

Research Project Title : Comparative Study of Air Quality in Areas with and without
Phytoremediation Plants at Wichienmatu School, Trang.

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Abstract

This environmental science research study, entitled ‘A Comparative Study of Air Quality in Areas with and without Phytoremediation Plants within Wichienmatu School, Mueang District, Trang Province,’ aims to compare air quality between areas planted with phytoremediation plants and areas without such plants. The study area was divided into two sections: an area with phytoremediation plants and an area without phytoremediation plants. The researchers were particularly interested in examining relative air humidity and temperature. The results showed that the area with phytoremediation plants had higher relative air humidity and lower temperature compared to the area without phytoremediation plants.

Keywords : Phytoremediation plants Relative humidity Temperature Air quality

Background and Significance

Currently, the increasing air pollution from industrial activities or deforestation to expand human living spaces has led to a decrease in trees that produce oxygen. This impacts the human body, causing the accumulation of toxins within it. Therefore, the organizing committee has taken an interest in studying plants that absorb toxins, specifically four types: Sansevieria trifasciata (snake plant), golden snake plant, dwarf snake plant, and emerald plant, in the area of Vichairamat School, Mueang District, Trang Province. These plants can absorb toxins through their leaf pores and transfer them to the roots, which then send the toxins into the soil to be broken down by microorganisms around the roots as food. Meanwhile, the plants will produce oxygen, which is essential for human life.

Research Questions

1. Is there a difference in relative humidity between areas planted with phytoremediation plants and areas without phytoremediation plants?
2. Is there a difference in temperature between areas planted with phytoremediation plants and areas without phytoremediation plants?

Research Hypothesis

1. The relative humidity in areas planted with phytoremediation plants differs from that in areas without phytoremediation plants.
2. The temperature in areas planted with phytoremediation plants differs from that in areas without phytoremediation plants.

Materials and Methods

Research Variables

The First Hypothesis: The relative humidity in areas planted with phytoremediation plants differs from that in areas without phytoremediation plants.

Independent Variable : Area planted with phytoremediation plants , Area without phytoremediation plants

Dependent Variable : Relative Humidity

Controlled Variables : Date, time, and equipment used to measure the relative humidity in the area where plants absorb toxins.

The Second Hypothesis : The temperature in areas planted with phytoremediation plants differs from that in areas without phytoremediation plants.

Independent Variable : Area planted with phytoremediation plants , Area without phytoremediation plants

Dependent Variable : Air Temperature

Controlled Variables : Date, time, and equipment used to measure the relative humidity in the area where plants absorb toxins.

Materials and Equipment

- 1) Hygrometer
- 2) Thermometer

- 3) Plants that absorb toxins include Snake Plant (Sansevieria Trifasciata), Golden Snake Plant, Dwarf Snake Plant, and Emerald Plant.

Research Methodology

Study Area

This research was conducted at Wichienmatu School, Mueang Trang District, Khok Lo Subdistrict, Trang Province, Thailand

Geographical Coordinates

Table showing the geographical coordinates of the study area at Wichienmatu School

Area	Research Methodology	
	Latitude(N)	Longitude(E)
Phytoremediation area	7.50419	99.62906
Non-phytoremediation area	7.50423	99.62887



Figure 1 shows the area planted with phytoremediation plants.



Figure 2 shows the area without phytoremediation plants.

Research Methodology

GLOBE Measurement Principles

Principles of Atmospheric Measurement Methods for Measuring Atmospheric Conditions

1. Research Preparation

The research preparation process consisted of four steps like formulating the research topic, reviewing and collecting relevant knowledge and theories related to the study, defining the objectives of the research, and determining sampling locations within the educational area. This study focused on the ability of plants to absorb toxic substances. The methodology involved measuring relative air humidity in areas planted with phytoremediation plants and in areas without such plants. The study area comprised of one location, which was divided into two sections.

2. Research Implementation

2.1 Measurement of Relative Humidity

Relative humidity was measured by installing a hygrometer in areas with phytoremediation plants and in areas without phytoremediation plants. The relative humidity was determined by calculating the temperature difference between the dry-bulb and wet-bulb hygrometers and comparing the values with the relative humidity table provided with the instrument. Then, the average relative humidity was then calculated. The area planted with phytoremediation plants exhibited a relative humidity of 91%, whereas the area without phytoremediation plants showed a relative humidity of 74.5%.

2.2 Measurement of Air Temperature

Air temperature was measured by installing a thermometer inside an instrument shelter. The thermometer was reset at solar noon and allowed to record temperature continuously for one day. Data were recorded at solar noon on the following day, and the average air temperature was calculated. The area planted with phytoremediation plants had an average temperature of 30.63 °C, while the area without phytoremediation plants had an average temperature of 30.75 °C.

Research Results

Table 1 shows the results of relative humidity measurements in the area planted with phytoremediation plants.

Sampling sit	Measurement	Relative Humidity(RH%)
Area planted with phytoremediation plant	Measurement No.1	100
	Measurement No.2	92
	Measurement No.3	86
	Measurement No.4	86
Average		91

Table 2 shows the results of relative humidity measurements in the area without phytoremediation plants.

Sampling sit	Measurement	Relative Humidity(RH%)
Area without phytoremediation plant	Measurement No.1	61
	Measurement No.2	85
	Measurement No.3	79
	Measurement No.4	73
Average		74.5

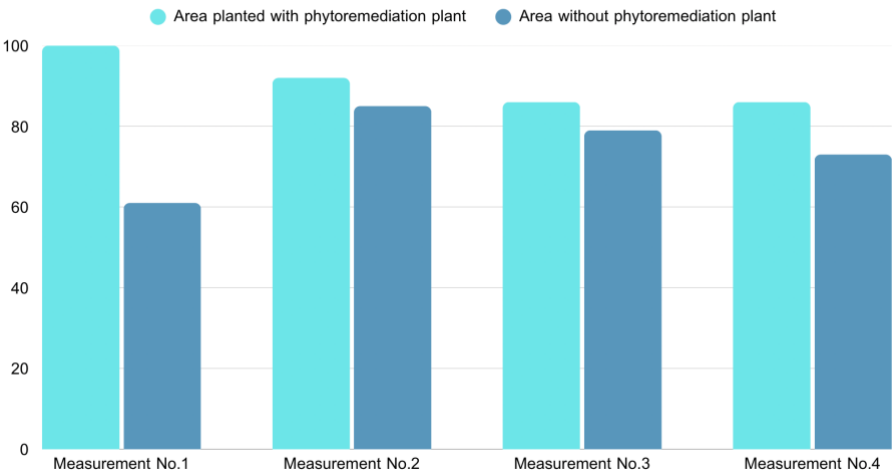
Table 3 shows the results of air temperature measurements in the area planted with phytoremediation plants.

Sampling sit	Measurement	Temperature(°C)
Area planted with phytoremediation plant	Measurement No.1	31.5
	Measurement No.2	29
	Measurement No.3	31
	Measurement No.4	31
Average		30.62

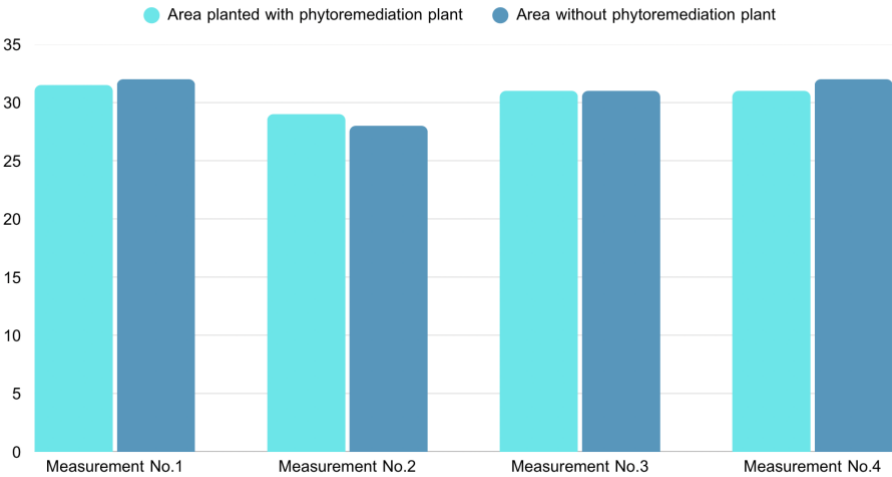
Table 4 shows the results of air temperature measurements in the area without phytoremediation plants.

Sampling sit	Measurement	Temperature(°C)
Area without phytoremediation plant	Measurement No.1	32
	Measurement No.2	28
	Measurement No.3	31
	Measurement No.4	32
Average		30.75

Bar chart 1 shows a comparison of relative humidity between the area planted with phytoremediation plants and the area without phytoremediation plants.



Bar chart 2 shows a comparison of air temperature between the area planted with phytoremediation plants and the area without phytoremediation plants.



Conclusion and Discussion

From the comparison of air quality between areas planted with phytoremediation plants and areas without phytoremediation plants within Wichienmatu School, it was found that the area with phytoremediation plants had a relative air humidity of 91% and an average temperature of 30.63°C. In contrast, the area without phytoremediation plants had a relative air humidity of 74.5% and an average temperature of 30.75°C. The results indicate that the area planted with phytoremediation plants exhibited higher relative air humidity and lower air temperature than the area without phytoremediation plants.

Acknowledgements

This environmental science research study entitled ‘A Comparison of Air Quality in Areas with and without Phytoremediation Plants,’ which aimed to examine relative humidity and temperature in areas planted with phytoremediation plants and areas without such plants, was successfully completed. The researchers would like to express their sincere gratitude to Mrs. Khwanjai Kanchanasrimek, the project advisor, for her valuable guidance and support throughout the research process. Special thanks are also extended to all team members for their cooperation and assistance in conducting this independent study.

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