A Study of microplastics in the soil, water and oysters (*Crassostrea belcheri*) in Trang, Thailand.

Princess Chulabhorn Science High School Trang

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Introduction



Research questions

GLOBE

- 1. Coastal soil around oyster farm. Is there any microplastic contamination?
- 2. Seawater in the area where oysters are grown. Is there any microplastic contamination or not?
- 3. White-jawed oysters raised in cages. Is there microplastic contamination in the area of Ban Tha Rua, Wang Won Subdistrict, Kantang District, Trang Province?





Objectives

GLOBE

- 1. To study the amount, size, shape, and color of microplastics in coastal soil around farm used in oyster farming.
- 2. To study the amount, size, shape, and color of microplastics in seawater at different depths. together in the area where oysters are grown.
- 3. To study the amount, size, shape, and color of microplastics in the digestive tract,

the body parts and the water inside the shells of oysters are grown at different depths.



Hypothesis

GLOBE

- 1. To study the amount, size, shape, and color of microplastics in coastal soil around farm used in oyster farming.
- 2. To study the amount, size, shape, and color of microplastics in seawater at different depths. together in the area where oysters are grown.
- 3. To study the amount, size, shape, and color of microplastics in the digestive tract, the body parts and the water inside the shells of oysters are grown at different depths.



Equipment



1. N P K test kit



2. Water quality test kit



3. Beaker



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5. Vacuum pump



6.Small surgical instrument set



7. Stereo microscope









8. Hot air oven





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Define the study area





Define the study area





How to grow oysters



0.55 m.

1.20 m.

Check soil quality

1. Bake and sift the soil









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Check water quality







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3. Check Transparency



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Check Micro plastic in soil















5. Bake the sample on GF/C.

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Check Micro plastic in soil







8. analyze data

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Check Micro plastic in sea water





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2. Bringing water into the WPO



5. Inspect Microplastic



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6. analyze data

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Check Micro plastic in oyster





2. Bringing oyster into the WPO







6. analyze data

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Oyster separation surgery



Divide into 2 parts by finding the Adductors muscle, with one side being the gums and anus. After that, level the gums up until meeting the labial palp and cut them apart using (gill) and labial palp

- Digestive tract part
- Body part
- Water



Results

Soil quality chart





Results

Soil quality chart





- Northern: port environment
- Beside : house environment
- Southern: mangrove forest



Results Water quality chart





Results Water quality chart



Results Water quality chart



Results

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The amount of plastic in the soil table

	Amount of microplastics per 100 grams of soil (pieces)							
Study area	> 5 mm.	1-5 mm.	300 µm 1 mm.	20 - 300 μm.	Aggregate			
Northern	Northern 26.33 ± 0.88		19.00 ± 1.73	5.00 ± 0.58	76.00 ± 2.68			
Be side	35.00 ± 1.00	23.00 ± 2.08	20.33 ± 2.91	6.67 ± 0.88	84.67 ± 3.14			
Southern	30.33 ± 1.45	25.00 ± 2.52	14.33 ± 0.88	6.33 ± 1.45	76.00 ± 2.90			

The highest amount of plastics was found in the Be side the farm area.



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Results The amount of plastic in the soil table

	Amount of microplastics per 100 grams of soil (pieces)								
Study area		> 5 mm.		1-5 mm.	300 μm 1 mm.	20 - 300 µm.	Aggregate		
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Be side		35.00 ± 1.00		23.00 ± 2.08	20.33 ± 2.91	6.67 ± 0.88	84.67 ± 3.14		
Southern		30.33 ± 1.45		25.00 ± 2.52	14.33 ± 0.88	6.33 ± 1.45	76.00 ± 2.90		

Most plastics found in the soil are larger than 5 mm., which are not microplastics. But we also found microplastics in many different sizes.

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Results

The shape and color of microplastics in soil chart



Results The amount of microplastic in the water table

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		Amount of microp	lastics per 300 ml. of water	(pieces)
	Depth level (m)	300 µm 1 mm.	20 - 300 µm.	Aggregate
o	0.55	13.80 ± 1.17	5.80 ± 0.75	19.60 ± 3.27
	1.20	7.60 ± 1.36	3.40 ± 1.85	11.00 ± 1.71

 $^{\circ}$ More microplastics were found at a depth of 0.55 m. than 1.20 m.



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Results The amount of microplastic in the water table

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	Amount of mi	croplc	astics per 300 ml. of water	· (pieces)
Depth level (m)	300 µm 1 mm.		20 - 300 µm.	Aggregate
0.55	13.80 ± 1.17		5.80 ± 0.75	19.60 ± 3.27
1.20	7.60 ± 1.36		3.40 ± 1.85	11.00 ± 1.71

The most common microplastics are 300 µm. - 1 mm.



Results The shape and color of microplastics in water chart



Blue and fibrous microplastics were most commonly found.

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GLOBE



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Results The amount of microplastic in the oyster table

Depth level (m)	Parts of oyster	Amount of mic	roplastics per 300 ml. of water (pie	eces)
Depth level (III)	Purts of Oyster	300 µm 1 mm.	20 - 300 μm.	Aggregate
	Digestive tract	5.80 ± 0.75	3.00 ± 0.63	8.80 ± 1.14
0.55	Body	7.80 ± 1.17	4.40 ± 0.49	12.20 ± 3.89
	Water in oyster	14.40 ± 3.07	8.40 ± 0.49	22.80 ± 2.45
	Digestive tract	3.40 ± 1.02	2.60 ± 1.02	6.00 ± 0.32
1.20	Body	5.00 ± 1.41	3.00 ± 1.10	8.00 ± 0.81
	Water in oyster	7.80 ± 1.72	3.00 ± 0.89	10.80 ± 1.96

More microplastics were found in oyster at a depth of 0.55 m. than 1.20 m.



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Results The amount of microplastic in the oyster table

Depth level (m)	Parts of oyster	Amount of microplastics per 300 ml. of water (pieces)						
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	Body	5.00 ± 1.41	3.00 ± 1.10	8.00 ± 0.81
	Water in oyster	7.80 ± 1.72	3.00 ± 0.89	10.80 ± 1.96

Microplastics were found in water in oyster the most, followed by body and digestive traces, respectively.



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Results The shape and color of microplastics in oyster chart



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Blue and fibrous microplastics were most commonly found.

Color of microplastics in oyster Body Water Digestive Body Water 1.20 0.55 Black Blue Red

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Results

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Examples of microplastic characteristics found



Red fiber



Black fiber



Blue fiber



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Clear fiber





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the Mangwo

The amount of organic matter statistical significantThe soil under the farm had a higher amount of organic matter because it was close to the mangrove forest, unlike the area above and beside the farm where there are ports and houses.





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the turbidity and salinity values had a statistically significant differenceThe turbidity is a result of the number of oysters whose shells have accumulated sediment causing different turbidity. Still in the range of 20–22 ppt, which is the normal salinity of brackish water



Discussion

ไมโครพลาสติกในดิน

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The amount of plastic in the soil in each area was slightly different and found to be large pieces of plastic that may have come from community garbage or fishing equipment.



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Discussion ไมโครพลาสติกในน้ำ



The amount of microplastics in the water More microplastics were found in the water surface area of 0.55m than in the water depth of 1.20m because microplastics are lightweight and small in size, and the water in the cultivation area is brackish water that is denser than normal water. This makes it possible to find more microplastics at the surface of the water than in deep water (KHON KAEN AGRICULTURE JOURNAL SUPPL. 1: 2021



Discussion ไมโครพลาสติกในหอยนางรม

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more microplastics are found in the water inside the shells. body parts and the digestive tract of oysters, respectively, because more microplastics in the water can remain inside the shells. There is contamination in oysters through eating filtered through the gills, which has a high chance of microplastic residue (Ponnapa Saelee et al. 2021). As a result, more microplastics were found in the body parts than in the trail parts.



Conclusion

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discovered to be blue and fiber.

Microplastics the soil, larger plastics than microplastics were found, which may have come from garbage or fishing equipment in the community. The highest amount of microplastics was found in the area flanking the farm. The majority of microplastics were



Conclusion



Microplastics in water , The amount of microplastics on the surface of the water was higher than in deep water, at 4.3 ± 1.45 pieces per 300ml of water. The majority of microplastics were discovered to be blue and fiber.



Conclusion



Microplastics in oysters,The amount of microplastics in oysters grown in surface water was higher than in deep water, 19.8 ± 2.41 pieces per 6 oysters, with more found in the water inside the shells. body parts and parts of the digestive tract, respectively The majority of microplastics were discovered to be blue and fiber.



Citation

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Thank you

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