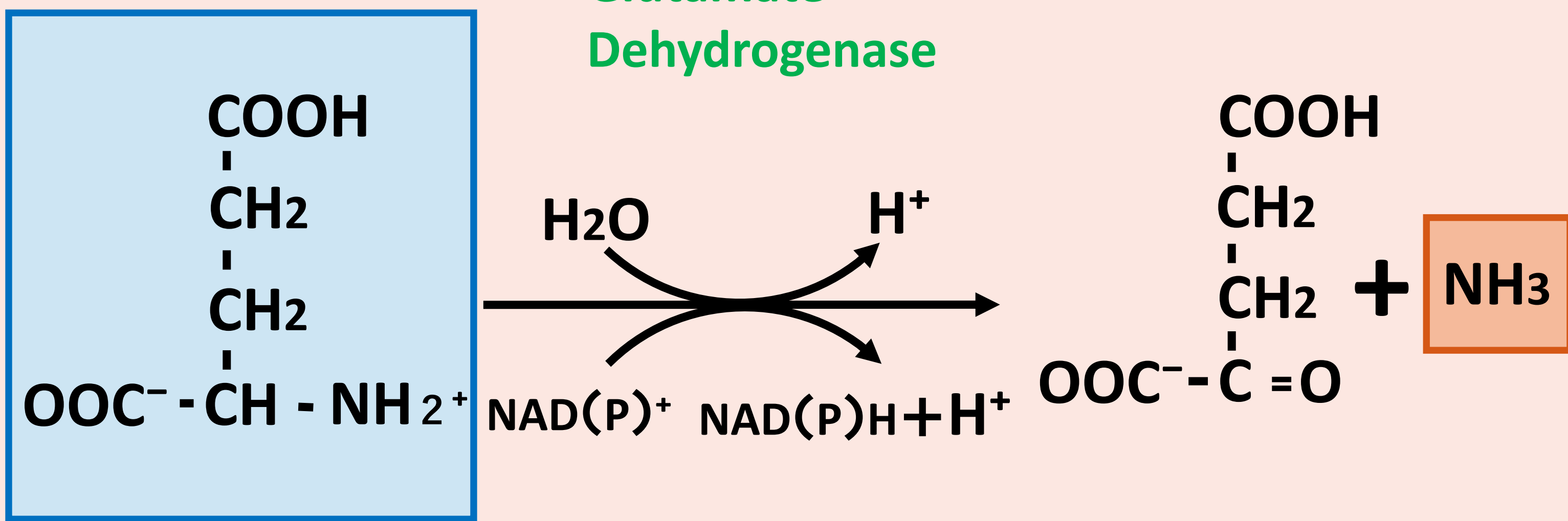
Tatsuno Senior High School Grade 3 Integrated Science Course

1. Purpose

Make more natural and higher-performance preservatives for glutamic acid.

2. The Change of Glutamic Acid

Glutamate
Dehydrogenase



Glutamic Acid

α -ketoglutaric acid

- Glutamate dehydrogenase promotes the reaction.
- NH_3 is produced by the reaction.

3. Experiment 1

<MATERIALS>

- Glutamic Acid • Pure Water • Tofu • Nitrile Gloves
- Sterile Petri Dish • Incubator • pH Sensor
- Centrifuge (60Hz 3090rpm) • Samples

<SAMPLE>

- Japanese Pepper • Cinnamon • Chili Pepper • Salt
- Sodium Benzoate • Potassium Sorbate

<PRESERVATION CONDITIONS>

30°C (constant) A Place Protected from Light

<THE EXPERIMENT METHOD>

- ① A saturated aqueous solution with glutamic acid was made (SASG).
- ② 0.10 g of a sample (preservatives → 0.01 g) and SASG were put into a petri dish.
- ③ 0.01 g of tofu were put into ② (as microorganism culture).
- ④ It was kept in the incubator, and the pH was measured everyday for three days.

4. Result

Except for chili pepper, all of them showed smaller differences than the one without a sample. This shows that most samples play a role as a preservative.

5. Hypothesis

Vertical axis: Variation of pH (pH)
Horizontal axis: Elapsed Time (h)



If the samples in the graphs above are combined with each other, a stable preservative can be made.

6. Experiment 2

Materials: The same as Experiment 1

<COMBINATION SAMPLES>

- | | |
|--------------------------|----------------------------------|
| Salt and Chili Pepper | Japanese Pepper and Chili Pepper |
| Japanese Pepper and Salt | Cinnamon and Japanese Pepper |
| Cinnamon and Salt | Cinnamon and Chili Pepper |

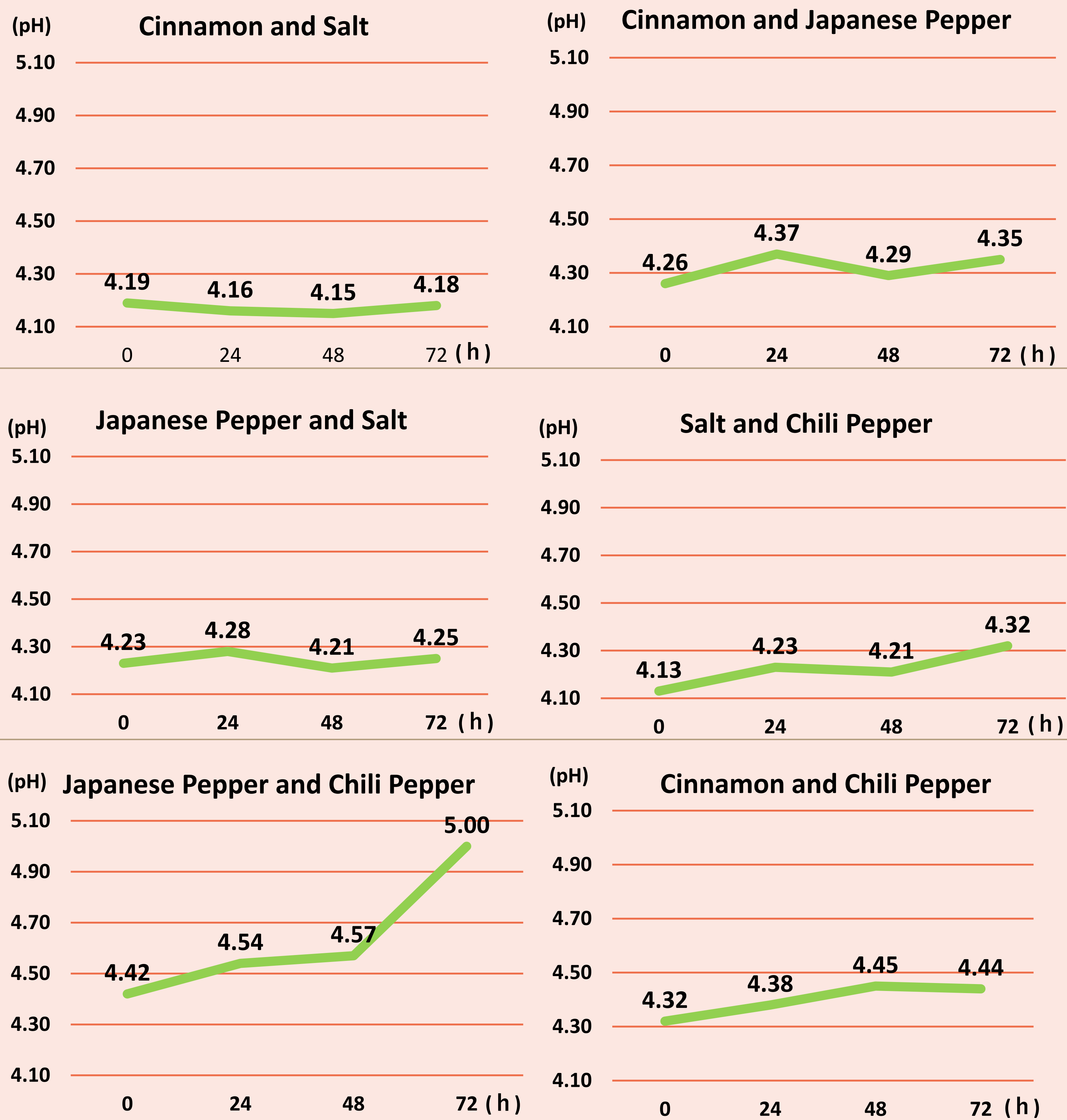
<THE EXPERIMENT 2 METHOD>

- ① SASG with glutamic acid was put in a petri dish.
- ② 0.10 g of samples (each sample → 0.05g) and SASG were put into a petri dish.
- ③ 0.01g of tofu were added into ②.
- ④ It was kept in the incubator, and the pH was measured every day for three days.

7. Result & Conclusion

Vertical axis: Variation of pH (pH)

Horizontal axis: Elapsed Time (h)



Salt and Cinnamon, Salt and Japanese Pepper are the most effective preservatives.

8. Future Work

Experimenting with actual foods.
Considering the taste and flavor.

9. Reference

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