A Study into the harvesting processes of Trang pepper; with relation to its effect on the percentage of piperine

Mr.Womgsakorn Weerakul and Mr.Kittiwat Junkate

School : Princess Chulabhon Science High College Trang

Teachers : Mrs. Patchara Pongmanawut and Mrs. Sirikwan Nuphuti

Email : 06497@pcshstrg.ac.th

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Abstract

This project aims to study the harvesting process of Trang pepper which affects the percentage of piperine. The researcher has set up a study point at the Bang Charoon Siem Mai's pepper plantation, Palian District, Trang Province, collecting pepper data during February 2023. by collecting the ripe peppers ready for harvesting and using three different harvesting processes. (processing from fresh pepper to dried pepper), namely Method 1, Sun-dried pepper, Method 2. Curing the pepper before sun exposure and method 3. Dried pepper in the oven. After that, the obtained produce was tested for the percentage of piperine by HPLC Chromatogram. During the study period, weather data were collected, including temperature, humidity, rainfall and brightness. to confirm the weather conditions during the experiment to confirm the weather conditions during the experiment.The results showed that the three harvesting methods yielded statistically significant differences in percentage of piperine. Method 2 gave the highest percentage of piperine (3.61%), followed by Method 1 (2.85%) and Method 3 (2.21%), respectively. From collecting weather data during the experiment, it was found that Climatic data of the study area had an average temperature of 22.20 °C, an average of 74.90% of humidity, and an average of 0 mm. of precipitation because there was no rainfall during the harvesting period of Trang pepper. The average illuminance was 27329.06 lux. From the above study, for the benefit of selecting the appropriate process and time for harvesting Trang peppers. to maintain product quality and to obtain the highest percentage of Trang pepper.

Keywords: Trang Pepper, Piperine, Harvest Process

Introduction

Trang pepper has been an important economic crop in Trang province for a long time ago since the reign of King Rama V. It was exported to Europe under the name "Trang pepper". However, the cultivation of pepper declined due to the popularity of growing easy-to-care-for rubber trees Instead of Trang peppers that use very meticulousness.

Nowadays, the cultivation of Trang pepper has regained popularity as farmers turn to it as a supplemental source of income. During the off-season of rubber tree cultivation, farmers cannot harvest their crops, so Trang pepper becomes an alternative option for income.

Trang pepper is back in the spotlight, in 2564, the Department of Intellectual Property has registered Trang pepper as a geographical indication (GI) of Trang province. The Trang Provincial Commerce Office has been pushing for the implementation of a GI product standard control system to maintain the quality of the product (Trang Provincial Office, 2021). One of the quality standards for testing Trang pepper is to measure the percentage of piperine.

The researcher went to the storage area in Trang pepper plantation and found that each area has different pepper harvesting process which is one factor that affects the percentage of piperine The research group is interested in studying whether different harvesting processes of Trang pepper affect the percentage of piperine or not. and store weather data, including temperature, humidity, precipitation and brightness to confirm the weather conditions during the experiment It is a guideline for harvesting Trang pepper to maintain product quality and obtain the highest percentage of Trang pepper.

Research questions

Will different harvesting processes for Trang pepper affect the percentage of piperine of pepper?

Hypothesis

If there are different harvesting processes for pepper, there will be a difference in the percentage of piperine of pepper.

Material

Equipment for harvesting process and determination of percent piperine content

1) Round basket for washing vegetables

2) A basin with a hole size of 0.5 cm.

3) Fertilizer sacks

4) Brown bottle

5) Scale

6) paraffin sheet

7) Steel tray

8) Foil

Methods

1. Study site

This research was conducted at Mr. Charoon Siemmai's pepper plantation, Palian district Trang Province is located at latitude 7.243333 ° N, longitude
99.681389 ° E as shown in the picture.

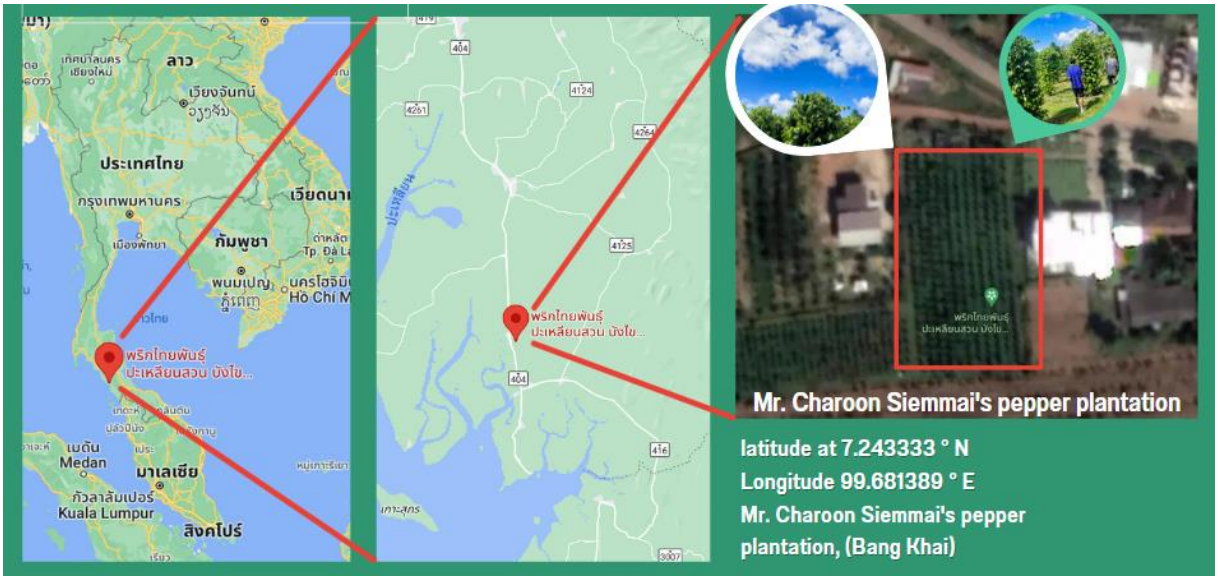


Figure 1 Mr. Charoon Siemmai's pepper plantation

Figure 2 Landcover recording using the Application GLOBE Observer.

2. The study of percentage piperine content in Trang pepper

2.1 Pepper harvest process

2.1.1 Harvesting Process ((Method 1 is the method of Sun-dried pepper)

1). Collect the whole bunch of pepper, each bunch must have 2-3 ripe seeds or a bouquet with mature green seeds about 6 months

2). Airing for 2-3 days.

3). Separate the seeds from the stems by taking a round basket, washing the vegetables, adding the dried peppercorns and crushing them by hand.

4). Bring the pepper seeds that have been separated from the stems and put them in a basket or a basin with a small sieve 0.5 cm, then winnow to separate the small seeds.

5). Leave exposed in direct sunlight for 2-3 days.

6). Wash and soak in order to extract healthy seeds from redundant ones.

7). Leave to dry completely.

8). Store in a moisture-proof container.

9). Check for the percentage of piperine.

Figure 3 show Method 1 Sun-dried pepper.

2.1.2 Harvesting process (Method 2 is the method of Curing the pepper before sun exposure)

1). Collect the whole bunch of pepper, each bunch must contain 2-3 ripe seeds or a bouquet with mature green seeds about 6 months

2). Incubate the whole bunch of pepper in a fertilizer sack for 2 days.

3). Bring the cured pepper to the sun for 2 days.

4). Separate the dried seeds from the bouquet by bringing a round basket to wash vegetables and put the sun-dried pepper then use your hands to grind to separate the seeds from the bouquet.

5). Wash and soak to separate the seeds, peel the sinking seeds, and then remove the floating seeds.

6). Hang until it completely dry.

7). Store in a moisture-proof container.

8). Check for the percentage of piperine.

Figure 4 show Method B is Curing the pepper before sun exposure.

2.1.3 Harvesting Process (Method 3 is Dried pepper in the oven)

1). Collect the whole bunch of pepper, each bunch must have 2-3 ripe seeds or a bouquet with mature green seeds about 6 months

2) Separate the pepper seeds from the stems by hand.

3). Rinse fresh pepper seeds with water, then soak in water to separate floating seeds, sink seeds, and discard the floating seeds.

4). Airing for 1 day.

5). Place the pepper seeds in a foil-lined metal pan and bake in the oven at 50 °C for 32 hours.

6). Store in a moisture-proof container.

7). Check for the percentage of piperine.

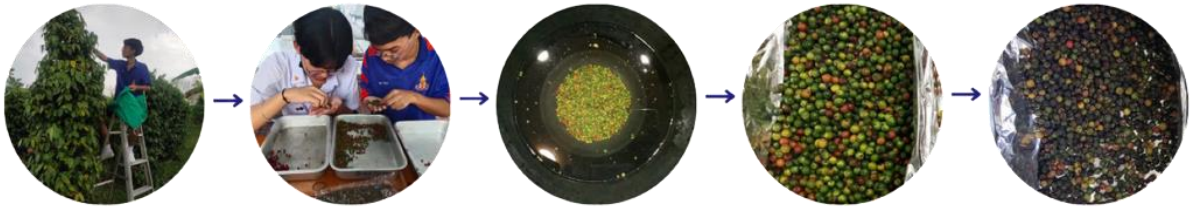


Figure 5 show Method 3 is Dried pepper in the oven .

2.2 Preparation of the substance before the percentage piperine test

1). Take the dried pepper seeds and put them in a tea-colored bottle.

2). Mass technician to get approximately 15 g per bottle.

3). Put the anti-humidifier in the brown bottle.

4). Bring a paraffin sheet to cover the mouth of the brown bottle 2 times per bottle.

5). Keep the sample bottle in the dark and wait to measure the percentage of piperine.

Figure 6 show Put the sample of pepper in a tea-colored bottle and weigh it.

2.3 Piperine extraction

Percent of piperine content determination by HPLC chromatogram.

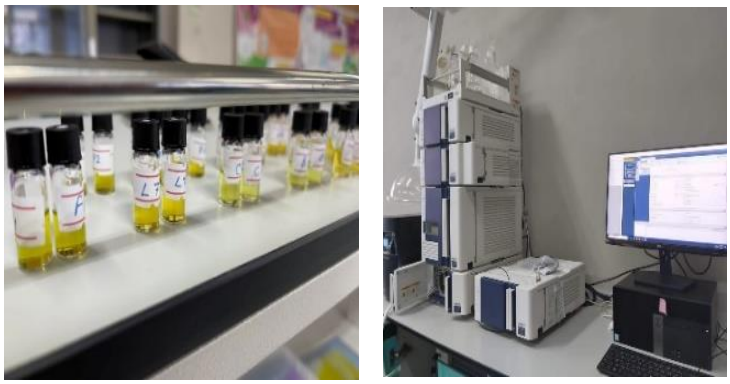


Figure 7 show the analysis process of measuring the percentage of piperine.

3. Study of weather data

3.1 Clouds recording using the Application GLOBE Observer.

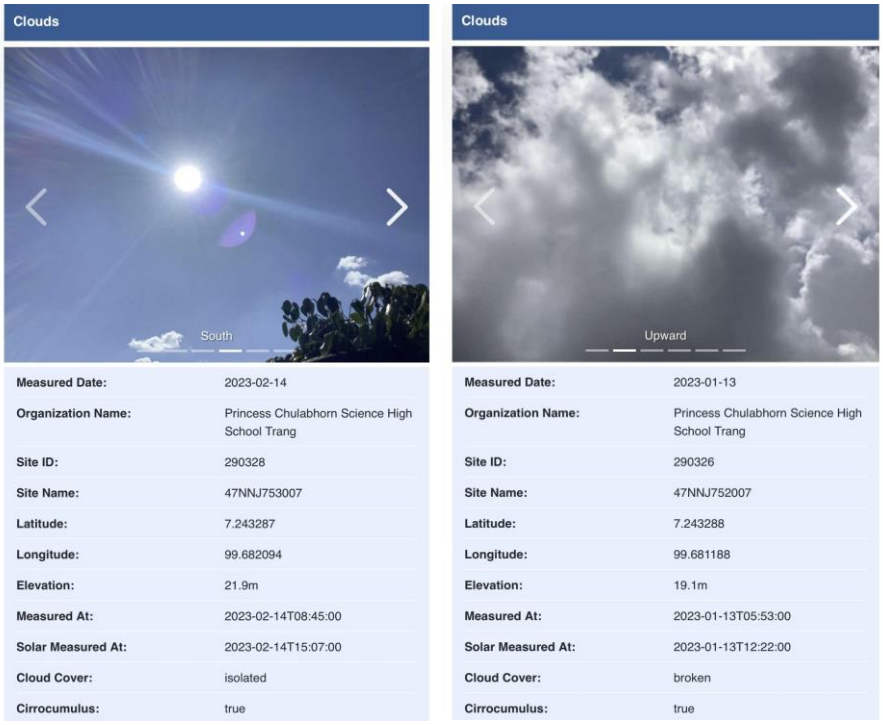


Figure 8 Clouds recording using the Application GLOBE Observer.

3.2 Weather data collection

The Data were collected between 4 - 14 February 2023 at Bang Jaroon Siem Mai's Pepper Plantation, by using a weather meter installed at Bang Jaroon Pepper Plantation, Siem Mai. The research team studied 4 sample factors as follows.

1 Air temperature
2 Air humidity
3 Rainfall
4 Brightness (lumens/m²)

Figure 9 shows a weather meter.

3.3 Save data in data entry in the Web page of GLOBE

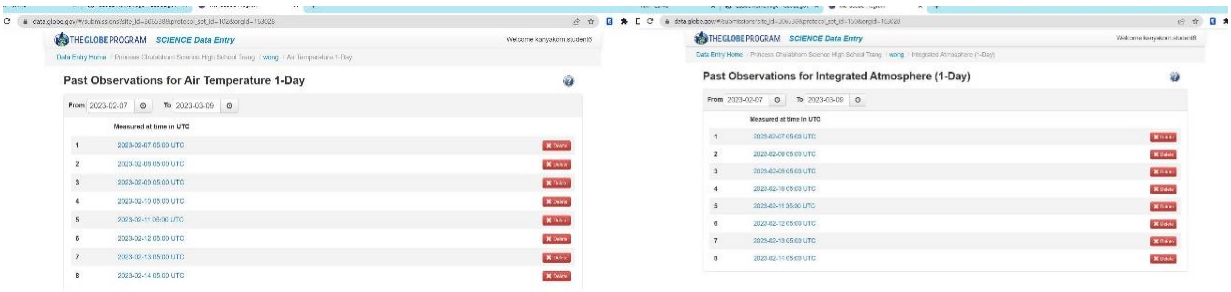


Figure 10 show data in data entry in Web page of GLOBE

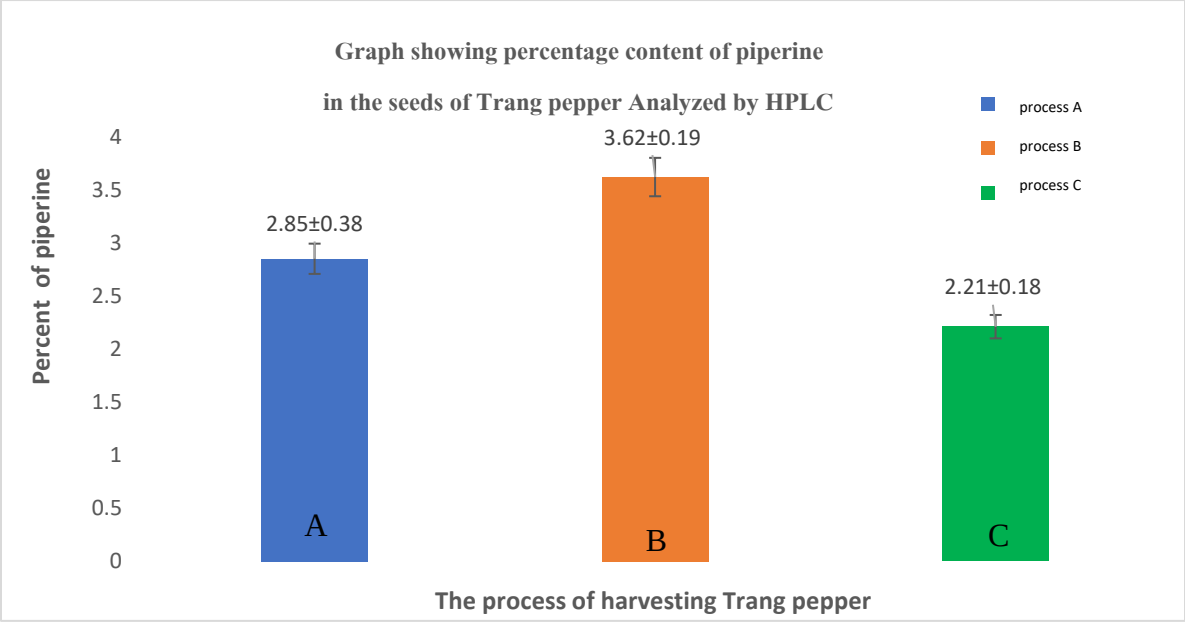
4. Statistical analysis

1. Analyze the weather conditions, temperature, air humidity, rainfall and brightness values using mean and standard deviation.

2. Comparison of piperine percentages in different pepper harvesting processes using one-way ANOVA.

Results

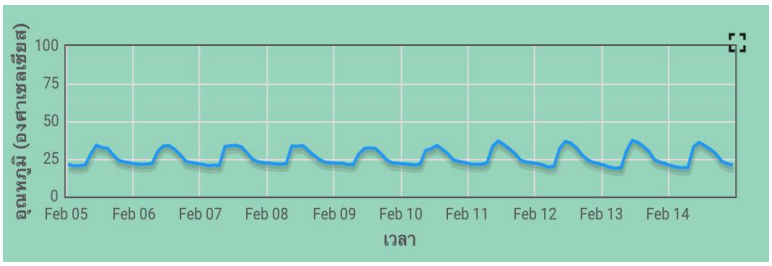
1. Piperine test results



Graph 1 Percent Piperine Content Graph

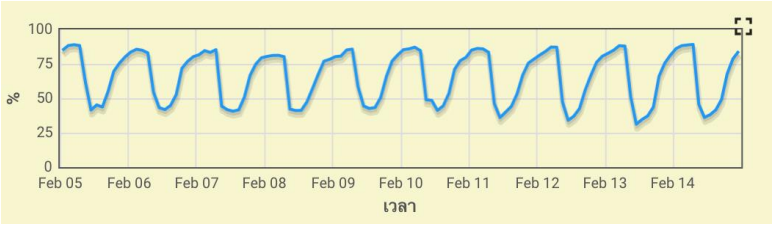
2. Results of the study of weather data

2.1 Air temperature



Graph 2: Temperature in the air as of February 4-14 2023

2.2 Air humidity

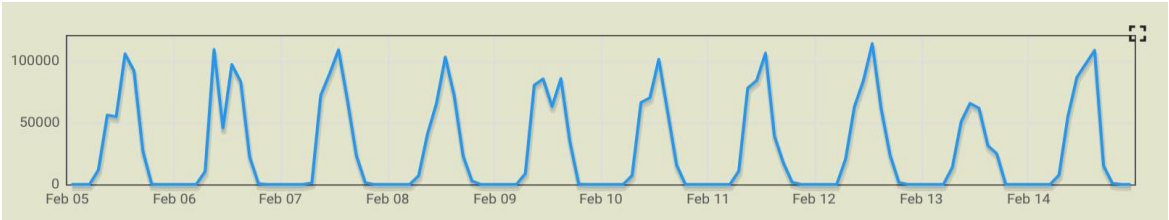


Graph 3 shows humidity in the air as of February 4-14, 2023

2.3 Rainfall

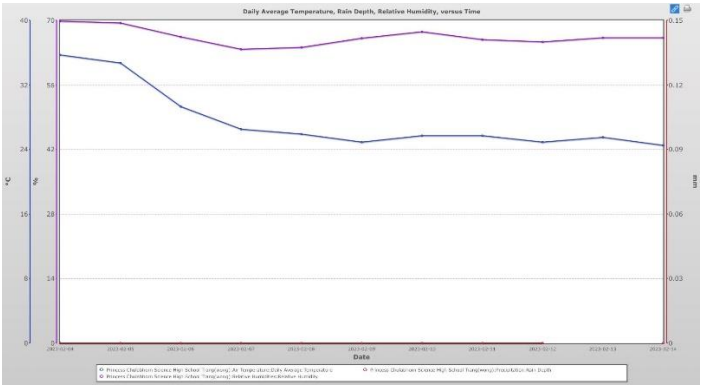
Graph 4 shows rainfall as of February 4-14, 2023

2.4 Brightness (lumens/square meter)



Graph 5 shows the illuminance value as of February 4-14, 2023

3. Temperature in the air, Air humidity and Rainfall from GLOBE Visualization page



Graph 6 Temperature in the air, Air humidity and Rainfall

Discussion

The researchers used dried pepper seeds that were harvested from Trang pepper 3 different methods, namely Method A, B and Method C, to test for percentage of piperine by HPLC. The three methods gave statistically significant differences in percentage of piperine, with method 2 giving the highest percentage of piperine (3.61%), followed by method 1 (2.85%) and Method 3 (2.21%) respectively.

From collecting weather data during the experiment (4 – 14 February 2023), it was found that the weather data of the study area had an average air temperature of 22.20 °C, an average air

humidity of 74.90%, and rainwater. The mean value was 0 mm because there was no rainfall during the harvesting period of Trang pepper. The average illuminance was 27329.06 lux.

Conclusion

From the experiment it was concluded that The harvesting process is another factor that affects the quality of Trang pepper. Different harvesting processes of Trang pepper resulted in statistically significant differences in percentage of piperine, with method 2 giving the highest percentage of piperine content (3.61%), followed by It came down to Method 1 (2.85%) and Method 3 (2.21%), respectively. These were guidelines for harvesting Trang pepper to maintain product quality and obtain the highest percentage of Trang pepper.

Harvesting process of Trang pepper, method 2, has the highest percentage of piperine. Because there is a harvesting process that is different from other methods, that is to incubate fresh pepper seeds before drying for 2 nights, so farmers are advised to adopt method 2 to increase the quality of Trang pepper and increase farmers' income.

Acknowledgements

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Citations

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Badge

I AM A COLLABORATOR

Step 1: Topic thinking and event planning Person 1 is responsible for thinking about the topic of study and contacting scientists and teacher advisors. The second person is responsible for planning the work process.

Step 2 Go to the storage area Person 1 Inquire about the pepper harvesting process with farmers Do it. Person 2 The process of harvesting Trang pepper Check the weather data, collect Landcover and clounds recording using the Application GLOBE Observer. and record the harvesting process of Trang pepper.

Step 3 Test the percentage of piperine. Person 1 prepares pepper samples for each harvest process. Person 2 tests for the percentage of piperine.

Step 4 Analyze and summarize . Person 1 Analyzes experimental results and conclusion. Person 2 Fills in research results and map out the distribution of information to Data Entry.

Step 5 Presentation The 1st person made the report and the 2nd person made the powerpoint. There were also Princess Chulabhorn Science High School teachers, Trang and scientists to give advice throughout the work.

I AM AN IMPACT

Since our research involves Trang pepper being registered as a Geographical Indication (GI), villagers are interested in growing Trang pepper to generate income.The researcher went to the area to study the harvesting process of Trang pepper. in Palian District, Trang Province, and to control the quality of Trang pepper by quantifying percentage piperine from different harvesting processes of Trang pepper. To provide information to farmers about the harvesting process of Trang pepper that leads to the best quality of pepper and to raise the level of Trang pepper

I AM A DATA SCIENCETIST

Researchers have studied the weather. according to the GLOBE method, including air temperature. Thequality of Trang pepper was examined according to the GI principle by measuring the percentage of piperine, a biochemical constituent, by HPLC Chromatogram and analyzing the data using statistical principles.