

Comparison of Soil Quality Affecting the Growth of Different Mushrooms Species in Thung Khai Botanic Garden , Trang Province



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Abstract

This study investigates the effect of soil quality on the growth of different mushroom species in Thung Khai Botanic Garden, Trang Province. The objective of this research is to examine the soil quality parameters influencing the growth of various mushrooms, specifically termite mushrooms, Jun mushrooms, and egg mushrooms. The study focuses on the physical and chemical properties of the soil, including soil structure, color, texture, cohesion, pH levels, soil moisture content, temperature, and the presence of essential nutrients (Nitrogen (N), Phosphorus (P), and Potassium (K)). The findings indicate that the soil in Thung Khai Botanic Garden has an average pH ranging from 6 to 7, a moisture content of 10-20%, and a temperature range of 24-26°C. The nitrogen level averages at 2.1, phosphorus at 2.6, and potassium at 7.4

Introduction



Research Question

1. Does soil quality affect the growth of different mushroom species?



Research Hypothesis

1. Soil quality influences the growth of different mushroom species. Variables
Independent : Variable: Soil in areas where different mushroom species grow.
Dependent Variable : Soil quality.
Controlled Variables : Study location Thung Khai Botanic Garden, Trang Province, research equipment, and tools.

Study Location

Thung Khai Botanic Garden, Trang Province Coordinates: Latitude 7.46924,Longitude 99.64021

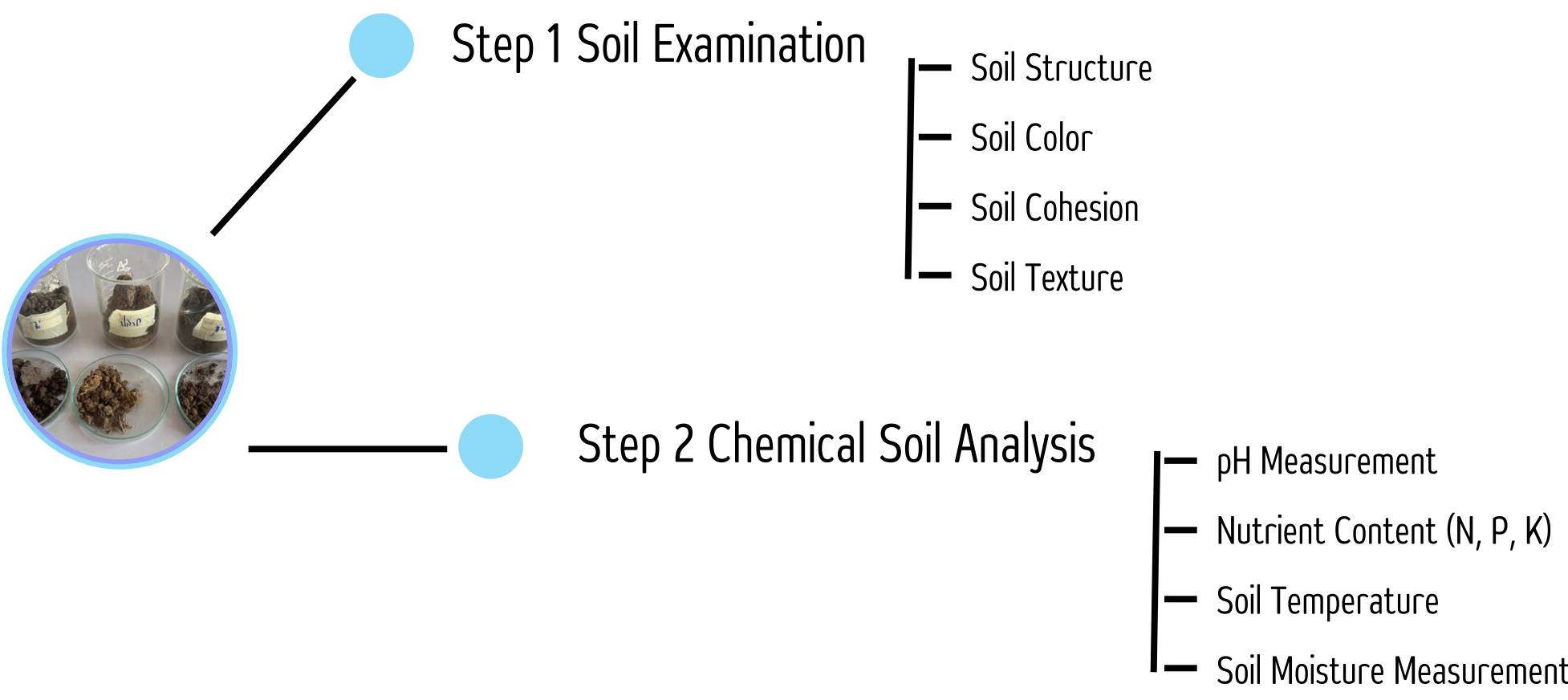
Materials and Equipment



Acknowledgements

The research project, "Comparison of Soil Quality Affecting the Growth of Different Mushroom Species," has been successfully completed thanks to the support and encouragement of many individuals. We would like to express our deepest gratitude to Mr. Sakda Paisomboon, Director of Wichienmatu School, for his support and encouragement throughout this research. Our sincere appreciation goes to Ms. Khwanchai Kanjanasrimek, our research advisor, for her invaluable guidance, advice, and assistance in reviewing and correcting various aspects of this study. Her dedication and expertise have been instrumental in the successful completion of this project. We would also like to extend our heartfelt thanks to our friends for their support, constructive feedback, and willingness to exchange ideas throughout the research process. Their collaboration and encouragement have contributed significantly to the success of this study. Lastly, we are grateful to everyone who has contributed, directly or indirectly, to the completion of this research.

Research Procedures



Results

Table 1: Physical Properties of Soil

| Thung Khai Botanic Garden | Physical properties of soil | | | |
|---------------------------|-----------------------------|-------------|-----------------|---------------|
| | Soil structure | Soil color | Soil texture | Soil cohesion |
| Termite fungus | Granular | 7.5YR 3/3 | Sandy loam | Firm |
| Jun mushroom | Granular | 7.5YR 2.5/2 | Sandy clay loam | Friable |
| Egg mushroom | Granular | 7.5YR 2.5/1 | Loamy sand | Firm |

From Table 1, it can be observed that all three mushroom species grow in soil with different physical characteristics. All three types of soil exhibit a granular structure. The soil color varies: the termite fungus grows in light brown soil, the jun mushroom in reddish brown soil, and the egg mushroom in dark brown soil. The soil texture also differs, with termite fungus found in sandy loam, jun mushroom in sandy clay loam, and egg mushroom in loamy sand. Soil cohesion also varies: the termite fungus and egg mushroom grow in firm soil, whereas the jun mushroom grows in friable soil. These physical properties of soil affect the growth and suitability of each mushroom species.

Table 2 : Soil Temperature

| Thung Khai Botanic Garden | Soil Temperature °C | | | |
|---------------------------|---------------------|---------|---------|---------|
| | Trial 1 | Trial 2 | Trial 3 | Average |
| Termite fungus | 24 | 23 | 25 | 24 |
| Jun mushroom | 24 | 25 | 24 | 24 |
| Egg mushroom | 26 | 26 | 26 | 26 |

From Table 2, it can be seen that the soil temperature differs among the three species. The average soil temperature for termite fungus and jun mushroom is 24°C, while the soil temperature for egg mushroom is 26°C. Soil temperature significantly impacts mushroom growth since each species has an optimal temperature for its development. If the temperature deviates too much from this optimal range, the mushrooms may not grow properly.

Table 3 : Soil Moisture

| Thung Khai Botanic Garden | Soil Moisture | | | |
|---------------------------|---------------|---------|---------|---------|
| | Trial 1 | Trial 2 | Trial 3 | Average |
| Termite fungus | 10 | 10 | 10 | 10 |
| Jun mushroom | 20 | 20 | 20 | 20 |
| Egg mushroom | 10 | 10 | 10 | 10 |

From Table 3, it is evident that the three mushroom species grow in soils with different moisture levels. The average soil moisture for termite fungus and egg mushroom is 10%, whereas for jun mushroom, it is 20%. Soil moisture influences mushroom growth because mushrooms require a suitable moisture level to thrive. If the soil is too dry, mushroom growth may be stunted.

Table 4 : pH Levels

| Thung Khai Botanic Garden | pH values | | | |
|---------------------------|-----------|---------|---------|---------|
| | Trial 1 | Trial 2 | Trial 3 | Average |
| Termite fungus | 6.0 | 7.0 | 6.0 | 6.3 |
| Jun mushroom | 6.0 | 6.0 | 6.0 | 6.0 |
| Egg mushroom | 7.0 | 7.0 | 7.0 | 7.0 |

From Table 4, it is shown that the soil pH varies among the three mushroom species. The termite fungus grows in soil with an average pH of 6.3, the jun mushroom in soil with an average pH of 6.0, and the egg mushroom in soil with an average pH of 7.0. Soil pH affects mushroom growth because it influences the decomposition of organic matter and nutrient availability in the soil. If the pH is too acidic or too alkaline, it may create unfavorable conditions for mushroom development.

Table 5: Mineral Content in Soil

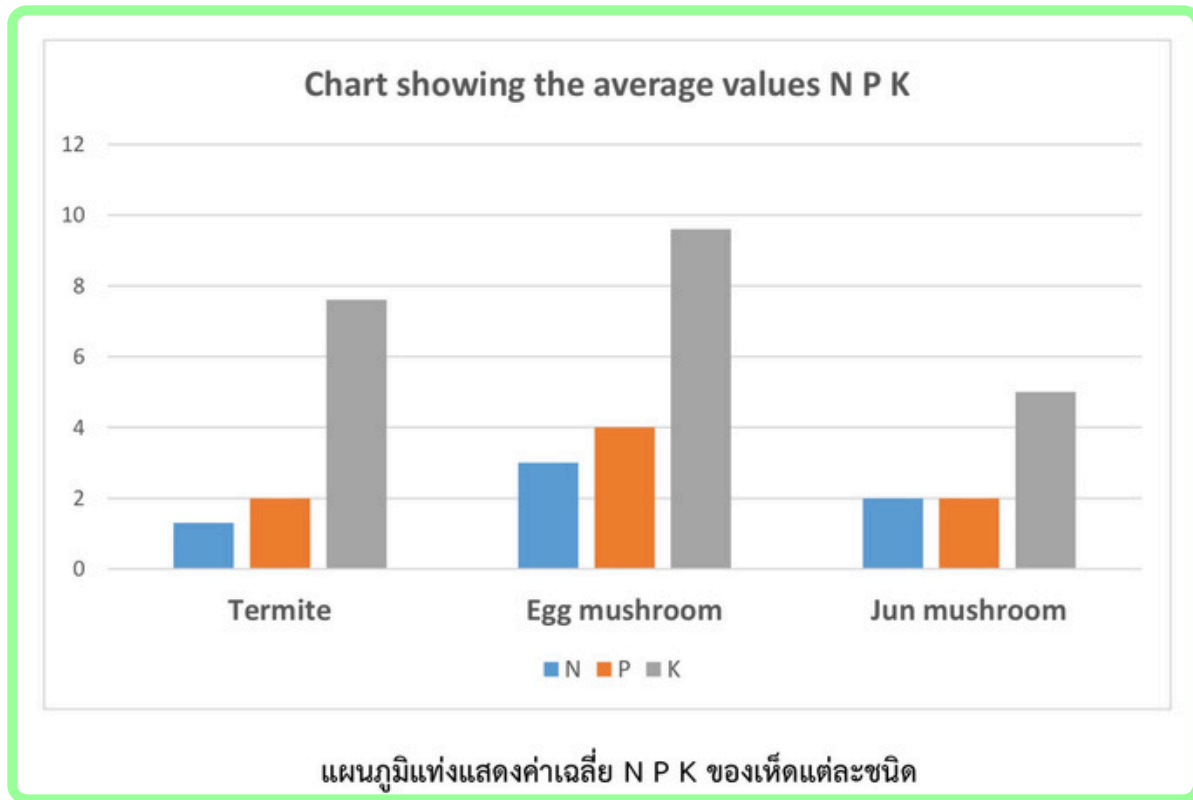


Table 5 shows the mineral content in the soil for the three types of mushrooms, where termite fungus soil contains 1.3% nitrogen (N), 2.0% phosphorus (P), and 7.6% potassium (K), jun mushroom soil contains 2.0% nitrogen (N), 2.0% phosphorus (P), and 5.0% potassium (K), and egg mushroom soil contains 3.0% nitrogen (N), 4.0% phosphorus (P), and 9.6% potassium (K), with an overall observation that potassium (K) levels are consistently higher than nitrogen (N) and phosphorus (P) in all soil samples, which may influence the growth and development of the mushrooms.



Conclusion and Discussion

The study on soil quality affecting the growth of different mushroom species at Thung Khai Botanic Garden, Trang Province, found that soil quality factors, including pH, moisture, temperature, and essential mineral content (nitrogen (N), phosphorus (P), and potassium (K)), significantly influence mushroom growth. The optimal soil pH for mushroom growth ranges between 6 and 7, which promotes healthy development. Soil moisture affects certain mushroom species, such as Jun mushroom, which requires higher moisture levels than other species. The ideal soil temperature for mushroom growth is between 24-26°C, with Egg mushroom thriving best at slightly higher temperatures compared to other mushrooms. Regarding mineral content, potassium (K) levels were found to be higher than other nutrients in the studied soils, playing a crucial role in the growth of all mushroom species. Egg mushroom had the highest nitrogen (N), phosphorus (P), and potassium (K) levels, leading to optimal growth, while Termite fungus thrived in soil with high potassium but low nitrogen levels. Jun mushroom had moderate nutrient levels and required high moisture for proper growth. These findings highlight the importance of soil properties in optimizing mushroom cultivation and suggest that different mushrooms have specific soil requirements for optimal growth.

Reference documents

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