



Comparative on soil quality on the growth of Chinese spinach grown on the ground and in
floating cages.

Research team

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Abstract

Title : Comparative on soil quality on the growth of Chinese spinach grown on the ground and in floating cages.

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Comparative research on soil quality on the growth of Chinese spinach grown on the ground and in floating cages. Two growing areas will be planted to compare growth: on normal soil and in floating cages. It will study the physical characteristics of the soil, soil temperature, soil moisture values. Soil acidity and baseness, check NPK in soil, soil color, soil texture, soil structure. It was found that the soil had different adhesion, that is, the adhesion in normal soil would stick together into a ball. It was denser than the soil in the floating cage. The soil in the cage was loose. . Normal soil has a higher temperature than the soil in the cage. As a result, the growth of Chinese spinach grown in normal soil grew more than those grown in soil in floating cages.

Keywords : soil quality and Growth of the Chinese spinach

Introduction

Chinese spinach, small green lettuce, large leaves. It is useful in terms of providing calcium and fiber, as well as helping to nourish the eyes. Planting and care, since green lettuce is a vegetable with a shallow root system. Therefore, it is better to plow or dig the soil to a depth of about 15-20 cm, dry the soil for 5-7 days, and fertilize the soil by adding manure or compost that has already decomposed well into the soil. Growing cabbage greens can be done in a variety of ways, such as sowing. Sprinkling in rows Raising planting grooves in single or double rows, but the most popular method is to sow or sprinkle in rows directly in the plot. The seeds of cabbage greens are relatively inexpensive. And damage may occur during transplanting seedlings because this vegetable is quite weak. If you want to transplant seedlings, you need to wait for about 20 days of planting period. They move into nursery bags and continue to maintain for about 10 days before transplanting into the plot and ensuring they receive enough water. When the cabbage is about 40-45 days old, it is possible to harvest it with a sharp and clean knife at the base of the plant and transport it to the desired source.

Soil refers to a naturally occurring material resulting from the physical and chemical decomposition of rocks and minerals combined with organic matter formed by the decomposition of humus into the upper surface that envelops the earth. Soil has different characteristics and properties in different places according to the climate, terrain, object of origin, organism and period of soil formation. so Therefore, Chinese cabbage is a popular cash crop that farmers grow to generate income. Most of the production and trading is produced by smallholder farmers, who use natural processes to grow. It is a normal method of planting on the ground because of its low production cost. Later, the cultivation of Chinese cabbage in floating cages was invented and this process was used to compare how Chinese cabbage is grown on normal ground and planted in soil in floating cages to compare and observe the growth of Chinese cabbage. Which one has a better yield ?

So, The researcher is therefore interested in studying the physical characteristics of the soil. Soil temperature Soil moisture value, soil acidity-base Check for NPK in the soil, soil color. Ground beef Soil structure and growth of celery plants in different growing locations To apply the knowledge gained to develop the careers of farmers who grow celery plants.

Research Objectives

1. To study the physical characteristics of the soil. Soil temperature Soil moisture value, soil acidity-base
Check for NPK in the soil, soil color. Ground beef Soil structure
2. To compare the growth of Chinese spanich grown on normal ground and those grown in soil located in
floating cages.

Research Questions

1. Physical characteristics of the soil Soil temperature Soil moisture value, soil acidity-base Check for NPK in
the soil, soil color. Ground beef Is the soil structure of the two regions different?
2. The growth of Chinese spanich grown on the ground normally grows better or slower than chun celery
vegetables grown in the soil that is in floating cages.

Research hypothesis

1. Physical characteristics of the soil Soil temperature Soil moisture value, soil acidity-base Check for NPK in
the soil, soil color. Ground beef The soil structure of the 2 areas is different.
2. The growth of Chinese spanich grown on normal ground grows more and faster than chun celery vegetables
grown in the soil in floating cages.

Methods and materials

Materials and equipment

- Metal vernier

Measure soil quality monitoring

- Soil sampling equipment
- Soil samples
- Soil Analysis Guide

- Clay color chart book
- Soil Analysis Guide
- pH paper, pH pen, pH meter
- Distilled water
- Glassware
- Soil sample preparation tool
- Soil in floating cages and soil on the ground.
- pH comparison solutions
- Soil nutrient test kit for measuring NPK

How to conduct research

1. Research preparation stage

- 1) Set up a study point on the topic you want to study.
- 2) Study, research, gather knowledge and theories related to the research.
- 3) Determine the purpose of the study.
- 4) Determine the planting area to be studied.

2. Implementation steps

- 1) Conduct research planning.
- 2) Conduct a survey of the area to be researched.
- 3) Collect samples for measurement.

Soil sampling and soil monitoring

Part 1 : Soil Sampling and Soil Determination

1. Determine the soil sampling points in both areas at a depth of 10 cm.
2. Write a label showing the details of the soil sample.
3. Study the physical characteristics of the soil by studying the structure of the soil using CU Smart Len to study the soil texture and soil color.
4. Measure soil moisture in 2 areas by using a multi-purpose meter at a depth of 5 cm.
5. Measure the soil temperature in 2 areas using a thermometer to measure the soil temperature at a depth of 10 cm.
6. Measure npk with N P K test kit in soil.
7. Take the soil in both areas to measure the pH, which can be measured using indicator paper and discuss the results.

Measurement of the growth of Chinese spinach

Part 2 : Growth monitoring of cultivated celery vegetables for 45 days



1. Compare the growth of Chinese spinach by using a tape measure to measure the height of chun celery vegetables grown in both areas.
2. Conclusions

Results and data

Soil characteristics

Based on the study of soil structure. Soil color Adhesion of soil and soil texture Display as shown in Table 1.

Table 1 shows the structure of the soil.

Soil characteristics	Soil structure	Soil color	Soil fixation	The photo shows the characteristics of the soil in which 20x magnification
Normal ground	It is nodular	Grayish-brown	There is tightness.	
Soil in floating cages	It is nodular	Pitch black	It is crumbly.	

Soil moisture values

According to the study, normal soil moisture has an average of 5.595 millivolts.

Table 2 shows the soil temperature in both areas.

Soil characteristics	Moisture value (millivolts)			average
	1st time	2nd time	3rd time	
Normal ground	7.1	8.9	9.1	8.36
Soil in floating cages	2.1	2.9	3.5	2.83

Soil temperature

According to the study, the soil temperature in both areas has an average temperature of 32.16 degrees Celsius.

Table 3 shows the soil temperature in both areas.

Soil characteristics	Temperature (degrees Celsius)			average
	1st time	2nd time	3rd time	
Normal ground	31	32	32	31.66
Soil in floating cages	33	32	33	32.66

Soil fertility

1. Nitrogen

Normal soil nitrogen measurements showed low nitrogen values, and floating cages soils were found to have low nitrogen values.

Values are shown in Table 4.

2. Phosphorus

Phosphorus measurements in normal soil showed moderate phosphorus values, and soil in floating cages showed moderate phosphorus values. Values are shown in Table 4.

3. Potassium

Potassium measurements in normal soil showed high potassium values, and soil in floating cages was found to have low potassium values. Values are shown in Table 4.

Table 4 shows the soil fertility in both areas.

Planting ground area	Soil fertility		
	Nitrogen	Phosphorus	Potassium
Normal ground	low	medium	high
Soil in floating cages	low	medium	low

Soil pH

As a result of the experiment, it was found that the ground is normal and the soil in the cages floats. It has an average pH of 5.5.



Display as shown in Table 5.

Table 5 shows the pH of both soil areas.

Soil characteristics	Soil pH			average
	1st time	2nd time	3rd time	
Normal ground	6	6	6	6
Soil in floating cages	5	5	5	5

Comparative growth of Chinese spinach grown on the ground and in floating cages.

By measuring the growth of Chinese spinach grown on normal ground and soil in floating cages.

Soil characteristics	Leaf size of Chinese spinach	Height size Chinese spinach	The picture shows the growth of Chinese spinach
Normal ground	17	46	
Soil in floating cages	15	38	

Discussion and conclusion

Based on a study comparative research on soil quality on the growth of Chinese spinach grown on the ground and in floating cages. It was found that normal soil has different adhesions, that is, the normal ground adhesions stick together in a nodular shape. It is firmer than the soil in the floating cage. As for the soil in the floating cage, it is crumbly. These 2 soils have a temperature of 32.16 degrees Celsius. This is a relatively normal temperature for plant growth, but normal ground soil is more abundant in all three macronutrients than the soil in the cage. As a result, the growth of Chinese spinach grown in normal ground grows more than those grown in the soil in floating cages.

Acknowledgements

Environmental research Comparative on soil quality on the growth of Chinese spinach grown on the ground and in floating cages. At Khuan Pring Subdistrict, Muang District, Trang Province The researcher would like to thank Ms. Kwanjai Kanjanasrimek for providing knowledge, advice and advice to the research team in conducting this environmental research, and thank the parents of Ms. Natjiya Sriwichian for providing knowledge on growing Chinese spinach and providing a place to plant them for research.

Finally, the research team would like to thank all parents for their encouragement and support in this research.

Research team

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