Abstract

Title: Study of soil and water quality around Kantang Hot Springs Hot Springs Subdistrict, Trang Province

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Hot springs or hot springs usually There are many important minerals such as calcium, magnesium, sodium, potassium, and chlorine. Therefore, soil close to The hot spring area may contain the important minerals mentioned above. which are important minerals for plant growth. The researcher is therefore interested in studying the minerals in the water that are related to the soil minerals in the hot springs and the soil near the hot springs. By collecting soil samples to study. Soil structure characteristics Measure soil elongation, soil temperature by measuring pH and check for the amount of minerals in the soil using a soil NPK test kit. Water samples were analyzed to find the average value of copper, iron, zinc, nitrate, and conductivity. Electricity, water temperature, acidity - base (pH), alkalinity of water The amount of oxygen dissolved in water (DO)

Water quality study results It was found that the electrical conductivity of the pond and stream pond was the same, at 1.1 microMohs/cm ± 0, the transparency was the same, at 100 cm ± 0, the pH - base was the same, at 7 ± 0. The pond had a temperature of 52 °C ± 0, but the pond The stream had a temperature of 38.5 °C ± 0. The temperature of the pond was higher than that of the stream pond.The pond had dissolved oxygen at 4 mg/L ± 0, but the stream 5.5 mg/L ± 0. The hardness of the pond was 255 mg/L ± 0, and the stream pond was 280.5 mg/L ± 0. 0 Zinc values were higher in the birth pond than in the stream pond. The birth pond had a value of 0.35 mg/l ± 0, the stream pond had a value of 0.2 mg/l ± 0, and both ponds had no nitrate, copper, and iron levels.

When studying the soil temperature from the two ponds and the area 0.3 km2 away from the Kantang hot springs to the north, south, east, and west, a total of 6 areas, it was found that the soil in the vicinity of the hot springs had a value. pH, soil moisture, soil temperature soil structure And the soil fertility is similar but different from the soil in the hot springs. Therefore, it can be concluded that the minerals in the hot spring water have not dissolved in the nearby area.

Keywords: Kantang Hot Springs,Soil Quality,Water Quality

Introduction

Hot springs are a type of natural phenomenon, which indicates that beneath the earth's crust there is a greater accumulation of heat energy than usual. When rain seeps through the soil layer and rocks go down. The retained heat causes the water temperature to rise to become hot water or steam, with chemical and physical properties changing. Such hot water and steam circulate through the cracks and move up to the surface. And it appears to be in the form of hot springs and to hot water with thermal energy that accumulates beneath the earth's crust. As above, the so-called "geothermal energy" is a source of geothermal energy. It is one of the important sources of natural energy. The development of geothermal heat is done by drilling holes to heat storage sources, where heat and steam circulate in hot water and hot steam to be processed for various purposes. Hot springs are an important source of geothermal energy.Nowadays, it can be used for many human benefits, such as generating electricity. It is used in industrial plants (Saraburi Chaimongkol, 1980) and is used by humans to treat medical diseases such as joint pain, muscle inflammation, skin diseases, and many others (Udomluck Sompong, 2001).

Kantang Hot Springs or Kantang Hot Springs Forest Park It is located in Hot Spring Subdistrict, Kantang District, Trang Province. It has a total area of more than 500 rai, is a plain at the foot of the mountain, has a humid rainforest, some parts are swamp forests, and flooded all year round, and of course, there are areas of water that spring up from underground all the time. There is also an abundance of flora and fauna. The plants found in this area are rubber, takhian, wa, and wild tassels. thung fa kao dang kuan kradon tang han rattan pit phi palm orchid

This project recognizes the importance of studying water quality, the amount of certain minerals in springs and hot springs. The quality of water is studied: conductivity, water temperature, acidity-base (pH), alkalinity, dissolved oxygen (DO), total nitrate, total iron, and total copper. To be used for maintenance and environmental benefits.

Research Objectives

- To study the chemical and physical water quality of hot decay water in Kantang hot springs.

- To study the quality of soil in the hot water murmur area and near Kantang hot springs.

Research Questions

- Is there a correlation between the quality of the water around the hot springs and the soil and nearby areas?

Research hypothesis

- There is no correlation between the quality of the water around the hot springs and the soil nearby.

Materials and equipment and methods of conducting research

Methods and materials

1.Transparency measuring plate

2.Transparency measuring tube

3.Spade

4.Phosphate test kit

5.Copper test kit

6.Beaker

7.NPK Test Kit

8.Water alkalinity measurement kit

9.Distilled water

10.acidity base test kit of water and soil

11.thermometer

12.Dissolved oxygen; DO

13.steel test kit

14.nitrate test kit

15.soil moisture meter

16.Conductivity Meter

17.tape measure

Research hypothesis

Kantang Hot Spring Area, Hot Springs Subdistrict, Kantang District, Changawatrang and nearby areas.

Conducted 2 sample water collection sites:

1. A pond is a hot spring that builds the edge of the pond over the eye and has a pipe to connect the water from the pond to the clarifier.

2. And a stream pond is hot decaying water that flows from the source pond and combines with natural water.

And the soil that is 4 directions away from the hot spring, a distance of 300 meters, 2 points, the study time is from 4:30 p.m. to 6:00 p.m.

Episode 1 Physical Water Quality Studies

1. Determine the water sampling point.

2. Collect water samples 4 times from the water source by collecting water samples in the designated area. Put the resulting water into the storage container.

3. Explore geographic coordinates using the Maps application (in iOS)

4. Study the translucency of the water by using the transparency tube. Notice the black and white on the round plate at the bottom of the tube and continue pouring until the visible white and black fade as you look from the mouth of the transparency tube to the black and white palette at the bottom of the tube. The transparency measuring tube should also be rotated at the same time to see the difference between white and black on the plate at the bottom of the tube. Record the readings to the log worksheet. If the reading is fractions of a centimeter, make the closest integer, e.g. 2.1 centimeters, recorded as 2 centimeters. If the color is still visible on the measuring plate, record that the transparency of the water is greater than (>) the length or height of the transparency tube. Repeat the experiment according to the methods in items 1 – 3 at least 2 times to control the quality of the measurement and the transparency of the measurement. From the same sample water, the difference must not exceed 10 centimeters.

5. Measure the water temperature using a thermometer by putting it in the prepared water. Wait 1 minute, read the soil temperature 1st time and the reading time, save it in the data sheet. If the readings of all 3 times differ by not more than 1 degree Celsius, it is considered acceptable.

6. Measure the electrical conductivity of water using a water conductivity meter (Digital Conductivity).

EPISODE 2 A study of water sampling for chemical water quality study.

1. Measure the pH of the water by dipping pH paper in water and soaking it for about 30 seconds.

2. Measure dissolved oxygen using a dissolved oxygen meter (Dissolved

Oxygen Test Kit) and then use the resulting values to record data.

3. Measure nitrate content Iron and copper in water bodies using nitrate monitoring kits. Steel and

Copper is compared with the standard value and then recorded

4. Measure the hardness of water using the Alkalinity Meter tool to measure the alkalinity of water. Read the resulting value.Then take it to record the data.

The values from the water quality study are compared with the standard values.

Part 3 Physical Soil Quality Study

1. Measuring the amount of solids within the soil

1.1 Use a conductivity meter.

1.2 Let's record the results in the table.

2.Measuring soil temperature

2.1 Hammer the pilot steel down to a depth of approximat

2.2 Bring a thermometer for measuring temperature at depths of 5 centimeters and 15 centimeters by

Insert it into the prepared soil furrow, wait 1 minute, read the soil temperature value for the first time, record it in the data record sheet.

2.3 Read the soil temperature value 2 more times, waiting for only 1 minute to read each time.

2.4 If the three readings differ by no more than 1 degree Celsius, it is considered an acceptable value. Then

Save the value

3. Measuring soil moisture (baked type)

3.1 Weigh the soil.

3.2 Bake the soil in a clay oven.

3.3 After baking is complete Use the formula to calculate humidity.

Soil moisture (grams/grams) = (mass of soil before drying - mass of soil after drying)/mass of soil

before baking

Part 4 Study of chemical soil quality

4. Preparation of soil samples

4.1 Determine the soil sampling point.

4.2 Collect soil samples in all 6 areas.

4.3 Collect soil samples in the designated area along the plane. Use a hoe to dig the soil to a depth of approximately 15 centimeters or

Approximately 1 screen

4.4 Put the obtained soil into a plastic bag and tie the bag.

5.Measurement of soil fertility

5.1 Take the collected soil and dissolve it with distilled water with the soil:water ratio being 1:5.

5.2 Take the dissolved soil and filter it with filter paper.

5.3 Take it for testing with a nitrogen, phosphorus, and potassium testing kit.

Compare with standard values Then record the value.

6.Measurement of acidity-base value

6.1 Take 1 tablespoon of collected soil and dissolve it with 20 milliliters of distilled water.

6.2 Leave it to settle.

6.3 Use a universal indicator paper dipped in the solution and soak for about 30 seconds.

6.4 Compare the color with the standard value on the side of the box.

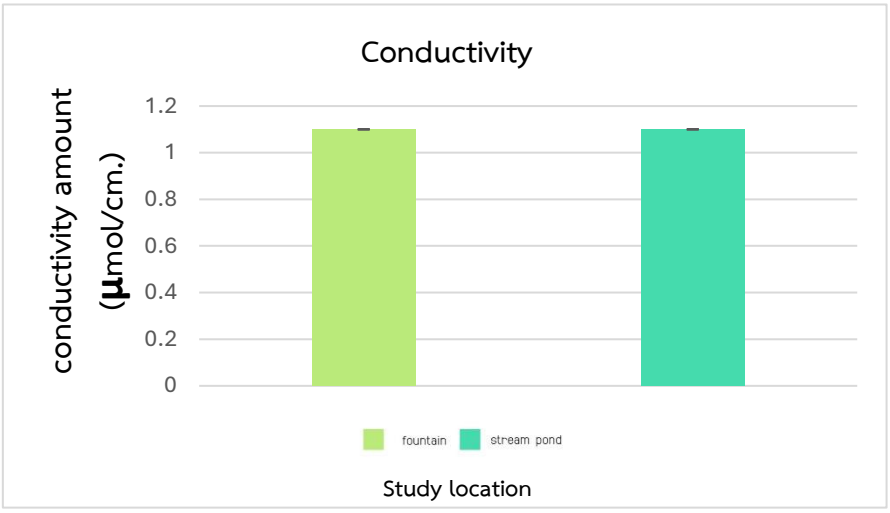
Part 1 Physical Water Quality Analysis Results

Geographical coordinates Conducted a study and soil around Kantang Hot Springs Forest Park, Hot Springs Subdistrict, Kantang District, Trang Province 7.40983°N, 99.46340°E

1. Results and data

1.1 Conductivity

From the measurement of the conductivity of the water source at Kantang Hot Springs. The average occurrence and stream area were 1.1 ± 0 and 1.1 ± 0 μmoh/cm, respectively. Displays the value as shown in graph 1.



Graph 1: Conductivity of water source at Kantang Hot Spring Origin pond area and stream pond area

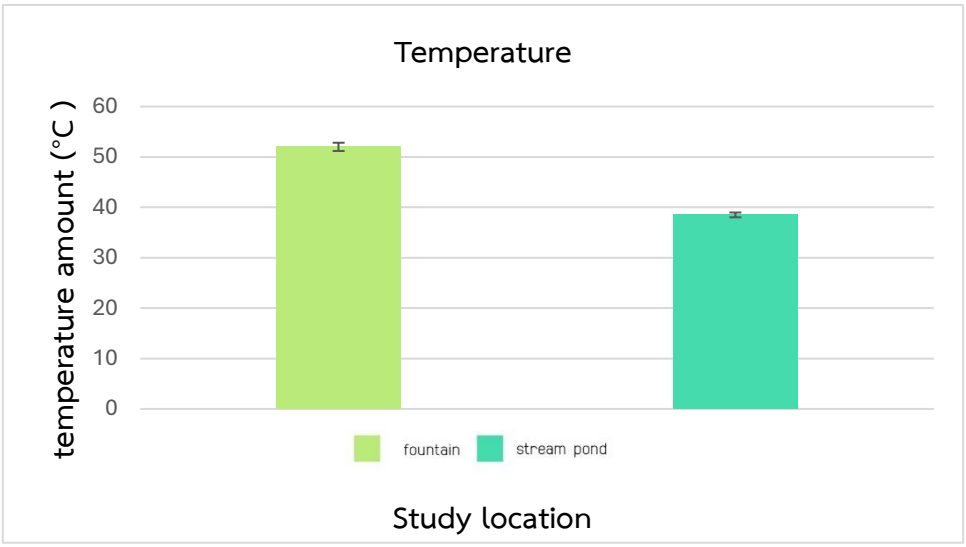
1.2Translucency value

From the measurement of the conductivity of the water source at Kantang Hot Springs. The average occurrence rate is 100±0 and 100±0 cm, respectively. Show the value as shown in graph 2.

Graph 2: Translucency of water source at Kantang Hot Spring Origin pond area and stream pond area

1.3 Water temperature

From measuring the water temperature at Kantang Hot Springs. The average occurrence was 52±0.82 and 38.5±0.48 (°C), respectively. Shows the value as shown in graph 3.

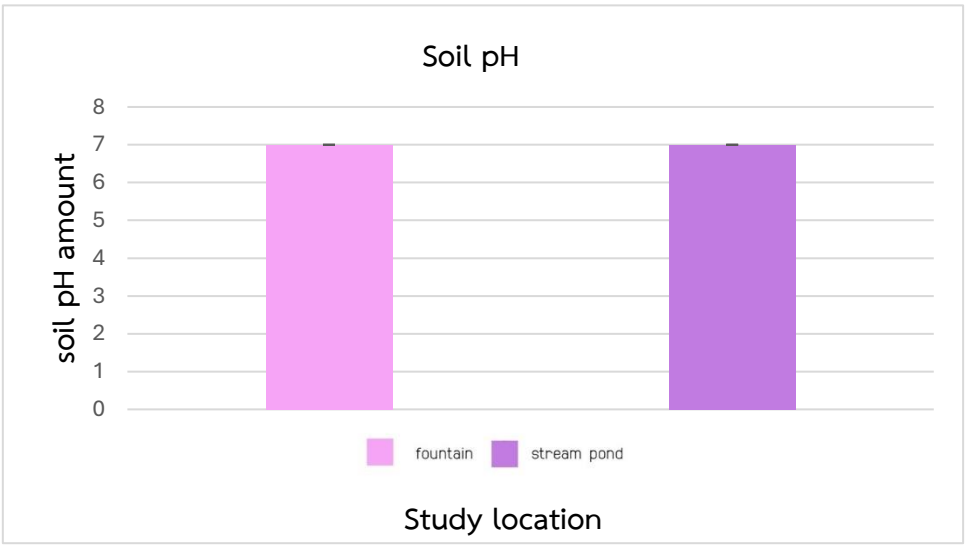


Graph 3: Water temperature at Kantang Hot Springs Origin pond area and stream pond area

Part 2: Study of water quality in chemistry

2.1 pH of water

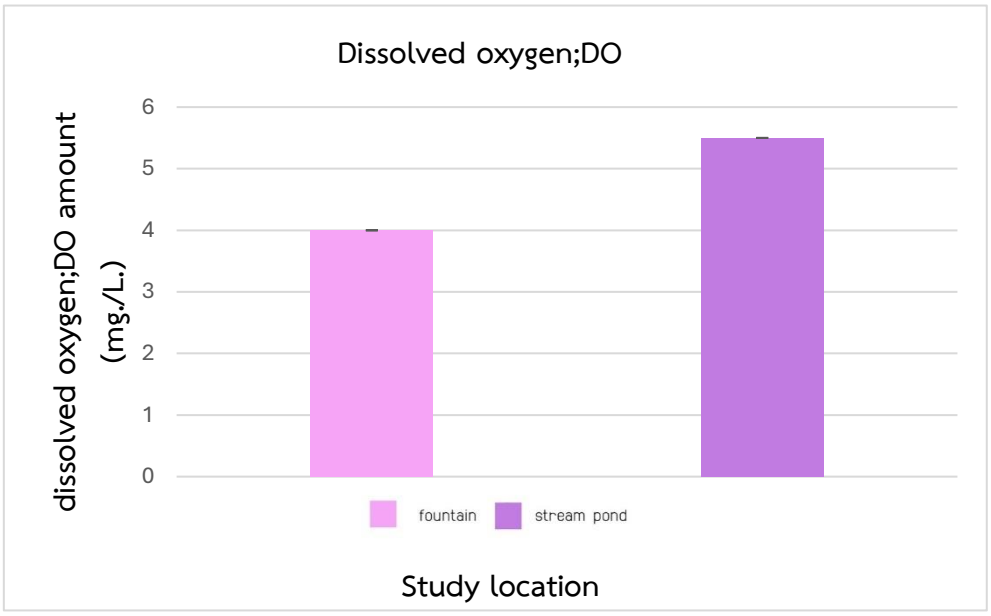
The pH of water at Kantang Hot Springs, the source pond and the stream area averaged 100±0 and 100±0 cm, respectively. The value is shown in graph 4.



Graph 4: pH of water at Kantang hot springs, source areas and stream ponds

2.2The amount of oxygen dissolved in water

From measuring the amount of dissolved oxygen in the water at Kantang Hot Spring. The area of the source pond and the area of the stream pond the average values were 4±0 and 5.5±0 mg/l, respectively, showing the values as shown in graph 5.

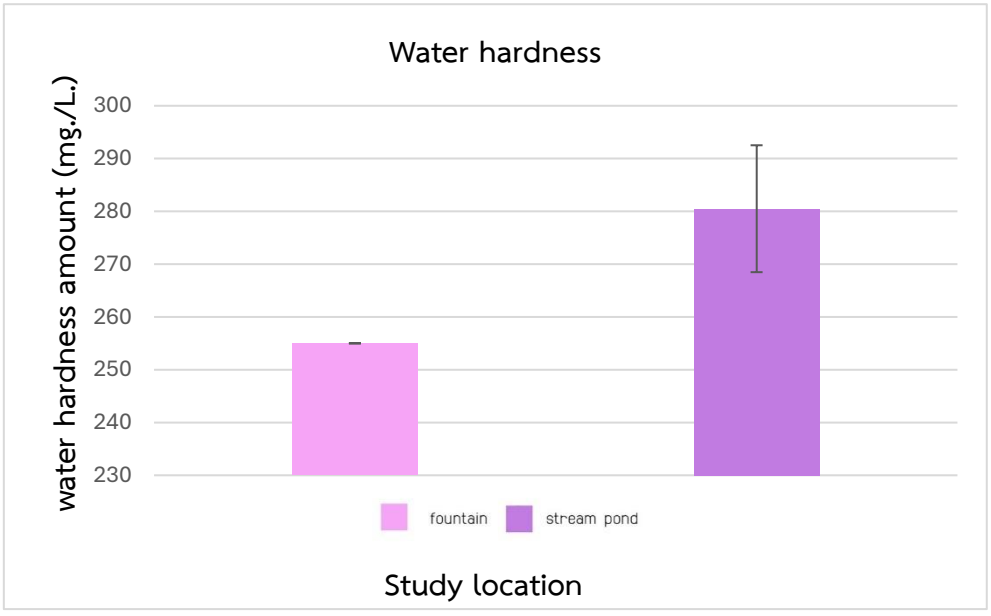


Graph 5: Value of dissolved oxygen in water at Kantang Hot Spring. Origin area and pond area

Stream

2.3 Alkalinity of water (mg/L)

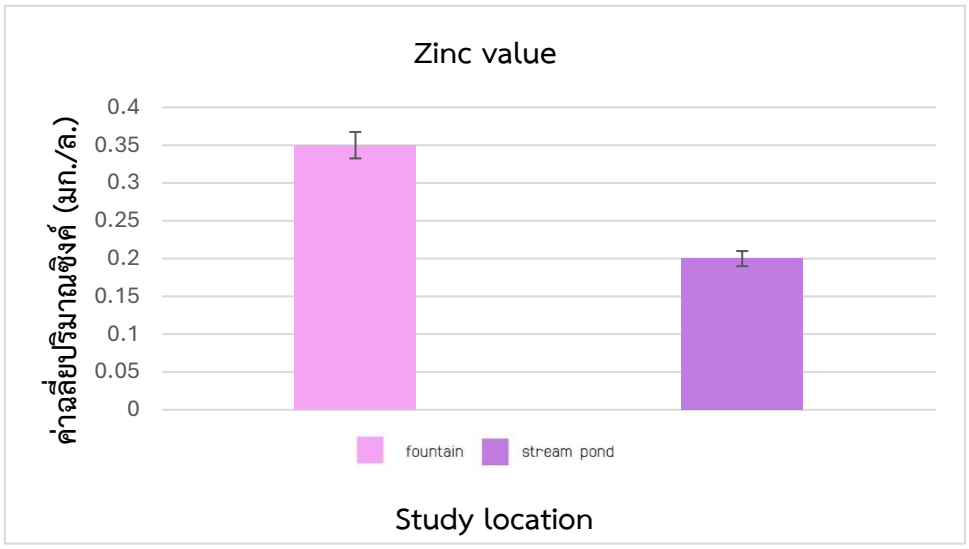
From measuring the alkalinity of the water at Kantang Hot Spring. The area of the source pond and the area of the stream pond the average values were 255±0 and 280.5±12.02 mg/l, respectively, showing the values as shown in graph 6.



Graph 6: Alkalinity of water from water sources at Kantang Hot Spring. The area of the source pond and the area of the stream pond

2.4 Sync value

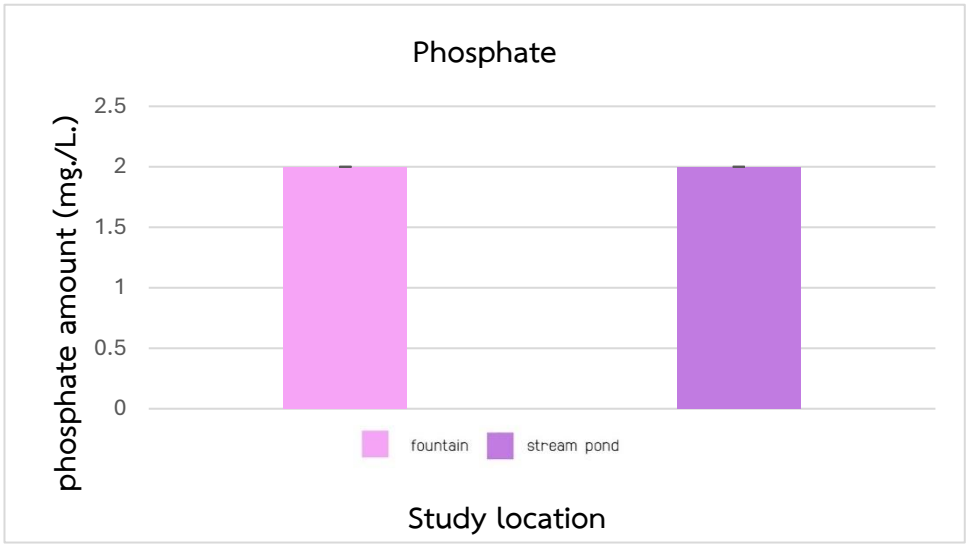
From measuring the water value at Kantang Hot Spring The area of the source pond and the area of the stream pond the average values were 0.35±0.21 and 0.2±0 mg/l, respectively, showing the values as shown in graph 7.



Graph 7: Zinc values in water at Kantang Hot Spring. The area of the source pond and the area of the stream pond

2.5 Phosphate value

From measuring the water value at Kantang Hot Spring The area of the source pond and the area of the stream pond the average values were 2±0 and 2±0 mg/l, respectively, showing the values as shown in graph 8.



Graph 8: Phosphate values in water at Kantang Hot Spring. The area of the source pond and the area of the stream pond

2.6 Nitrate, copper and iron values

From measuring water at Kantang Hot Spring The area of the source pond has a nitrate value equal to 0, a copper value equal to 0, and an iron value equal to 0, and the stream pond area has a nitrate value equal to 0, a copper value equal to 0, and an iron value equal to 0. Values are shown in the table. 1

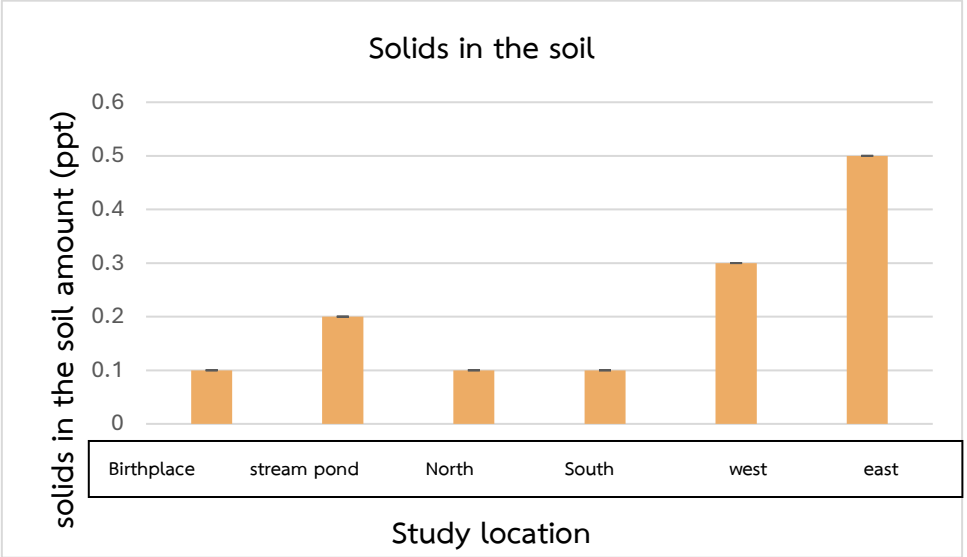
Chemical Water Quality/Area	Origin Pond	Ponds streams
1. Nitrate value (mg/l)	0	0
2. Copper value(mg/l)	0	0
3. Steel value(mg/l)	0	0

Table 1 Details of water sample collection and analysis at Kantang Hot Spring area. Nam Ron Subdistrict, Kantang District, Trang Province

Part 3 Physical soil quality

3.1Amount of solids in the soil

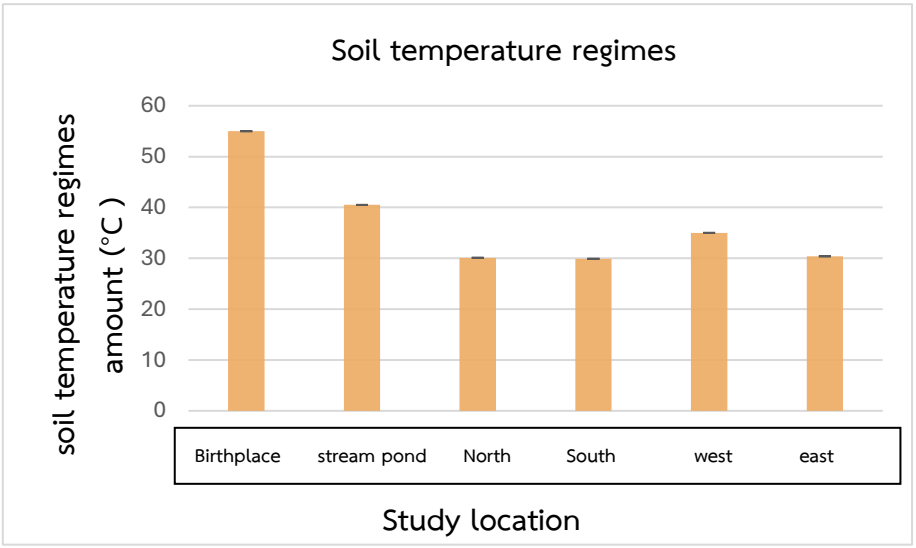
From measuring the amount of solids in the soil at Kantang Hot Spring. Origin area the average is 0.1±0 ppt in the stream pond area. The average is 0.2±0 ppt in the northern area. The average is 0.1±0 ppt in the southern area. The average is 0.1±0 ppt in the eastern area. The average is 0.3±0 ppt and the west The average is 0.5±0 ppt, showing the value as shown in graph 9.



Graph 9: The amount of solids in the soil at Kantang Hot Spring. Origin area stream pond area North area, South area, Western area and the eastern area

3.2 Soil temperature

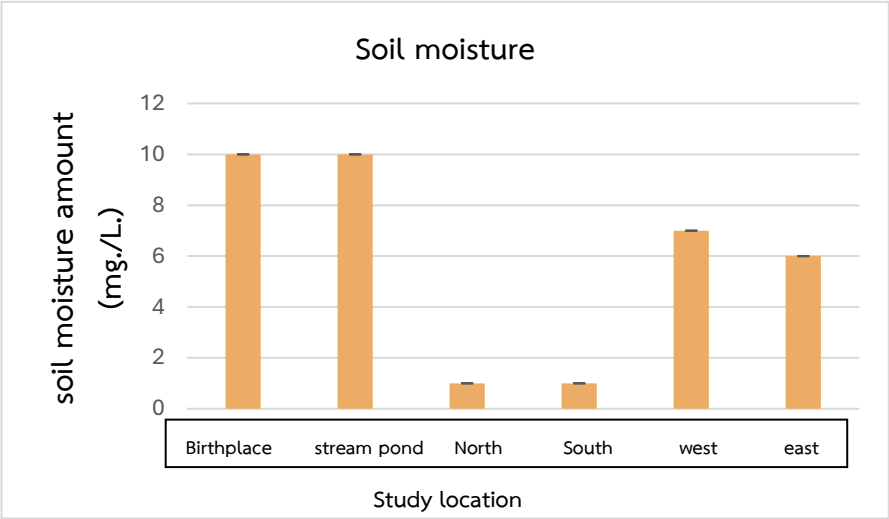
From measuring the temperature of the soil in the soil at Kantang Hot Spring. Origin area the average temperature is 55±0 ℃ around ponds and streams. The average is 40.5±0 ℃ in the northern area. The average is 30.1±0 ℃ in the south. The average is 29.9±0 ℃ in the west. Average is 35±0 ℃ and east. The average is 30.4±0 ℃, showing the value as in graph 10.



Graph 10: Soil temperature values at Kantang Hot Spring. Origin area stream pond area North area, South area, Western area and the eastern area

3.3 Soil moisture

Soil moisture was measured at Kantang Hot Springs. The average in the pond area is 10±0 mg/l, and in the stream pond area, the average is 10±0 mg/l. In the north, the average is 1±0 mg/l. In the southern area, the average is 1±0 mg/l. In the west, the average is 7±0 mg/L and the east is 6±0 mg/l. The value is shown in graph 11.

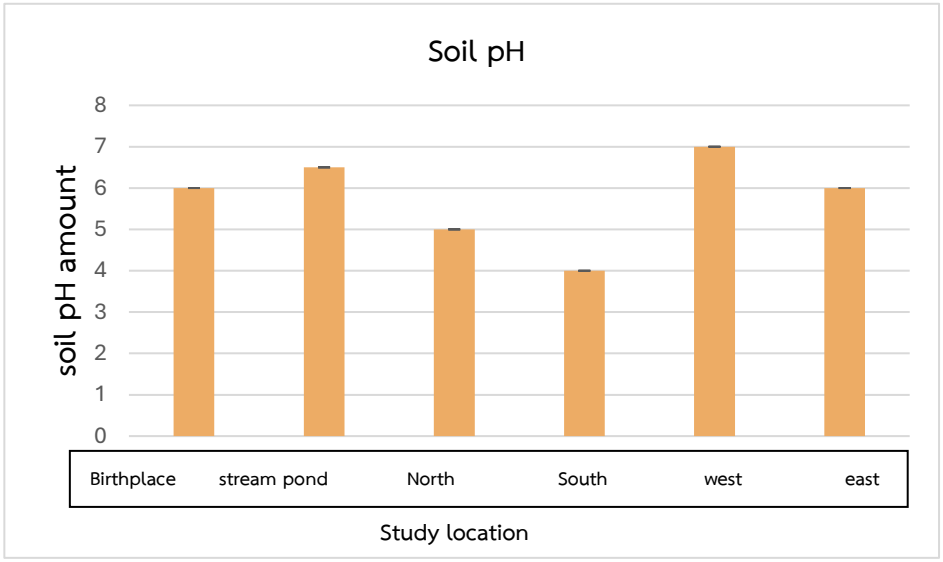


Graph 11: Soil moisture values at Kantang Hot Spring. Origin area stream pond area North area, South area, Western area and the eastern area

Chapter 4 Chemical soil Quality

4.1 Acid-base value (pH)

From measuring the acidity-base value (pH) in the soil at Kantang Hot Spring. Origin area The average is 6±0 in the pond and stream area. The average is 6.5±0 in the northern area. The average is 5±0 in the south, the average is 4±0 in the west. The average is 7±0 and east. The average is 6±0, showing the value as shown in graph 12



Graph 12: The acidity-base value (pH) of the soil at Kantang Hot Spring. Origin area stream pond area North area, South area, Western area and the eastern area

Table recording soil fertility

From measuring the soil structure at Kantang Hot Spring The area of the origin is sandy loam. The area of the stream pond is sandy loam. The northern area is silty soil. The southern area is sandy loam. The western area is sandy. and the east is a clay loam mixed with silty sand. Values are shown in Table 2.

From the measurement of nitrogen (N) in the soil at Kantang Hot Spring. The area of the source pond has a value at low, the area of stream pond has a value at low, in the north area there is a value at trace, in the south area there is a value at medium, in the west area there is a value at high, and in the east area there is a value at low. Show the value. As in Table 2

From the measurement of phosphorus (P) in the soil at Kantang Hot Spring. The area of origin has a value at high, the area of stream pond has a value at trace, in the north area has a value at trace, in the south area has a value at trace, in the west area trace has a value at and in the east area has a value at low, showing the value. As in Table 2

From the measurement of potassium (K) in the soil at Kantang Hot Spring. The area of the source pond has a value at low, the area of stream pond has a value at trace, the north area has a value at low, the southern area has a value at trace, the western area has a value at trace, and the east area has a value at trace showing the value. As in Table 2

Study location	birthplace	stream pond	North	South	west	east
physical water quality						
1.Soil structure	Sandy loam	Sandy loam	Silty soil	Sandy loam	sandy soil	Clay loam mixed with silty sand
chemical water quality						
1.N value	low	low	trace	medium	high	low
2.P value	high	trace	trace	trace	trace	low
3.K value	low	trace	low	trace	trace	trace

Table 2 Details of soil sample collection and analysis at Kantang Hot Spring area. Nam Ron Subdistrict, Kantang District, Trang Province and areas 0.3 kilometers away, 4 directions.

Conclusion and discussion

From the study of water quality Kantang hot spring Hot Spring Subdistrict, Kantang District, Trang Province, water quality results are as follows:

The water temperature ranges from 38-52 C and is a warm to hot spring. Hot spring water with two temperatures in tourist attractions is often used for boiling eggs. The hot spring water with a temperature higher than 65 C will boil the eggs within 12 minutes (Wannapa Chamrat 2003

water transparency Both the source pond and stream pond have the same value of 100 cm electrical conductivity. Both the source pond and stream pond were the same, 1.1 microMohs/cm.

The pH value of both the source pond and stream pond is the same, which is 7, which is neutral. This is because the spring water has heat under the ground and has dissolved minerals in the rock layers.

The amount of oxygen (DO) in the pond and stream area is value greater than the originating pond

Nitrate values showed that both the soil pond and the stream pond did not contain nitrate.

Iron and copper values were found in source ponds and stream ponds. Zinc values were found to be higher in source ponds than stream ponds. This is because the spring water has heat under the ground and has dissolved minerals in the rock layers.

Water hardness values were found to be higher in stream ponds than source ponds. It was found that both the origin and Phosphate values of both soil ponds and stream ponds are the same.

The quality of hot spring water from two sources was compared to the standards of groundwater used for consumption. It was found that the measurement of 5 items, namely hardness, acidity-alkalinity, nitrate, iron, and copper values, were all lower than the standard values. and the spring water studied is classified as general hot spring water. That is, water with a temperature higher than 25 C that contains less than 1 mg/L of carbon, salt, and minerals.

From the study of soil quality in the Kantang hot spring area. Hot Spring Subdistrict, Kantang District, Trang Province, water quality results are as follows:

The soil near the pond had the highest soil fertility values: nitrogen (N), phosphorus (P), and potassium. For the soil near the stream pond, the soil in the north, south, east, and west, which is 0.3 meters away from the source pond, has low soil fertility because the water has heat under the ground and minerals can dissolve in the rock layer and mix in the soil.

The highest soil temperature was in the area of the birthing pond. The lowest temperature in the area was Soil in the area south from the originating pond

The highest pH value is the area west of the originating pond. The lowest pH value is the soil south of the originating pond.

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