

# A New Approach

## to Measure the Concentration of Solanine in a potato

Yumeki Sato, Hiroto Ueda, Towa Kitahashi, Yuka Totani, Kahiro Maeda, Amane Matsushita

### 1. Motive and Purpose

Potatoes contain toxins called solanine, reports of solanine poisoning due to eating potatoes are reported in great numbers. Then, we are treating (besides cutting off the bud that has been done in the past and besides peeling off the skin). We thought whether the content of solanine could be reduced more efficiently. Then, we decided to think about conducting a concentration analysis of solanine essential for doing research by using colorimetric analysis and see if it is possible.

### 2. What is solanine?

Solanine is a type of alkaloid toxin contained in plants, such as potatoes. Features include water solubility, heat resistance, and the like. Symptoms of solanine poisoning include vomiting, diarrhea and the like.

### 3. What is the colorimetric analysis?

It uses the spectrophotometer. This time we use the Marquis Reagent Testing Kit. It makes the solanine yellow.

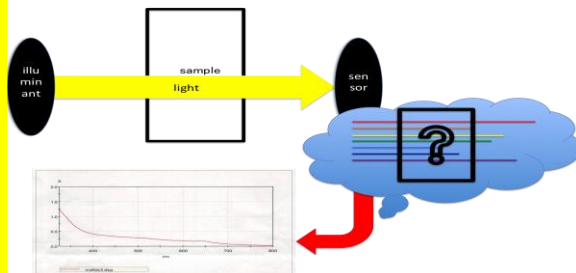
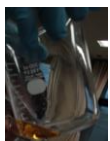


Diagram 1: schematic diagram of colorimetric analysis



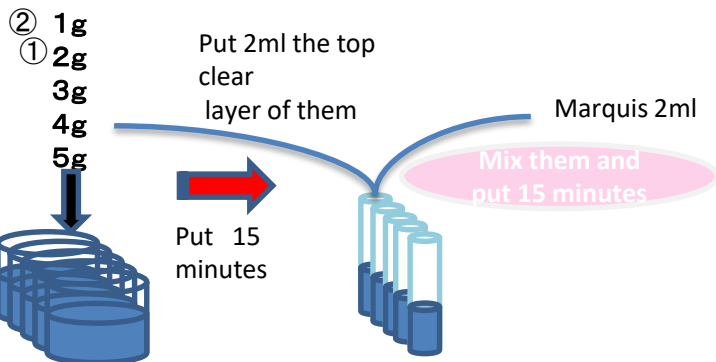
Picture 1: reaction of marquis reagent testing kit

### 4. Research Method

Experiment1:Confirm that the absorbance changes with a difference in solanine concentration.

- ①Cut out the growing buds from potatoes and mash them.
- ②The details of the process is shown below:
- ③Put ② into cell and perform colorimetric analysis.

|                       |                |                |                |                |                |
|-----------------------|----------------|----------------|----------------|----------------|----------------|
| Experiment 1's sample | growing bud 1g | growing bud 2g | growing bud 3g | growing bud 4g | growing bud 5g |
|-----------------------|----------------|----------------|----------------|----------------|----------------|



Experiment2:Confirm that the absorbance changes too in the case of the edible parts of the potatoes.

- ①Cut the edible parts and the skin of potatoes and mash them.
- ②Please refer to Experiment 1-②, 1g, 2g, 3g, 4g, 5g of growing bud change to 5g,10g,15g of the edible parts and skin.
- ③ Put ② into cell and perform colorimetric analysis.

|                       |                          |                           |                           |
|-----------------------|--------------------------|---------------------------|---------------------------|
| Experiment 2's sample | edible parts and skin 5g | edible parts and skin 10g | edible parts and skin 15g |
|-----------------------|--------------------------|---------------------------|---------------------------|

### 5. Expectations

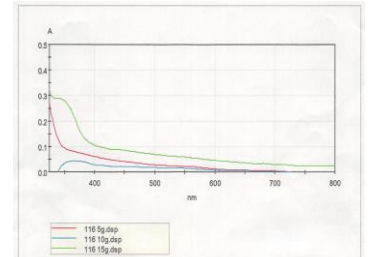
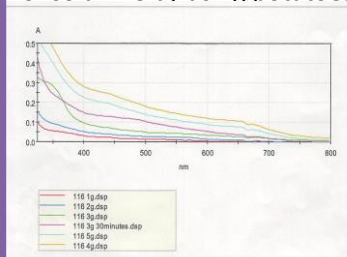
The larger amount of solanine, the deeper the sample's color change.

### 6. Results and consideration

The results are as shown below:

The considerations are:

- 1 By experiment 1's result, the more amount of solanine, the deeper the sample's color change. But, spaces every time data aren't regular, so we couldn't make an index.
- 2 By experiment 2's result, the datas' change was irregular, so we decided that it is impossible to measure the concentration of solanine by using potatoes.



### 7. Conclusions

We had collected little data because it had taken a lot of time to do every experiment. Though it is undecided whether we'll continue this research, we would like to collect more data if we continue it. And we'll take the average measured value, we hope to achieve the purpose of this research and make an index of concentration measurement of solanine. Also, we would like to consider the reasons why the data of an edible part of potato was different from one of the buds of a potato, from a potato that was changed in mass, by taking more data.