

Copper ions toxic effect on plants

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>Introduction

Copper exists as copper ions in animals and plants. They need to take in copper by as nutrient.

However it's said that environment with a high concentration of copper ions is poisonous for them.

Based on the present experiment , it is clearly shown that copper ion is a poison for plants.

>Purpose

The purpose of this research is to detect the amount of copper ion that affects radish seed .

We experimented with a copper sulfate aqueous solution and radish seeds.

>Experiment1

Finding the amount affected of copper ion.

<Materials>

- Copper sulfate aqueous solution
(Concentration 1.0%, $1.0 \times 10^{-1}\%$, $1.0 \times 10^{-2}\%$, $1.0 \times 10^{-3}\%$, $1.0 \times 10^{-4}\%$, $1.0 \times 10^{-5}\%$, $1.0 \times 10^{-6}\%$)
- Water
- Radish seed

<Method>

We put 6 radish seeds , water , and the copper sulfate aqueous solution in a petri dish.

The petri dish was taped with parafilm and wrapped with aluminum foil.

After a week, we measured the root length.

We measured the length from the root to the hypocotyl.

We made 30 samples for each concentration.

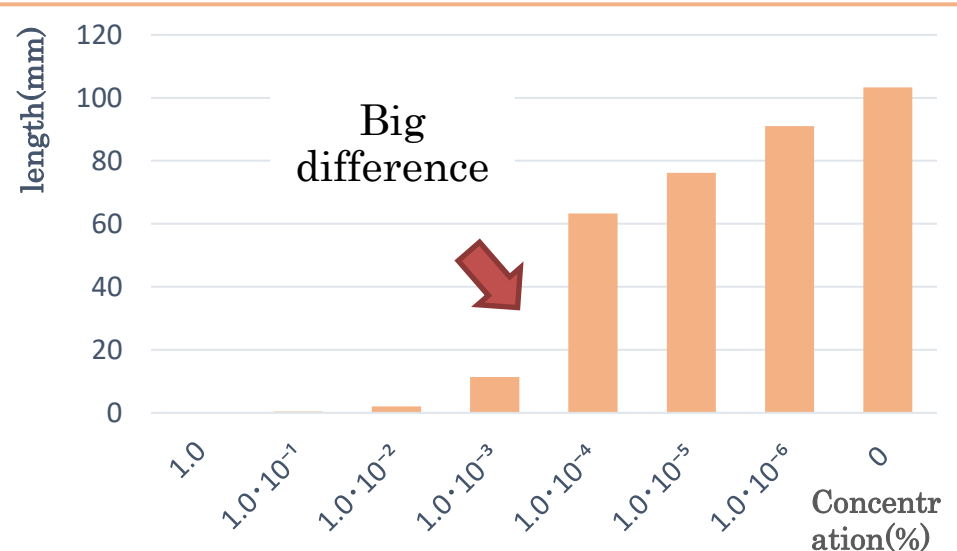
We used incubator to keep the temperature at 20°C.



Hypocotyl



<Result>



According to the graph , there is a big difference between $1.0 \times 10^{-3}\%$ and $1.0 \times 10^{-4}\%$. Radish seeds are affected by more than $1.0 \times 10^{-3}\%$ of copper sulfate aqueous solution.

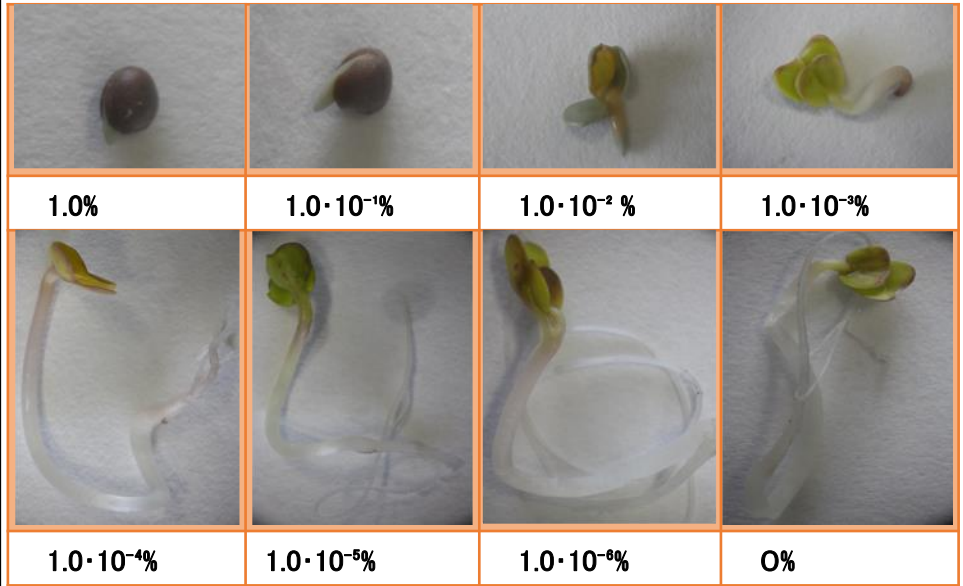
<Consideration>

This result shows us that a copper ions concentration of more than $1.0 \times 10^{-3}\%$ causes toxicity for plant.

We think it's a great opportunity to know about the tolerance of radish seeds for copper ions.

>References

銅の殺菌作用と毒性 仙台第三高等学校 黒川朝陽 他著



>Experiment2

Finding the part of the root which is most affected

<Materials>

- Copper sulfate aqueous solution
(Concentration $1.0 \times 10^{-2}\%$, $1.0 \times 10^{-3}\%$)
- Water
- Radish seed

<Method>

We put 6 radish seeds and water in a petri dish. The petri dish was taped with parafilm and wrapped with aluminum foil .

After 5 days , we measured the root length and changed water into copper sulfate aqueous solution . Similarly , we processed the petri dish. After 2 days , we measured the root length and calculated the root length grow for 2 days .

We made 30 samples for each concentration.

We used incubator to keep the temperature at 20°C.

<Result>

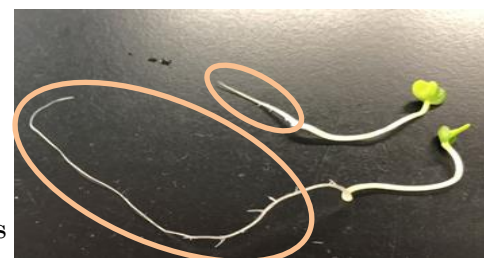
• According to the graph , the root length was copper ions concentration of $1.0 \times 10^{-2}\%$ and $1.0 \times 10^{-3}\%$ is shorter than the root length was copper ions concentration of 0%.

• According to the picture , the hypocotyl length was copper ions concentration of 0%, $1.0 \times 10^{-2}\%$ and $1.0 \times 10^{-3}\%$ is almost the same.

0%	0%	0%
↓ 0%	↓ $1.0 \times 10^{-3}\%$	↓ $1.0 \times 10^{-2}\%$
33.59 mm	7.01 mm	3.25 mm

<Consideration>

The result shows us that a copper ions affects the root. We think that The cell wall hardened by copper ions causes this result.



>Conclusion

From our experiment , we find out two results.

First , a copper ions concentration of more than $1.0 \times 10^{-3}\%$ causes toxicity for plant.

Second , a copper ions affects the root.

>Future work

- We will solve the mechanism of preventing the growth of seeds.
- We will research when copper ions prevents the growth of seed.