**Rhizophora stylosa** as a protector against overwhelming copper (Cu) and lead (Pb) metal substances and how they affect on Belawan's water quality

Yunasfi¹*, R Leidonald², A Dalimunthe¹ and A S Siregar³

¹Faculty of Forestry, Universitas Sumatera Utara, Medan, North Sumatra 20155, Indonesia
²Faculty of Agriculture, Universitas Sumatera Utara, Medan, North Sumatra, Indonesia
³Fakultas Perikanan dan Ilmu Kelautan (FPIK), Universitas Jenderal Sudirman

*E-mail: yunasfijamhar@yahoo.co.id

**Abstract.** Rhizophora stylosa, Rhizophora mucronata, Rhizophora apiculata, and Bruguiera gymnorrhiza are among the rare types of mangrove found in coastal areas. The presence of these mangrove species in the coastal environment could be a boon to the environment. *R. stylosa* is one of the many species, and it can be used as a plant that collects heavy metals present in coastal areas. As a result of out-of-collection metals from various mechanical exercises that exist surrounding waterways and estuaries. From May to August 2021, researchers studied the capacity of *R. stylosa* to withstand the heavy metals copper (Cu) and lead (Pb) and their impact on water quality. This investigation took place at the Belawan Stream Estuary in Baristan Medan, as well as the Office of Timberland Development's research center at the College of North Sumatra. Different types of mangrove plants found in coastal areas have unique strategies for dealing with contamination caused by heavy metals. Constructing various types of overpowering metal at various portions of the tree is one of the few methodologies used by mangroves. *R. stylosa* is a type of mangrove that may collect a lot of metal in its roots and stem before clearing it out. Overwhelming metals will degrade water quality, which will, in turn, degrade the condition of the biological system as a whole. The overpowering metal substance of Cu and Pb in the *R. stylosa* mangrove was found to be higher than that of Pb. The Cu component was found to be more notable than Pb in the water contained within the developing put of *R. stylosa*. Meanwhile, the mud material in which the *R. stylosa* mangrove grows creates an abundance of metal substance that is less than that of Pb.

1. **Introduction**

Belawan is a sea port located at the mouth of a river in Medan including the Deli River and the Babura River. As an zone found in a coastal range, the Belawan zone cannot elude the nearness of squander from different community exercises, as an zone found in a coastal extend the Belawan zone cannot escape the closeness of misuse from distinctive community works out. Industrial squander is for the most part arranged of through waterway and the after stream into the ocean. At the mouth of the conduit there are few organic framework that will be impacted by mechanical defilement tallying the mangrove environment which comprises of different sort of mangrove plants.
The mangrove biological systems will hurt people, particularly individual living in coastal zone. Human activity, such as manufacturing and agro-industry, as well as urbanization, would degrade the mangrove ecosystem [1]. Besides [2] also claimed that the causes of harm to the coastal environment, such as fertilizer and pesticides, as well as other rural activities, contributed to the introduction of excessive metals into coastal zones, including mangrove biological systems. Various activities [3-10], within the terrestrial ranges of this location, such as farming, gold and nickel mining, may add to the discharge of overwhelming metal into streams and marine water [11]. A few sorts of mangrove can develop superior in coastal zones since of their tall capacity to retain overwhelming metal, whereas other sorts of mangrove are beneath weight to live in contaminated situations [12]. Mangrove have the capacity construe up metal and are tolerant of overwhelming metal defilement within the environment where they develop [13].

Mangrove ecosystems have biogeochemical potential as a barrier to various pollutants such as heavy metals produced from anthropogenic exercises, rural, run off and mechanical waste [14]. Overwhelming metal concentrations will cause natural harm and increment harmfulness, as well as diligent metal bioaccumulation itself [15]. Past think about have appeared that a few mangrove species are able construct up overwhelming metals and particularly. Other mangrove species can collect more Pb and Cu than *Avicennia marina* [16], [17]. Belawan waters, as a coastal location, is home to a plethora of spanning communities, agriculture, shipping, fisheries, port, and industry. Mercury (Hg), iron (Fe), manganese (Mn), copper (Cu), lead (Pb), zinc (Zn), chromium (Cr), and nickel (Ni) contaminated waste is provided by businesses that do not have a waste management system in place (Ni).

Examined in the past in the seas of Belawan,[18] showed up that the broken down overwhelming metall substance in Cu and Zn species had outperfomed the seawater quality standard. The large substance of overpowering metals Cu and Zn surrounding the Belawan and Deli watersheds is assumed to be the result of waste exchange from small groups of businesses. Based on data from characteristic influence Organization Office (Bapedalda) of North Sumatra Region [19] According to the North Sumatra nitty gritty, 57 enterprises were identified along the shop conduit and 22 businesses along the Belawan Stream in 2003. The businesses join cooking incorporate cooking, oil taking care of metal dealing with, plastic creating, sticking plywood, material, paint, dry batteries, dry batteries, dolomite, fertilizer, metal coating, and others.

Mangrove timberland might bussines that are not arranged with a misuse organization system will provide wasten containing mangrove timberland might be a sort of forest that be uncoverd to hams. Thus according [20], the Cu and Pb concentrations in the water have depleted. *R. stylosa* stores a part of water to debilitate the concentration of overwhelming metals in body tissues, which is one way it reduces the harmfulness of overwhelming metals. In coastal run, *R. stylosa* can be used to control overabundant metal pollution.

2. Materials and Methods

2.1 Date and Location
The levels of excessive cooper and lead were determined at the Baristan Research facility in Medan using *R. stylosa* trees growing on the coast of Belawan as a test. The coastal zone of Belawan is notable for its mangrove woods, which is thought to be polluted by overwhelming metals due to its proximity to industry. From May until August 2021, this study lasted three months.

2.2 Sources and Procedures
In this investigation, the following materials were used: concentrated HNO₃ aragement, refined water, HClO₄ aragement, and standard Cu and Pb aragement. *R. stylosa* root test, which included bark from ancient takes off, youthful clears out, still roots, silt test, and seawater test. Aquadest bottle, Erlenmeyer jar, dropper pipette, heater and channel paper, widespread pH, porcelain glass, measuring container, container, measuring bump, thermometer, hand refractometer, hot plate, test holder,
informative alter, and nuclear assimilation spectrophotometer were among the tools used in this think about.

2.2.1 Sampling. The sampling was done by following moderately parallel and relatively parallel coastline transects. Root and leaf samples were gathered from an R. stylosa tree that measured 25-30 cm in diameter and stood 4-6 meters tall. Taproots were used for root testing, although energetic clears were collected from shoots and old twigs. To measure the concentration of heavy metals, dregs were obtained on the surface, as well as dregs water (profundity 30 cm). For supporting data, water quality indicators for examples temperature, water temperature, water’s pH, and saline water (in situ) were measured at 6 at the line transect's center.

2.2.2 Organizing bark tests, as well as testing of young and old clears, root tests, and silts. The to star with test was homogenized by compiling test from each of the six testing center. For arranging, test of roots and takes off were cut into small pieces a few times as of late pounding while the quicken was crushed particularly. It was dried after that for 12 hours in a stove at 105°C to get rid of the clamminess substance and get a consistent weight. Each root, take-off, and silt sample was weighed to a maximum of 5 grams and then heated for 3-4 hours at 600-650 °C (ashing). The test was then disrupted 10 ml HC\textsubscript{4}O\textsubscript{4} and 20 ml pure HNO\textsubscript{3} At the moment, 50 cc of refined water was introduced to the system. Warm the arregment on a hot plate until it begins to bubble and the volume is reduced by 30 ml. If no further soaking is required, 20 ml HNO\textsubscript{3} and 10 ml HC\textsubscript{4}O\textsubscript{4} are added to the mixture arrangement, which is then warmed until a haze appears. Following the fog, the course of action was supplemented with refined water to make the test volume 50 ml, after then, it was chilled to room temperature. Using channel paper, the filtered course of action is one that has been cooled. The watery setup filters the cooled course of action. The obtained course of action is now available for AAS analysis.

2.2.3 Preparing for water tests. A total of 100 mL of saltwater was tested, with the addition of 10 mL of pure on top. The arrangement was then cooked until it was reduced on a heated platter in volume by 30 milliliters. After that, the remaining 70 mL of seawater is added to the until the whole volume is refined reaches 100 ml. Previously combined sea water and refined water were chilled to room temperature. Using channel paper, the arrangement was filtered with the watery organize. The obtained arrangement after that, it's ready to be examined with AAS.

2.2.4 Standard solution preparation. Cu and Pb are both metals sample was weighed at 1 g and then it was disbanded in refined 1000 ml volumetric flask filled with water carafe to produce a 1000 ppm stock arrangement. A total a supply of ten milliliters arrangement was pipetted, and after that placed in a measuring jar with 100 ml of refined water to achieve a 100 ppm arrangement. This configuration was downgraded to a 10 ppm arrangement at the time. To enable the arrangement of the following standard arrangement, there are a total of five duplicates of the arrangement were carried out with a concentration of 10 ppm. Pipette a mixture of 2 ml, 4 ml, 6 ml, 8 ml, and 10 ml of a 10 ppm arrangement to get a benchmark arrangement 0.2, 0.4, 0.6, 0.8, and 1 ppm concentrations. Each arrangement (2 ml, 4 ml, 6 ml, 8 ml, and 10 ml) was made using a different amount of liquid then placed in a measuring jar, and refined Each carafe was filled with water until it reached its maximum capacity of 100 ml.

2.2.5 Atomic Assimilation Spectrophotometer's operating principle. The Atomic Assimilation Spectrophotometer's operating principle (AAS). The AAS is produced ahead of time for the educational portion of the tool's strategy manual. At that point, the standard twist of each metal Cu and Pb with concentrations of 0; 0.2; 0.4; 0.6; 0.8; and was calibrated. Each test is based on the absorbance of that particular point.
2.3 Evaluation of Data

2.3.1 Metal Concentration That Is Truly Overwhelming. At the Baristan Research Facility, the take
after condition is used to determine the actual concentration of overpowering metals in roots, bark,
clears out, and silt in accordance with standard operating strategy:

\[
Real \ K (\text{mg/kg}) = \frac{K \ AAS \left(\frac{\text{mg}}{\ell}\right) \times \text{Larutan Sampel (l)}}{\text{Berat Sampel (mg)}}
\]  

(1)

Note:
- K.AAS = The contain demonstrated
- K. Genuine = Genuine contain K
- Liquid Volume = Volume of liquid
- Solution Exercising = The size of the test setup
- Weight of a Sample = Weight was put to the test.

2.3.2 Make a bioconcentration calculation (BCF). The capacity of R. stylosa to absorb excessive
metals Cu and Pb is calculated using the concentration of biomaterials calculate (BCF) with the
condition:

\[
\text{Concentration of biomaterials } Cu/Pb = \frac{\left[ \frac{\text{Heavy metal Cu}}{\text{Plant}} \right]}{\left[ \frac{\text{Heavy metal Pb}}{\text{Water}} \right]} \]

(2)

Attention:
- Concentration of biomaterials > 1000 = Tall aggregation
- 1000 > Concentration of biomaterials > 250 = Moderate aggregation
- Concentration of biomaterials < 250 = Aggregation is not high

2.3.3 Self-examination. The information gathered was examined in keeping with the natural quality
guidelines set forth in the Service of Natural Resources Declare No. 51 of 2004 to improve the quality
of water. In the meanwhile, because there is no quality standard in Indonesia for overpowering metals
in mud or dregs, the standard of excellence established by IADC/CEDA (1997) with respect to as a
reference, the metal substance that can be withstood is chosen.

2.3.4 Information on the state of the water analysis. At six sites, factors of water quality such as
conversation almost temperature, water temperature, and pH of the water are, saltines and all factors to
consider were measured to get data on water quality.

3. Results and Discussion

3.1 Cu and Pb overwhelming metal substance in stem bark, energetic clears out test, old take off and
root bark tests of R. stylosa.

In R. stylosa, the usual Cu material was higher than Pb. This was the situation discovered in every
section each plant's that was tested. Cu concentrations in the R. stylosa bark were 7.357 mg/ml and
20.734, respectively, whereas Pb concentrations in the bark of R. stylosa were 1.125 mg/ml on average
and 2.380 mg/ml on average, respectively. The Cu values 6.133 mg/ml and 3.61 mg/ml, respectively,
for the root bark, respectively, whereas the Pb substance was 0.793 mg/ml and 0.785 mg/ml. Table 1
summarizes the final outcomes of the examination in the usual heavy metal substance within stems,
roots, and leaves clears out of R. stylosa.
Table 1. Overwhelming metal substance Cu and Pb levels in stem bark, the youthful takes off, the aged fades away, and the root bark of R. stylosa is put to the test.

| Tester           | Metal that is overpowering | Cooper (Cu) (mg/kg) | Lead (Pb) (mg/kg) |
|------------------|---------------------------|---------------------|------------------|
|                  | Site I | Site II | Site I | Site II |
| Bark             | 7,357  | 8,734   | 1,125  | 1,380   |
| Young leaves     | 6,697  | 6,931   | 1,120  | 1,130   |
| Old leaves       | 9,124  | 8,456   | 2,134  | 2,143   |
| Root bark        | 6,135  | 7,641   | 0,793  | 0,785   |
|                  | 29,313 | 31,762  | 5,172  | 5,438   |

3.2 Cu and Pb Metal Substances in Water and Silt are Overwhelming
Where R. stylosa mangroves grow, there is water and silt. According to the findings of the experiment, water samples taken from R. stylosa-infested mangrove forests contained higher Cu than Pb. When it comes to silt, the normal Pb content is higher than the typical Cu content. Table 2 shows the results of the examination of the typical overpowering metal substance in water and leftovers at the two inspecting stations in detail.

Table 2. Metal Substances in water and silt where R. stylosa Grows Cooper (Cu) and Lead (Pb)

| Tester       | Metal that is overpowering | Cooper (Cu) (mg/kg) | Lead (Pb) (mg/kg) | Environmental Proclamation No. 51 of IADC/CEDA Cu (600 mg/kg) in 1997 (0.008 mg/l) and Pb (1000 mg/kg) are the most common metals found in food. |
|--------------|---------------------------|---------------------|------------------|------------------------------------------------------------------------------------------------------------------------------------|
|              | Site I | Site II | Site I | Site II |                                                                                                                                 |
| Water        | 0,0339 | 0,0396  | 0,0247 | 0,0225   |                                                                                                                                 |
| Sediment     | 0,8003 | 0,670   | 1,758  | 1,543    |                                                                                                                                 |

3.3 Use the Bioconcentration Calculator (BCF) to determine R. stylosa's capacity for accumulating excessive amounts of copper and lead.
The highest BCF regard is 864,690 for Cu metal, and the lowest BCF regard is 209.39 for Pb metal, according to the calculation of the regard of the bioconcentration variabels (BCF). Table 3 displays the bioconcentration values for Cu and Pb components at each of the two distinct stations.

Table 3. Cu and Pb Bioconcentration Variable (BCF) Respect in Belawan

| Site | Contains of Cooper (Cu) | Contain of Lead (Pb0) |
|------|-------------------------|-----------------------|
|      | BCF (l/kg) | Air (l/kg) | BCF (l/kg) | Air (l/kg) |
| I    | 29,313     | 0.0339    | 864,690   | 5,172     | 0.0247    | 209.39   |
| II   | 31,762     | 0.0396    | 802,070   | 5,438     | 0.0225    | 241.68   |
3.4 Conditions of the water quality (pH), saltiness, temperature of the water and discuss temperature

The natural the situation waterways were measured in the field, with results appearing in the area between the recognition centers. The most elevated temperature of the water is 27.5°C at site I, and the most important discussed Belawan has a temperature of 32.5°C at site II. The water's pH level at site I and site II is currently 7 and 7.3, respectively. Table 4 summarizes the findings of the whole investigation of oceanic natural quality measures.

Table 4. The findings of a study into the characteristics of water quality in the environment are displayed

| Parameter            | Station I | Station II |
|----------------------|-----------|------------|
| Water’s pH           | 7         | 7.3        |
| Saline water (ppt)   | 19        | 20         |
| Temps in the pool    | 27.5      | 27         |
| Temperature of the air| 31.5     | 32.5       |

4. Discussion

4.1 R. stylosa Roots Contain Metal that is overpowering Substances of Cooper (Cu) and Lead (Pb)

The comes about in the evaluation of a large amount of data metals cooper and Pb within R. stylosa's still-growing roots appeared higher levels of cooper overwhelming metals other than lead. At the construction site, the normal Cu substance within R. stylosa tree roots were found in the area 6.135 mg/kg. The normal lead substance is around 0.793 mg/kg. At site II the cooper substance within the roots of R. stylosa was in the vicinity 7.641 mg/kg, the normal lead substance was around 0.785 mg/kg. [21] There's a lot of it overwhelming metals cooper within It's possible that the roots are a result of measure of sedimentation. Even if there aren't many different regions, if the estimation is better, the collection of overwhelming metals will be higher [22]. According to [23], the retention and a buildup overwhelming metals produced by plants can be separated into three sections types: a. assimilation via root in order for plants to be able to keep metals. b. metal should be put within the arrangement in and around the roots. Metals are transferred from the roots to the rest of the plant components is the second factor, and c. metal localisation in tissue and cells focuses on preventing metals derived from wreaking havoc on the plant's absorption system. Because Pb is not a necessary nutrient for plants, it has a lower metal content. As a result, plants accumulate less Pb.

4.2 Overwhelming metal substance of Cu and Pb in R. stylosa's youthful offspring of old clears

The results of the research of the overpowering metals Cu and Pb within the R. stylosa tree's clears looked to be quite tall. The young takes off at site I with a Cu content of on average of 6,697 mg/kg in the clears from R. stylosa Pb is found in the leaves of trees, although it isn't found in the substance 1,120 mg/kg was shown to be effective. The Cu substance takes off in at site II had a Cu overwhelming metal of 6,931 mg/kg on average. As a result, the Cu substance at site II (6,931) was higher than at the location where I worked (6,697). The station's normal Pb substance was 1,120 mg/kg, at the same time II's Pb was 1,130 mg/kg. The concentration of Cu at site II was greater than at site I. This was because of the distinct distance across the stems of the trees at both locations, as well as the composited in contrast to ancient clears out (with the foundation a reasonably large estimate, thickness, and dull hue of the leaves youthful clears out (on shoots with a small estimate, not as thick, and light green leaf color). Youth take off has a lower metal content than older take off. [24] stated that younger takes off are more difficult to retain than more experienced ones. The gathering of planitude particles in old take of, which is in the long run taken after by leaf untimely bith, is the most important component that happens in plants during development. Plants may be carrying out a localization effort by accumulating Cu and Pb in a single organ. Cu and Pb components can be
introduced into plant tissue in one of two ways: Cu and Pb particles are fusing to the take off and then into the tissue through the stomata, or Cu and Pb particles are fusing to the take off and then into the tissue through the stomata [25], [26]. The outcomes The amount of heavy metals (g/g) in mangrove clears out was found to be between the following ranges: Mg (987.5–1.743.7) < Fe (201.0–486.0) < Cu (10.2–25.6) < Zn (13.2–23.1) < Mn (8.6–19.1) < Ni (1.9–4.8) < Cr (1.2–3.9) < Co (0.4–2.6) < Pb (ND–3.5), < Cd (ND–3.5). [27] However, the remobilization of metals contained in soil during debris maturation, particularly takes off, can occur of massive metals that have been accumulated in the soil over time debris maturation. [1] The typical contain of Cu on the surface of the planet is around 50 mg/kg, while it is less than 0.02 mg/L in the surrounding oceanic environment. Cu concentrations in groundwater are roughly 12 mg/L, but Cu values in seawater range 0.125 mg/l to 0.001 mg/l. Chalcopyrite, cooper sulfide, malachite, and azurite are all common sources of Cu in expansion. Metal, textile, hardware, and antifouling paint are all businesses that use copper. Cu is also used to kill green algae in water by trapping silicates in diatoms, disrupting the flustule structure. [26] Mg < Fe < Cu < Zn < Mn < Ni < Cr < Co < Pb < Cd. The levels of obnoxious metals strewn about the consider location changed on a regular basis and in space.

4.3 Metal Substances of Cu and Pb in Excessive Amounts in R. stylosa Bark

At station I, the usual estimation of excessive metal Cu in the bark came to 7,357 mg/kg. The typical Cu level of overwhelming metal within the bark at station II was 8,734 mg/kg. Pb had a normal overpowering metal substance of 1.125 mg/kg, however at station II, it was 1.380 mg/kg. The difference between removing the tree trunk and removing the whole of the overpowering accumulation of metals and other elements inside the tree is the source of pollution is difference between removing the tree trunk and removing the whole of the overpowering metals and other materials that accumulate inside the tree.

The ability of a tree is proportional to its trunk width to accumulate massive amounts of metals and other chemicals. [28] noted that there are several factors that influence supplement maintenance, including: a) the ability of water to break down supplements or mineral compounds. b) root maintenance: The size/height of the plant has an impact on the total root weight. c) The takes off's suction is controlled by the dissimilation (transpiration) of water from the clears out, which has a clear bearing on the scattering field's location (evaporation). The massive metals Cu and Pb are found in abundance within the plant stem's bark. When compared to require off and typical thing, the time it takes for a post to be published is significantly longer grow excessive metal cooper and lead which is put absent its organs and tissues.

4.4 Overwhelming metals Cu and Pb material in the water silt where R. stylosa develops

Cu concentrations in the water were 0.0339 mg/l at site I and 0.0396 mg/l at site II. The average at site I, the Pb level in the water was 0.0247 mg/l, while at site II, it was 0.0225 mg/l within a short period of time. Site I has a lower copper content than site II. The amount of Pb in the The water quality at station I was better than at station II, which had more Pb contamination from cars, industry, mining, as well as other human activities. [30] stated that harmful substances get to the water sources in a variety of ways, including mechanical, rural, home, and urban activities. At the station, an overpowering metal material was examined in the silt. I obtained a normal concentration Cu was 0.8003 mg/kg and Pb was 1.758 mg/kg at station I, but Cu was 0.6700 mg/kg and Pb was 1.543 mg/kg at station II. Station I's concentration of Cu in the dregs was higher than station II's. Usually affected by the river's current speed, depth, and width. According to [31], the presence of overwhelming metals in combination the quality of dregs in both the foot and nearby rivers will be affected by suspended solids. Within the dregs, The following were the dominant metals found in the dregs: Fe < Mn < Zn < Cu < Cr < Pb < Ni [32]. The dregs of mangroves are thought to act as a barrier between metal toxicity sources and the marine environment [22]. In tidal swamp dregs, Cr, Cu, Zn, Ni, Pb, Cd, and Hg were measured at 15–51 g/g, 20–46 g/g, 18–42 g/g, 18–26 g/g, 8–13 g/g, 8–13 g/g, and 0–15 g/g, respectively. These metals are arranged in the following order in mangrove silts: Hg < Cd < Pb < Ni <
Zn < Cu < Cr, depending on their concentration inside the silts. The residue left behind by roots and clears away had the highest quantities of Pb and Cu. The presence of hazardous metals such as copper and lead at excessive concentrations inside the roots had been most likely a result of silt level. The degree of the dregs was most likely the reason of a large amount of overpowering metals cooper and lead inside the roots. [22] The contain of specific overpowering Pb, Ni, Cr, Cd, Zn, Cu, Fe, and Hg are examples of metals detected within the dregs and tissues of *Avicennia marina* (Forssk.) Vierh. seven estuaries in Gujarat’s south appear to demonstrate that overwhelming metal collection was Hg < Cd < Pb < Ni < Zn < Cr < Cu.  

4.5 Bioconcentration Variables (BCF) were used to assess *R. stylosa*’s ability to absorb heavy metals such as Cu and Pb  
At site I, Cu is the metal with the highest melting point critical Concentration of biomaterials regard of 864,690 ppm, as well as the lowest critical Concentration of biomaterials regard of 209.39 ppm, whereas the site II has bioconcentration values of 802,070 ppm for Cu and 241.68 ppm for Pb, respectively. The lack of excessive metal components placed absent within the outline common substances found in plant tissues causes the amount of bioconcentration components in a mangrove organic framework. The biomagnification handle the concentration of Cu metal in the water has an impact. This is frequently fitting [32] that if Cu dissolvability in marine waters increases, the biomagnification of ocean-going biota occurs beyond the crave restraint concern. At stations I and II, the overwhelming metal Cu bioconcentration components were 864,690 ppm and 802,070 ppm, respectively, falling into the medium group. At station I and II, the bioconcentration component of overwhelming metal Pb was 209.39 ppm and 241.68 ppm, respectively, and was included in the high category. This could be due to chemical structures like redox systems and complexing, which can have an effect on bioconcentration calculate of Pb concentrations at the two sites where the evidence is located or declaration of the metal Pb inside the foot fluids is taken.

4.6 Environmental conditions in the water (discuss temperature, temperature of the water, pH of the water, and saltiness)  
The outcome of the evaluation the level of quality seagoing at the time of looking standard at site I was a conventional look at temperature 31.5°C, whereas site II was 32.5°C. Because of the typical situation, the temperature at site I was lower than that at site II at the time. Because daylight is more prevalent and the temperature rises, the forecast could be a little late. The thicket of mangroves at Station II is unusual or non-existent, allowing daylight to flood in. Furthermore, the water temperature design is virtually same to the discuss temperature; at the time of reviewing, the water temperature at site I the water temperature at station I averaged 25°C, while the water temperature at station II averaged 26.5°C. Site I had a lower water temperature than site II, owing to the increased contrast in light, as the testing was done. The amount of foliage covering the location at Station II was significantly less during the day. Based on the Ministerial Decree Concerning the quality of ocean water, No. 51 was issued in 2004 benchmarks for a biota with a temperature range of 28 to 34 °C, in order for the temperature of the water at the testing region remains within the to sustain the survival of biota and other organisms, quality standard limitations have been established oceanic life forms. [33] said that the temperature of the seawater varied between 18°C and 28°C, indicating that the difference in water temperature between the two study The number of sites was still increasing. Site I had a pH of 7 while Station II had a pH of 7. The degree of carrosiveness at both site is classified as impartial, and it is still the industry benchmark for the quality of marine water (Serve of Environmet Proclamation No. 51 for the year 2004) that ranges from 7 to 8.5 and continues to host living forms within the environment of the sea. The dissolvability of overwhelming metals will increase when pH rises, according to [34].
5. Conclusion
Following are some of the conclusions reached as a result of the investigation: In *R. stylosa*, the overpowering metal substance of Cu is more important than the overwhelming metal substance of Pb. Belawan’s water quality contaminated with *R. stylosa* remains at a standstill safe level for vegetation growth.

Acknowledgments
According to the guidelines Inquiry regarding University of North Sumatra Talenta Contract Number : 6789/UN5.1.R/PPM/2021, to the investigate Institut the College of North Sumatra, 16 June 2021.

References
[1] DOE 1998 *Environmental Quality Report Malaysia, Department of Environment, Ministry of Science* (Kuala Lumpur: Technology and Environment Malaysia Maskha Sdn Bhd Ampang)
[2] Hashim N R and Hughes F 2010 *Tropical Ecology* **51** 173
[3] Agaromooorthy G, Chen F A and Hsu M J, 2008 *Environmental pollution* **155** 320
[4] Sarika P R 2008 *Chem Ecol* **24** 437
[5] Kamaruzzaman B Y, Ong M C, Jalal K C A, Shahbudin S and Mohd N O 2009 *J Environ Biol* **30** 821
[6] Chen G Z, Peng Y S, Zhao B and Zhou Y W *Marine Pollution Bulletin* **60** 1319
[7] Lewis M, Pryor R and Wilking L 2011 *Environ Pollut* **159** 2328
[8] Usman A R, Alkreda R S and Al-Wabel M I 2013 *Ecotoxicology and environmental safety* **97** 263
[9] Anouti F A 2014 *Mar Chem* **98** 1
[10] Armid A, Shinjo R, Zaeni A, Sani A and Ruslan R 2014 *Mar Pollut Bull* **84** 373
[11] Ido I, Sawaluddin, Mukhtar and Asrun L 2015 *Proc WSEAS Adv Environ Geo Sci Eng Salerno Italy ISBN: 978-1-61804-314-6 444*
[12] MacFarlane G R, Koller C E and Blomberg S P 2007 *Chemosphere* **69** 1454
[13] Zhang J, Hong H, Liu J, Lu H and Yan C 2017 *Marine pollution bulletin* **119** 81
[14] Nath B, G Birch and P Chaudhuri 2014 *Science of the Total Environment* **472** 1010
[15] Lindsey H D, James M M and Hector M G 2005 *Pacific Panama Marine Pollution Bulletin* **50** 547
[16] Yunasfi, Desrita and Singh K P 2019 *IOP Conference Series Earth and Environmental Science* **374** 012064
[17] Kamaruzzaman, Sharlinda M Z R, John B A and Waznah A S 2011 *Sains Malaysiana* **40** 555
[18] Directorate General of Supervision and Control of Marine and Fishery Resources (P2SDKP) 2005 *Monitoring and Control of Water Pollution Ministry of Maritime Affairs and Fisheries of the Republic of Indonesia*
[19] Regional Environmental Impact Management Agency (BAPEDALDA) of North Sumatra Province 2007 *Report on Regional Environmental Status of North Sumatra Province*
[20] Cheng H, Jiang Z Y, Liu Y, Ye Z H, Wu M L, Sun C C, Sun F L, Fei J and Wang Y S 2014 *Tree physiology* **34** 646
[21] Harlyan L I, Retnowati D, Sari S H J and Iranawati F 2015 *Journal of Life Science* **2** 124
[22] Dudani S N, Lakhmapurkar J, Gavali D and T Patel 2017 *Journal of Fisheries and Aquatic Sciences* **17** 755
[23] Priyanto B and Prayitno J 2006 *Phytoremediation as a Pollution Recovery Technology, Especially Heavy Metals* accessed from http: // ltl bppttripod com / sublab / lflora1htm October 1, 2013
[24] Soemirat J 2003 *Environmental Toxicology (in Indonesian)* (Yogyakarta: Gajah Mada University Press)
[25] Dahlan Z, Sarno and Barokah A 2009 *Journal of Scientific Research* **12** 12209
[26] Al Hagibi H A, Nagi H M, Al-Selwi K M and Al-Shwafi N A 2018 *Journal of Ecology and Natural Resources* **2** 120
[27] Almahasheer, Serrano H O, Duarte C M and Xabier 2018 *Frontiers in Marine Science* **5** 484
[28] Lakitan B 2001 *Fundamentals of Plant Physiology (Indonesian)* (Jakarta: King Grafindo Persada)
[29] Arisandy K R 2012 *Journal of Fisheries Research* **1** 15
[30] Darmono 1995 *Metals in Biological Systems of Living Things (in Indonesian)* (Jakarta: UI-Press)
[31] Hutagalung H P 1991 *Marine Pollution by Heavy Metals (in Indonesian)* Research Center for Oceanology Status of Marine Pollution in Indonesia and Monitoring Techniques (Jakarta: LIPI)
[32] Seedo K A, Abido M S, Salih A A and Abahussain A 2017 *Journal of Ecology* **978216** 1
[33] Kusmana, Wilarso C S, Hilwan I, Pamungkas P, Wibowo C, Tiryana T. Triswanto A, Yunasfi and Hamzah *(Bogor: Mangrove Rehabilitation Techniques Faculty of Forestry* (Bogor Agricultural University)
[34] Connel D W and Miller G J 1995 *Chemical and Ecotoxicology of Pollution* (Jakarta: University of Indonesia)