abstract

Research Title :Comparison of physical characteristics of soil Soil temperature, acidity. Soil base and soil nutrients of chili plants with coffee grounds. Eggshells and banana peels are organic fertilizers.
Author : Ms. Parisa Srirak
Ms. Napassakorn Rongrak
Ms. Supichaya Inchum
Grade Level : Grade 5
Advisor : Teacher Kwanjai Kanjanasrimek
Teacher Acharee Samhuay
School : Wichian Matu Trang

This research is a comparative study of the physical characteristics of soils. Soil temperature Soil acidity and soil nutrients of chili plants with coffee grounds It is an organic fertilizer with the objective of studying the physical characteristics of the soil, soil temperature. Soil acidity and soil nutrients of chili plants containing coffee grounds Eggshells and banana peels are organic fertilizers. The researcher then conducted a study by dividing the potting soil into nine pots. Pot one Second pot and third pitching Take the potting soil and mix it with coffee grounds. Fourth pot, fifth pot and the sixth pot, mixing potting soil with coffee grounds and eggshells, and the seventh pot, eighth pot, and ninth pot. The potting soil is mixed with coffee grounds and eggshells, and the physical characteristics of the soil are examined. Soil temperature Soil acidity and soil nutrients Plant the peppers in the soil in all nine pots and check the soil temperature. Weekly soil acidity and soil symptoms for four weeks showed that the physical characteristics of the nine potted soils were sandy loam with rounded lumps. The temperature and base pH values of all nine pots are approximately the same. and The nutrient values in the soil of all nine pots are getting higher every week as well.

Keywords: soil physical characteristics, soil temperature, soil pH base, soil nutrients

preamble

Origin and significance

Chili peppers are an important cash crop in Thailand. Growing good quality peppers with high yields requires a combination of factors. One of the important factors is soil quality. Good soil will help promote good growth of chili plants.

Soil is a fundamental component of agricultural ecosystems, playing an important role in providing nutrients. Water and plant adhesion Soil is formed by the decay of mineral rocks and organic matter by various physical, chemical and biological processes. Soil is an important factor affecting the growth and yield of peppers. Therefore, proper soil management is absolutely necessary to achieve high quality and quantity of chili pepper yields.

Organic fertilizers are naturally derived fertilizers. It has a great benefit for soil and plants. Coffee grounds Eggshells and banana peels are household waste materials that can be exploited as organic fertilizers. Coffee grounds contain macronutrients such as nitrogen, phosphorus, and potassium. Eggshells contain calcium. Banana peels contain potassium elements. Eggshells and banana peels are mixed together to form organic fertilizer, which may add nutrients to the soil and affect the growth of chili pepper plants.

The objective of this project is to conduct a comparative study of the physical characteristics of the soil. Soil temperature Soil acidity and soil nutrients of chili plants with coffee grounds It is a guideline to encourage farmers to use organic fertilizers produced from household waste materials to reduce production costs and protect the environment.

Research Questions

- Physical characteristics of the soil, soil temperature. Soil acidity and soil nutrients of chili plants with coffee grounds Are there any differences between eggshells and banana peels as organic fertilizers?

Research hypothesis

- Physical characteristics of the soil, soil temperature. Soil acidity and soil nutrients of chili plants with coffee grounds Eggshells and banana peels are organic fertilizers.

Research Objectives

To study the physical characteristics of the soil, soil temperature. Soil acidity and soil nutrients of chili plants containing coffee grounds Eggshells and banana peels are organic fertilizers.

Research Results

1. Gain knowledge of the subject Physical characteristics of the soil, soil temperature. Soil acidity and nutrients in the soil of chili plants with coffee grounds. Eggshells and banana peels are organic fertilizers.
2. Able to apply knowledge about organic fertilizer from coffee grounds. It is a way to encourage farmers to use organic fertilizers produced from household waste materials to reduce production costs and protect the environment.

Equipment material

- Potting soil
-flowerpot
- Chili pepper plant
- Coffee grounds Eggshells and banana peels
-thermometer
- Soil pH Test Kit
- Soil nutrient test kit (N , P and K)

How to proceed

- Soil preparation process

1.) Divide the potting soil into 9 pots, the amount of each pot is 50 grams.
2.) Pots 1-3 mix the soil with the coffee pot in a ratio of 2:1.
3.) Pots 4-6 Mix the soil with coffee grounds and eggshells in a ratio of 2:1:1.
4.) Pots 7-9 mix the soil with coffee grounds and banana peels in a ratio of 2:1:1.

- Research Implementation Procedure

1.) Collect soil samples before planting pepper plants from all 9 pots of soil. Measure soil pH and soil nutrients (N, P and K)The results of the experiment are then recorded.
2.) Plant the peppers in all 9 pots. Collect soil samples to check soil temperature. Soil pH and soil nutrients (N, P and K) were measured weekly for 4 weeks, then the results were recorded and the results were summarized.

findings

The study of soil acidity and soil nutrients has obtained the results of the study on comparing the physical characteristics of the soil, soil temperature. Soil acidity and soil nutrients of chili plants with coffee grounds Eggshells and banana peels are organic fertilizers with the following results:

Table 1 shows the physical characteristics of the soil of chili plants with coffee grounds. Eggshells and banana peels are organic fertilizers in all 9 pots.

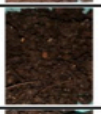
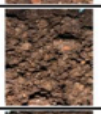
ดิน		ลักษณะทางกายภาพของดิน			
		โครงสร้างดิน	การยึดตัวของดิน	เนื้อดิน	รูปภาพดิน
ดินปลูกผสมกับกากกาแฟ	กระถางที่ 1	ก้อนมน	เกาะกัน	ร่วนเหนียวปนทราย	
	กระถางที่ 2	ก้อนมน	เกาะกัน	ร่วนเหนียวปนทราย	
	กระถางที่ 3	ก้อนมน	เกาะกัน	ร่วนเหนียวปนทราย	
ดินปลูกผสมกับกากกาแฟและเปลือกไข่	กระถางที่ 4	ก้อนมน	เกาะกัน	ร่วนเหนียวปนทราย	
	กระถางที่ 5	ก้อนมน	เกาะกัน	ร่วนเหนียวปนทราย	
	กระถางที่ 6	ก้อนมน	เกาะกัน	ร่วนเหนียวปนทราย	
ดินปลูกผสมกับกากกาแฟและเปลือกกล้วย	กระถางที่ 7	ก้อนมน	เกาะกัน	ร่วนเหนียวปนทราย	
	กระถางที่ 8	ก้อนมน	เกาะกัน	ร่วนเหนียวปนทราย	
	กระถางที่ 9	ก้อนมน	เกาะกัน	ร่วนเหนียวปนทราย	

Table 1 shows that:

The soil used to grow peppers in pots 1-3 mixed with potting soil and coffee grounds. The soil used to grow peppers in pots 4-6 mixed with potting soil with coffee grounds and eggshells, and the soil used to grow peppers in pots 7-9 mixed with potting soil with coffee grounds and banana peels. It has a rounded lumpy soil structure. The adhesion of the soil to each other and the soil texture is sandy loam.

Table 2 shows the soil temperature of chili plants with coffee grounds. It is an organic fertilizer in all 9 pots.

soil		Soil temperature (degrees Celsius)						
		Before planting	Week 1	Week 2	Week 3	Week 4	average	
Potting soil is mixed with coffee grounds.	Pot 1	31	31	30	30	30	30.4	30.5
	Pot 2	30	30	31	30	31	30.4	
	Pot 3	30	32	30	30	31	30.6	
Potting soil is mixed with coffee grounds and eggshells.	Pot 4	31	30	30	31	32	30.8	30.4
	Pot 5	30	30	31	29	29	29.8	
	Pot 6	31	31	31	30	30	30.6	
The potting soil is mixed with coffee grounds and banana peel.	Pot 7	32	30	30	30	30	30.4	30.5
	Pot 8	30	30	30	31	32	30.6	
	Pot 9	30	31	31	31	30	30.6	

From Table 2, after 4 weeks, it is found that:

- The soil used to grow peppers in pots 1-3 mixed with potting soil and coffee grounds, which has an average soil temperature of 30.5°C.

Pot 1 has an average soil temperature of 30.4 °C.

Pot 2 has an average soil temperature of 30.4 °C.

Pot 3 has an average soil temperature of 30.6 °C.

- The soil used to grow peppers in pots 4-6 mixed with potting soil with coffee grounds and eggshells, with an average soil temperature of 30.4 °C.

The 4th pot has an average soil temperature of 30.8 °C.

Pot 5 has an average soil temperature of 29.8 °C.

Pot 6 has an average soil temperature of 30.6 °C.

- The soil used to grow peppers in pots 7-9 mixed with potting soil with coffee grounds and banana peels, with an average soil temperature of 30.5 °C.

The seventh pot has an average soil temperature of 30.4 °C.

Pot 8 has an average soil temperature of 30.6 °C.

Pot 9 has an average soil temperature of 30.6 °C.

Table 3 shows the pH base in the soil of chili plants with coffee grounds. Eggshells and banana peels are organic fertilizers in all 9 pots.

soil		Soil pH						
		Before planting	Week 1	Week 2	Week 3	Week 4	average	
Potting soil is mixed with coffee grounds.	Pot 1	6	6	6	6	6	6	6
	Pot 2	7	6	6	6	6	6.2	
	Pot 3	6	6	6	6	5	5.8	
Potting soil is mixed with coffee grounds and eggshells.	Pot 4	6	6	6	7	7	6.4	6.3
	Pot 5	6	6	7	7	7	6.6	
	Pot 6	6	6	6	6	6	6	
The potting soil is mixed with coffee grounds and banana peel.	Pot 7	6	6	5	5	5	5.4	5.7
	Pot 8	6	6	6	6	5	5.8	
	Pot 9	7	6	6	5	5	5.8	

Table 3 after 4 weeks showed that:

- The soil used to grow peppers in pots 1-3 mixed with potting soil and coffee grounds. The average soil pH is 6.

Pot 1 has an average soil pH of 6.

Pot 2 has an average soil base pH of 6.2.

Pot 3 has an average soil base pH of 5.8.

- The soil used to grow peppers in pots 4-6 mixed with potting soil with coffee grounds and eggshells.

The average soil acid-base is 6.3.

The 4th pot has an average soil pH of 6.4.

Pot 5 has an average soil base pH of 6.6.

Pot 6 has an average soil pH of 6.

- The soil used to grow peppers in pots 7-9 mixed with potting soil with coffee grounds and banana peels, which has an average soil pH of 5.7.

The 7th pot has an average soil pH of 5.4.

Pot 8 has an average soil pH of 5.8.

Pot 9 has an average soil base pH of 5.8.

Table 4 shows the nutrient values in the soil of chili plants with coffee grounds. Eggshells and banana peels are organic fertilizers. pot

Soil		Soil nutrients														
		N					P					K				
		Before planting	Week 1	Week 2	Week 3	Week 4	Before planting	Week 1	Week 2	Week 3	Week 4	Before planting	Week 1	Week 2	Week 3	Week 4
Potting soil is mixed with coffee grounds.	Pot 1	medium	medium	medium	high	high	low	medium	high	high	high	low	low	medium	medium	high
	Pot 2	medium	medium	medium	medium	high	trace	low	medium	medium	high	trace	trace	low	medium	medium
	Pot 3	low	low	medium	medium	medium	trace	low	medium	high	high	medium	medium	medium	high	high
Potting soil is mixed with coffee grounds and eggshells.	Pot 4	medium	medium	medium	high	high	trace	low	medium	high	high	low	medium	high	high	high
	Pot 5	medium	medium	medium	medium	high	trace	low	medium	medium	medium	trace	low	medium	high	high
	Pot 6	medium	medium	medium	high	high	trace	low	medium	medium	medium	trace	low	medium	high	high
The potting soil is mixed with coffee grounds and banana peel.	Pot 7	low	medium	medium	medium	high	trace	low	low	medium	high	low	low	medium	medium	medium
	Pot 8	medium	medium	medium	high	high	trace	low	medium	high	high	low	medium	medium	high	high
	Pot 9	medium	medium	medium	medium	medium	trace	low	low	medium	high	low	medium	high	high	high

From Table 4, after 4 weeks, it is found that:

Nutrient N

- The soil used to grow peppers in pots 1-3 mixed with potting soil and coffee grounds.

Pot 1 is high in nutrients N in the soil.

Pot 2 is high in soil N nutrients.

Pot 3 contains nutrient N in moderate soil.

- The soil used to grow peppers in pots 4-6 mixed with potting soil with coffee grounds and eggshells.

Pot 4 is high in nutrients N in the soil.

Pot 5 is high in nutrients N in the soil.

Pot 6 is high in nutrients N in the soil.

- The soil used to grow peppers in pots 7-9 mixed with potting soil with coffee grounds and banana peels.

Pot 7 is high in nutrients N in the soil.

Pot 8 is high in nutrients N in the soil.

Pot 9 contains nutrient N in moderate soil.

Nutrient P

- The soil used to grow peppers in pots 1-3 mixed with potting soil and coffee grounds.

Pot 1 is high in soil P nutrients.

Pot 2 is high in soil P nutrients.

Pot 3 contains nutrient P in moderate soil.

- The soil used to grow peppers in pots 4-6 mixed with potting soil with coffee grounds and eggshells.

Pot 4 is high in soil P nutrients.

Pot 5 contains medium P nutrients.

Pot 6 contains medium P nutrients.

- The soil used to grow peppers in pots 7-9 mixed potting soil with coffee grounds and banana peels.

Pot 7 is high in soil P nutrients.

Pot 8 is high in soil P nutrients.

Pot 9 is high in soil P nutrients.

Nutrient K

- The soil used to grow peppers in pots 1-3 mixed with potting soil and coffee grounds.

Pot 1 is high in soil K nutrients.

Pot 2 contains nutrient K in moderate soil.

Pot 3 is high in soil K nutrients.

- The soil used to grow peppers in pots 4-6 mixed with potting soil with coffee grounds and eggshells.

Pot 4 is high in soil K nutrients.

Pot 5 has a high content of nutrients K in it.

Pot 6 is high in nutrients K in it.

- The soil used to grow peppers in pots 7-9 mixed potting soil with coffee grounds and banana peels.

Pot 7 contains nutrient K in moderate soil.

Pot 8 is high in soil K nutrients.

Pot 9 is high in soil K nutrients.

Summarize and discuss the results of the experiment.

From the comparative study of the physical characteristics of the soil. Soil temperature Soil acidity and soil nutrients of chili plants with coffee grounds It is an organic fertilizer, with potted soil first to third being soil with potting soil mixed with coffee grounds. The fourth to sixth potted soil is the soil with potting soil mixed with coffee grounds and eggshells, and the seventh to ninth potted soil is potting soil mixed with coffee grounds and banana peels. It was found that the physical characteristics of the nine potted soils are sandy loam, rounded lumps, sticking together The temperature and base pH values of all nine pots are approximately the same. And the soil nutrient values of all nine pots are getting higher every week as well. Make it known that the potting soil mixed with coffee grounds. Eggshells and banana peels are organic fertilizers, affecting the physical characteristics of the soil, soil temperature. pH and soil nutrients In a better way, the same.

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