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The quantity and the physical composition of the marine debris in the Pluem Suk beach area, Ratsada Subdistrict, Mueang Phuket District Phuket Province

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Abstract

This research had the objective for studying the quantity and the physical composition of the marine debris in the Pluem Suk beach area for the time period of 3 months since June to August, 2019. There was gathering of all samples for 12 times by using the method of gathering samples of the marine debris in all sand beach areas according the ICC method in the studied area size of 22,000 square meters since from the beginning of the beach until to the end of the beach. There was bringing of the marine debris to be sort out according to the physical composition and there was weighing. This could separate the marine debris to be 3 categories; such as; the general waste, the recyclable waste and the hazardous waste. The studied result was found that for the quantity of the marine debris in the Pluem Suk beach area for 3 months since June to August, 2019, this would have the total quantity that was equal to 145.81 kgs. By this was found that on July, this would have the the most quantity of the marine debris which was equalt to 60.67 kgs. This should be calculated to be 41.6%. Second, this was on June, there was the quantity of the marine debris which was equal to 52.05 kgs. This should be calculated to be 35.7%. And on August, this would have the least quantity of the marine debris which was equal to 33.08 kgs. This should be calculated to be 22.7%. For the physical composition of the marine debris that was mostly found, this would be; such as; the rope, the seine which were from the fishing activity. Second, this was the plastic bag and other kinds of plastics. This was found that the cause from the leisure activity and the fishery activity as the main issue.

Keywords : the marine debris; the Pluem Suk beach; the physical composition

Introduction

Most of the marine debris are the result of the human action directly; such as; throwing wastes in the sea, the inefficient waste management system; such as; throwing wastes in the canal, the wind and the water which has blown wastes from the community to the sea. The marine debris can be separated into 2 main sources; those are wastes which have the source from the sea; such as; the sea transportation, the cruise ship and the tourist boat, the coastal fishing boat, the oil rig and the gas, the animal husbandry and aquatic plants in the sea and wastes which have the source from the land; such as; from industrial areas on the coast, the transportation from the river on the coast, wastes which have been released from houses, throwing of wastes from the travelling on the coast, wastes which have been happened from the inappropriate management that is happened from the natural disaster [1] and at last, for the destination which those wastes will be moved, this is the sea and those wastes may be moved by the wave to the ocean and the ocean will be liked the big bin which will support garbages and many wastes from the land including from other ocean liners ; such as; the fishing boat, the cargo ship and the tourist boat. Those wastes are becoming the problem and this will give the effect on many marine lives.

There is the creation of the waste problem in marine attraction areas for both in beach areas and in the sea from throwing of wastes from other sources; such as; the store business, the resort, the hotel and the accommodation where are on the seashore including sailing activities for travelling and shipping, water activities and the relaxation. For water activities; such as; the fishery and boat activities, smoking activities; such as; the cigarette, cigarette butts and the lighter. In order that, for wastes which are thrown to the sea, it will become the waste which is called,"the marine debris", this is the one of the environment problem which has created the trouble thoroughly for both the ocean and the beach including other areas on the coast. The increasing of the marine debris quantity in the current situation which is the result from

many related factors; such as; the enhancement of the economic system, the sea tourism which is the increasing of the number of store businesses and sea accommodations [2].

In the installation of the floating rubbish collector in the estuary and the main canal of Department of Marine and Coastal Resources in the coast area in the past time, this was found that there were many floating rubbishes along the canal. This would have it every day and the quantity weren't reduced. And the most category of the waste which was found, it was the plastic waste. From the forecast, this is found that there are the quantity of plastic wastes which are contaminated in the sea up to 32,600 tons / year. By most of 80% of the marine debris, this were from activities on the shore; such as; the community, the garbage dump on the shore, the port and the beach tourism. For the rest of 20%, it will be came from activities in the sea; such as; the sea freight, the fishery and the sea tourism, the plastic waste in the sea. This will give the direct effect on the ecosystem in the sea; such as; the coral reef, the seagrass, the mangrove forest and the death of rare sea creatures; such as; (the turtle, the dolphin and the whale and the dugong), this will give the effect on the economic system, the tourism from the wane scenery, the health problem and foods which are contaminated with the micro plastic due to the plastic can be digested to be the small size plastic by the sunlight, (the photodegradation), this will make some kinds of toxic chemical substances be dissolved in the sea water [3].

Pluem Suk beach is the small size beach where is the recreation place in Mueang Phuket District Phuket Province and the study site of the ecosystem and the marine ecology for the teaching for students. In the beach area, this will have 1 food shop and 1 big size hotel and there is 1 homestay. For the general characteristic of the beach area, this will be the sand beach and the apocalyptic landscape. This will have many types of the beach forest; such as; the Portia tree, the Lam Chiak tree, the sea lettuce, etc. In this beach area, when there is the lowest water level, this will see the coral reef which will have many types of corals and someday, this will find that there are villagers to come to find fishes, (the sand fish), the shellfish, the squid and other sea creatures in the area of the coral reef due to in the area of the aforementioned beach, this has found accumulated and stuck wastes. The researcher will be interested in surveying the quantity and the physical composition of the marine debris in the area of Pluem Suk beach, Mueang Phuket District Phuket Province for bringing the information to use in planning and managing the marine debris further.

Tools and Methods

1. The studied area

For this research, the researcher has studied in the topic of studying the physical composition and the quantity of the marine debris in the area of Pluem Suk beach, Mueang Phuket District Phuket Province. By the studied area is the sand beach where will have the size of 22,000 square meters as shown in Picture 1.

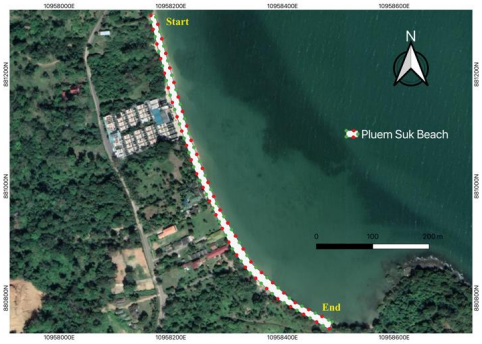


Figure 1 shows a collection of marine debris.
Pluem Suk Beach, size 22,000 square meters

2. For the time period in gathering the information. This would use the time for gathering the sample for 3 months during of June to August, 2019. By this would gather the sample for 4 times per month on Wednesday and Sunday of every week. This would be the time for gathering the marine debris sample of June and July. For Wednesday and Friday, this would be the day for gathering the marine debris sample of August due to the water level would be different in each month. By this would choose the date that the water level was the lowest or was nearly to be lowest because the beach area was suitable for gathering the information; such as; the date of 2nd, 5th, 16th, 19th of June, the date of 3rd, 14th, 17th, 31st of July, the date of 14th, 16th, 28th, 30th of August, 2019.

3. Tools that are used in the study. This will be; such as; the distance measuring rope, the garbage bag, the scale, the glove, the surgical mask, the camera, the data recording form, the geographic coordinate measurement, the scissor/ the knife and the canvas.

4. There is studying of the quantity and the physical composition of the marine debris in the area of the Pluem Suk beach, Mueang Phuket District Phuket Province. By this will determine the sampling point in the area of the beach since the beginning of the beach until to the end of the beach. By this will gather the marine debris sample in all beach areas. This will weigh it for finding the quantity and screen the physical composition of the marine debris in each category and there is recording of the result and recording of the picture. And for this research, this won't gather the organic waste due to this can be digested naturally.

5. There is the comparison of the quantity and the physical composition of the marine debris in the area of the Pluem Suk beach, Mueang Phuket District Phuket Province in each month. By this will bring the information of the physical composition and the quantity of the marine debris to analyze the information. This will use the descriptive statistic which is the percentage and this will bring the survey result to present in the chart form.

Result and Discussion

There is the study in the quantity and the physical composition of the marine debris in the area of the Pluem Suk beach, Mueang Phuket District Phuket Province by this will have the studied result as follows;

1. For the studied result of the quantity of the marine debris in the area of Pluem Suk beach for the time period of 3 months during of June to August, 2019, this would show the weight quantity as kilogram as shown in Picture 2.

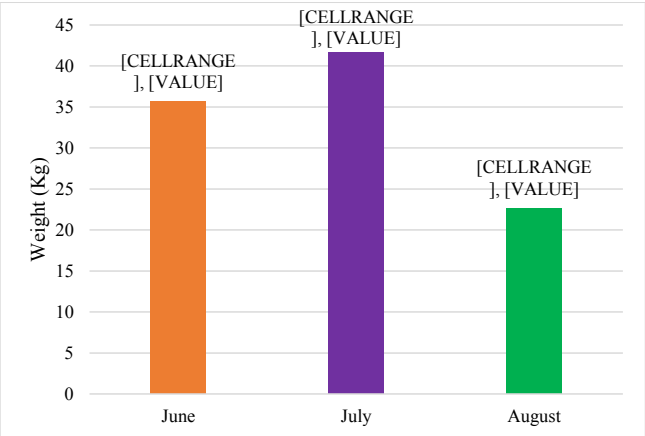
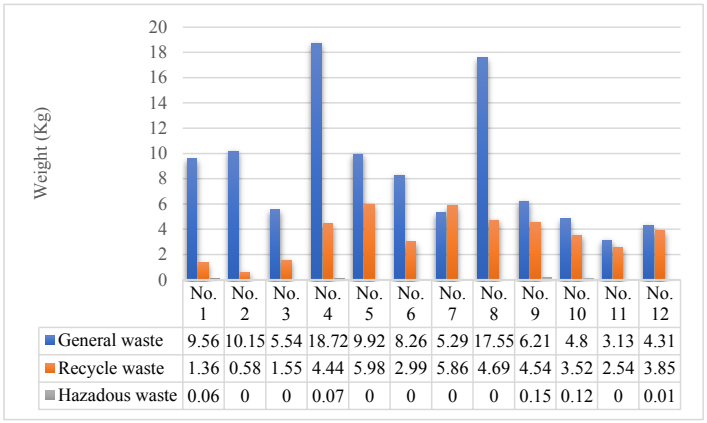


Figure 2 shows the amount of marine debris for all 3 months.

From Picture 2, for the marine debris quantity in the area of the Pluem Suk beach for 3 months since June to August, 2019, this was found that on July, there was the most quantity of the marine debris which was equal to 60.67 kgs. which would conform to the weather condition report in Thailand from June, 2019 to August, 2019 of Meteorological Department [4] this was found that it would be the factor which would make the marine debris quantity on July to have the most quantity due to the influence of the strength southwest monsoon which had be blown to cover the Andaman sea. This would give the effect to have the blowing of the waste from the sea to the beach more than on June and August. And on June of gathering the information in the 4th time, this was found that there was the most waste quantity of 23.18 kgs which would conform to the research of Mitil Pransilp, (2015), this had done the study of the quantity and the category of the marine debris in the area of the Laem Mae Phim beach, Rayong Province [5], this was found that the quantity of the marine debris had been changed according to the weather condition in the area. For the information in the category of the quantity and the source of the marine debris which was obtained from this research study, this might bring to use as the basic information in the planning, the administration, the management of the marine debris problem further and this would conform with the research of Nualpun Kananurak, (2012), this had studied about the category and the source of the marine debris according to the season in the area of the Bangsaen beach, Chonburi Province [6]. This was found that the marine debris quantity on the area had the relationship with the changing of the weather condition; such as; the speed and the wind direction. Second, this was June, this was equal to 52.05 kgs. And at least, this was August which was equal to 33.09 kgs, respectively and from the study found that Compared to the amount of waste per area equal to 0.007 kg per square meter. From studying the physical composition and the marine debris quantity in the area of the Pluem Suk beach during of June to August, this was found that for the marine debris quantity on July, this would have the most quantity of total wastes which was equal to 60.67 kgs. This should be calculated to be 41.6% due to this month had the most influence from the storm and the monsoon. Second, this was June, this would have the total waste quantity which was equal to 52.05 kgs. This should be calculated to be 35.7% and for the least found marine debris quantity was on August, this had the total waste quantity which was equal to 33.09 kgs. This should be calculated to be 22.7%.

For the weight quantity of the beach waste in each category; such as; the category of the general waste, the recycle waste and the hazardous waste for 12 times, this could be shown in Picture 3.



	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9	No. 10	No. 11	No. 12
General waste	9.56	10.15	5.54	18.72	9.92	8.26	5.29	17.55	6.21	4.8	3.13	4.31
Recycle waste	1.36	0.58	1.55	4.44	5.98	2.99	5.86	4.69	4.54	3.52	2.54	3.85
Hazadous waste	0.06	0	0	0.07	0	0	0	0	0.15	0.12	0	0.01

Figure 3 shows the weight of each type of beach waste. including general waste, recyclable waste and hazardous waste, all 12 times

From studying the physical composition of the marine debris in the area of the Pluem Suk beach, this was found that the most found category of the marine debris would be the general waste which would have the quantity which was equal to 103.44 kgs. This should be calculated to be 71.30%. Second, this was the recycle waste which had the quantity which was equal to 41.36 kgs. This should be calculated to be 28.51%. And the hazardous waste which had the quantity that was equal to 0.28 kgs. This should be calculated to be 0.19%, respectively.

For the physical composition of the category of the general waste, this was found that the rope net had the most quantity which was equal to 72.94 kgs, (70.51%). By most of the waste was from the fishery. Due to the Pluem Suk beach had the coral resource which was quite rather abundant. This would be the aquatic animal nursery and there were many sea creatures to live in the sea. Local fishermen would be popular to catch aquatic animals to bring to be foods and bring to sell for earning a living. This would be the cause to make the fishing waste; such as; the rope net, the foam which were equipments for the fishery to have the most quantity this would conform to the research of Santi Nilwat, Arun Nuichanai and Chanont Kullaya. (2016), there was surveying of the marine debris in the area of the coral reef of Kra islands, Nakhon Si Thammarat [7] From the study, it was found that the marine debris in the coral reef, it was the waste from the fishing equipment. In addition, it was found that from the study of Pensiri Ekajit and Siriwan, (2019). This had studied from the micro plastic waste in the area of the west beach, Phuket Province; such as; Patong beach, Kalim beach and Tri Trang beach [8] this was found that the waste in the category of the micro plastic waste which had the characteristic as the fiber. This was mostly found especially in the area of the Kalim beach. By this was found that the found fiber might be from the part of the rope and the material from doing the fishery. So the local fisherman shall gather the rope net or other equipments which will use in fishing and brings it back to throw in the supporting bin on the coast by himself.

From the study of the physical composition of general waste, Second, this was the plastic bag which had the quantity of 12.93 kgs, (12.50%), the sponge which had the quantity of 5.85 kgs , (5.66%), and for the least found waste, it was the rubber glove which had the quantity of 0.65 kgs, (0.63%), this would conform with the research of Teerawat and his team, (2018), this had studied about the type and the floating rubbish quantity in the area of 5 estuaries in the upper Thai gulf [9] this had studied about the type and the quantity of the floating rubbish in the area of 5 estuaries in the upper Thai gulf, this was found that the most waste quantity were the thin plastic material waste which would be flown to the sea. Second, this were the thick plastic material, the polymer material, the cloth material, the fiber and the foam material. And from the study of Nualpun Kananurak, (2012), this had studied about the category and the source of the marine debris according to the season in the area of the Bangsaen beach, Chonburi [6], this was found that the most waste quantity were the plastic waste which would have both the large size marine debris and the small size marine debris.

There were the physical composition in the category of the recycle waste, it was found that the most found quantity of the physical composition, it was the tea glass bottle which had the quantity of 10.85 kgs, (25.94%), Second, it was the thick plastic which had the quantity of 8.29 kgs, (19.82%), the clear glass bottle which had the quantity of 6.94 kgs, (16.59%), and the least found waste quantity, it was the plastic spoon which had the quantity of 0.03 kgs, (0.07%), this would conform with the research of Mitil Pransilp, (2016), there was the study of the quantity and the category of the marine debris in the area of the Laem Mae Phim beach, Rayong Province, from the year of 2014 to 2015 [5] From the study, it was found that the solid plastic waste that can be recycled the largest quantity. This had the most waste quantity which were at 34.49%. By most of the found composition from the Pluem Suk beach, this were from tourists, the people and medical activities.

For the physical composition in the category of the hazardous waste, the weight quantity of the marine debris in each composition for 12 times, this was found that the most found physical composition were the battery charger cable which had the quantity of 0.26 kgs, (47.97%), Second, this was the syringe which had the quantity of 0.172 kgs, (31.73%), the blade which had the quantity of 0.06 kgs, (11.07%). And the least found hazardous waste was the dry battery which had the quantity of 0.05 kgs, (9.23%). By most of the found composition, it was from the people and medical activities.

By most of the composition from the Pluem Suk beach, it were from fishing activities and recreation activities which would conform with Nutthavadee Buntiwiwatkul, (2016), there was the study of the type and the marine debris quantity in the area of the Ree sand beach, Savee District, Chumphon Province [10]. This was found that most of the marine debris quantity had the source from activities in the seashore and the recreation. Second, it were the waste from fishing activities and sailing activities. And besides, the research of Janewit Thammawijarn, (2014), there was the study of the quantity, the type and the activity which would create the marine debris in the area of the Rajamangala beach, Trang Province and Tangkhen gulf, Phuket Province [11] This was found that the most activity which would create the most waste, it were activities on the seashore and the recreation. Second, it was fishing activities and sailing activities. So this should have to keep the cleanness on the beach area from the tourist himself and the entrepreneur. By if they have brought foods to eat from other places, they shall have to take the responsibility on the waste that was happened from bringing to keep and throw away on the coast which will have the supporting bin. The package of the food from the food shop or the hotel shall have to be the type that can be used for the long time and this will reduce the use of the plastic for both the tourist and the entrepreneur for reducing the effect on marine lives from the blowing away of the plastic to the sea and this shall have to realize and create the conscious mind in the conservation of the natural resource of the Pluem Suk beach due to this is the coral reef. This will be the food source and the aquatic animal nursery in the local area. This will reduce the hunting of animals or trapping animals in the spawning season and this shalln't trap aquatic animals which haven't grown up fast for the propagation and this can have the marine resource and the coast sustainable to the younger generation.

Conclusion

There was the study of the quantity and the physical composition of the marine debris in the area of the Pluem Suk beach. There was the marine debris quantity in the area of the Pluem Suk beach since June to August, 2019. This was found that on June had the most waste quantity. By the most found physical composition were the rope, the seine and the plastic bag, respectively. By this was found that the found fiber was from the part of the rope and the material for the fishery.

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