Evaluation of the Potential of Sea Lettuce (Ulva lactuca), Sea Grapes (Caulerpa lentillifera), Blanket Algae (Cladophora sp.), and Red Algae (Gracilaria sp.) for the Treatment of Shrimp Pond Wastewater

Researcher

Mr. Kanakom khaorueang

Miss Chonchanok Chuaimit

Miss Raweepat Rodroo

Princess Chulabhorn Science High School Trang

Advisor

Mrs. Sirikwan Nuputi

Introduction

Shrimp Pond

Introduction

sea lettuce

sea grapes

red algae

blanket algae

Research Questions

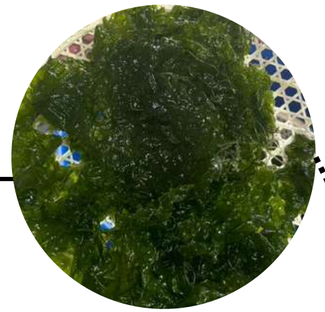
1. How do different types of algae compare in their ability to treat shrimp pond wastewater?
2. Do different algae species grow differently in shrimp pond wastewater? If so, how?

Hypothesis

1. Different algae species have different abilities to treat shrimp pond wastewater.
2. Different algae species grow differently in shrimp pond wastewater.

Materials and Equipment

Types of Algae



Sea Lettuce

Sea Grapes

red algae

Blanket algae

Measure the rate of weight change

Spring balance

Test water quality

termometer

Salt meter

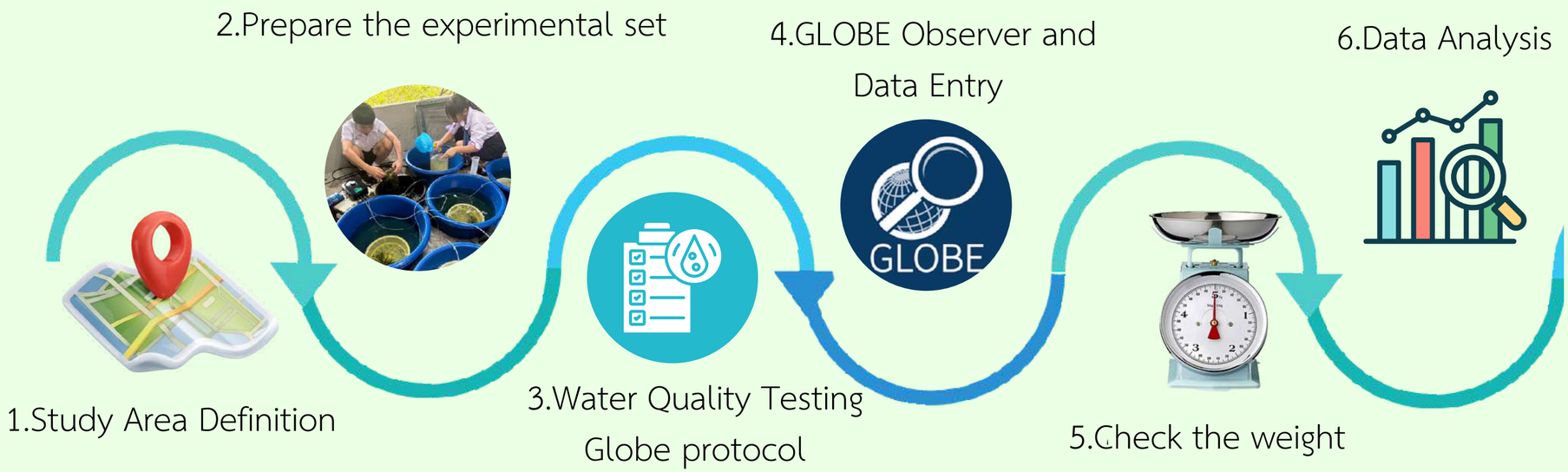
Ammonia Tester

pH meter

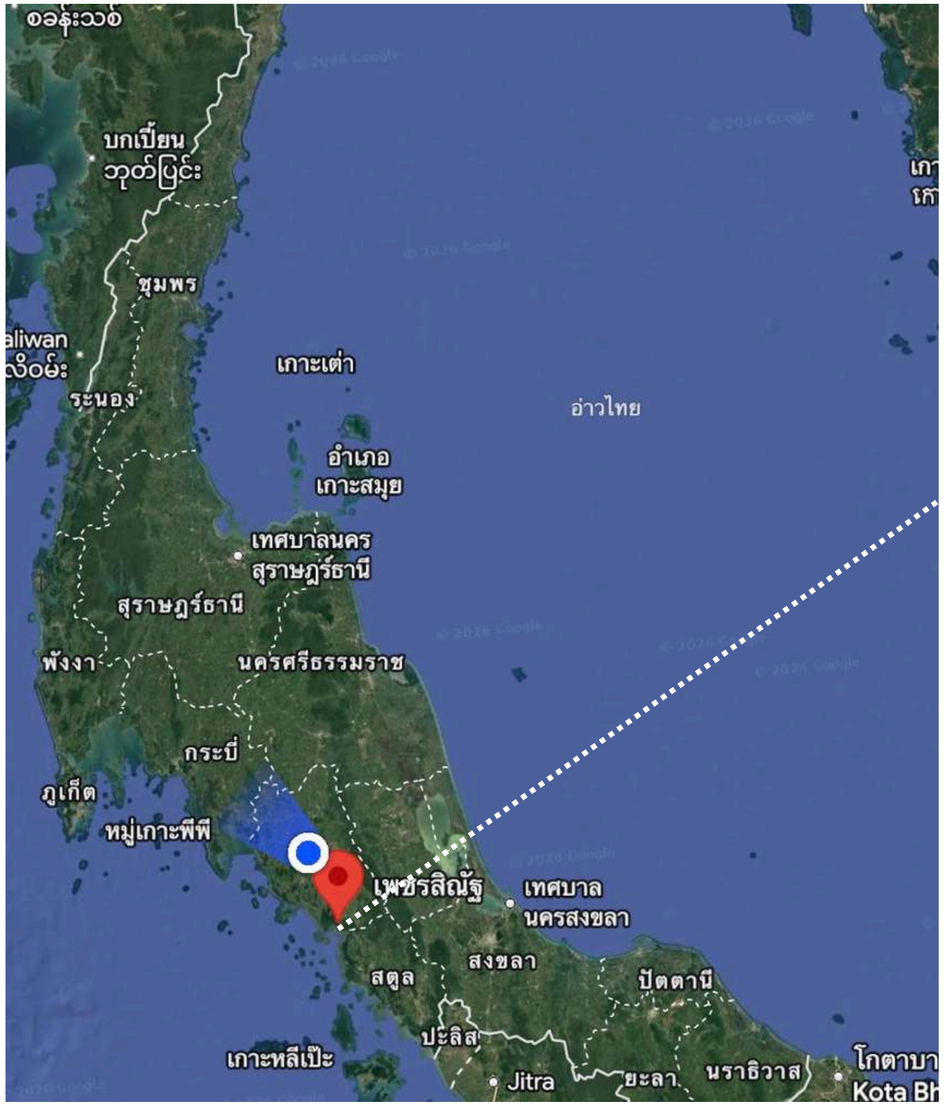
DO meter

Nitrite test kit

Research procedures



Part 1: Study Site



Shrimp pond

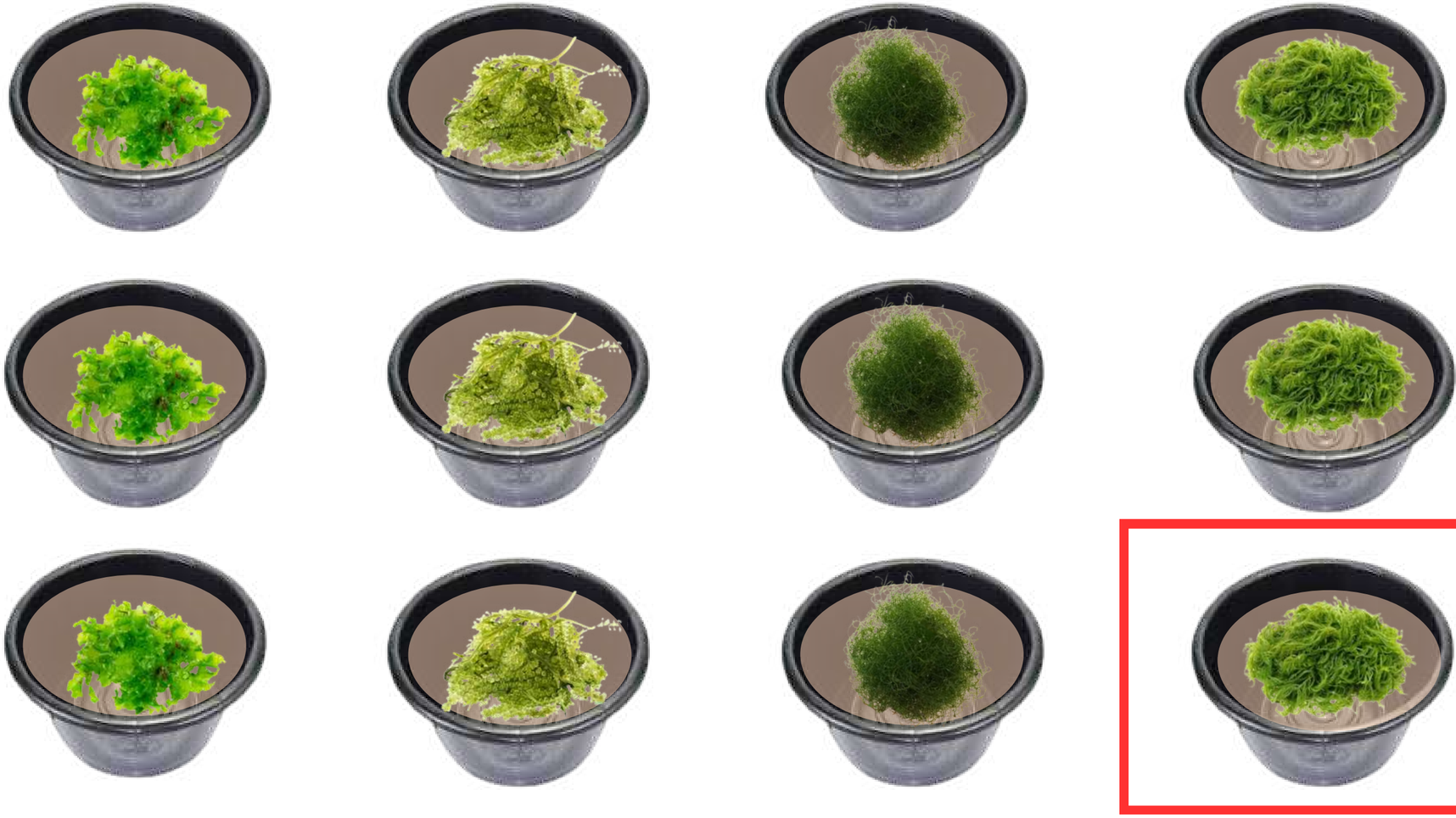
Palian District , Trang Province

Latitude 7.1875 °E

Longitude 99.6823 °N

Part 2: Experimental Design

Four experimental sets with three replicates each, for a total of 12 samples.



One basin 20 g of Algae
in 14 L Shrimp Pond Effluent

sea lettuce | sea grapes | red algae | blanket algae

Part 3: Evaluation of Wastewater Treatment Efficiency and Algae Biomass Weight

Testing pH levels by
pH Meter

Salinity Test

Measure nitrite and

ammonia levels

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DO Test

Check water temperature

Water Quality Testing

Measured every week

Check the weight

Measured every week

Results

Table 1 shows the average results of water quality from culturing the four algae species that affect their ability to treat shrimp pond wastewater over 8 weeks.

Algae Types	Results					
	Ammonia (ppm.)		Nitrite (ppm.)		DO value (mg/L)	
	before	after	before	after	before	after
sea lettuce	0.6	0.5	0.3	0.3	6.49	8.6
sea grapes	0.6	0.5	0.3	0.25	6.49	9.5
red algae	0.6	0.3	0.3	0.1	6.49	10.06
blanket algae	0.6	0.1	0.3	0.1	6.49	10.5

Results

Table 2 shows the average results of water quality from culturing the four algae species that affect their ability to treat shrimp pond wastewater over 8 weeks.

Algae Types	Results					
	Salinity (ppt)		pH value		Temperature	
	before	after	before	after	before	after
sea lettuce	26.33	42	8.5	7.9	24	26
sea grapes	26.33	40.7	8.5	8	24	26
red algae	26.33	38.7	8.5	7.9	24	26
blanket algae	26.33	37.3	8.5	7.5	24	26

Results

Table 3 shows the average results of the growth study of the four algae species cultured in shrimp pond wastewater following an 8-week experimental period.

Algae Types	Results		
	Pre-experiment weight (gram)	Post-experimental weight (gram)	
		4 week	8 week
sea lettuce	20	21.65	23.3
sea grapes	20	24.6	29.2
red algae	20	34.18	48.36
blanket algae	20	35	50

Conclusion and Discussion

1.) The ability to treat shrimp pond wastewater and the growth of all four algae species are as follows In terms of treatment efficiency, Blanket algae (D1) showed the best performance in treating the wastewater. It was able to reduce ammonia and nitrite levels by up to 0.5 ppm and 0.2 ppm, respectively, and increased the dissolved oxygen (DO) level to the highest value of 10.5 mg/L.

2.) Growth rate Blanket algae (D1) and filamentous algae (C1) showed the best growth performance, increasing from their initial biomass by 75% and 70.9%, respectively.

"Restoring Shrimp Farm Wastewater with Native Algae Breathing Life Back into the Ecosystem."

Thank you