Diatom Examination with Acid Destruction in Kelembah River and Sibarau River in Tebing Tinggi

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Abstract- Drowning is almost always found from time to time. This is not surprising because around us there are gutters, wells, ponds, rivers, lakes or the sea, even buckets filled with water or bath tubs. Examination of victims removed from water outside the flood season or disaster, is a death suspected of being a murder event. It is very important to determine whether the victim is still alive when entering the water or if he has just died then drowned.

Diatoms as diagnostic tools for investigating drowning cases need to be examined to find out the location of drowned body before dying, by comparing the diatoms found in the victim's body with the water diatoms where the bodies were found or thought to be the place of the drowned corpse.

This type of research is descriptively, which is to find out the type of diatoms in the rivers in the city of Tebing Tinggi in helping determine the crime scene of the drowned victim. This research was conducted in the Kelembah River and the Sibarau River. The study population was diatoms in the Kelembah River and the Sibarau River in Tebing Tinggi City. The material used in this study is water taken from the two rivers.

The results of the study found 14 species of diatoms in the Kelembah River and 11 species of diatoms in the Sibarau River. Found in the Kelembah River and Sibarau River there are some different types of diatoms at each station, but several types of the same diatoms are found at each station. Likewise, in the Kelembah River and the Sibarau River there are numbers of different types of diatoms in the two rivers, but several types of the same diatoms are found in both rivers.

The results of this study have not provided a comprehensive result of the types diatom in the Kelembah River and the Sibarau River because the limited duration of the study. It's hoped to get a clearer diatom picture, further research needs to be done with better tools and instruments.

Index Terms- drowning, diatome.

I. PRELIMINARY

BACKGROUND

Drowning is a condition in which blood oxygenation is disrupted in the lungs due to the entry of fluid into the airways through the nose and mouth.[1] Death due to drowning or drowning is one form of suffocation or asphyxia which can be caused by victims completely immersed or partially submerged in a liquid.[2] Drowning is one of the deaths caused by asphyxia. Deaths from asphyxia often occur, both naturally and unnaturally, so it is not uncommon for doctors to be asked for help by investigators to help solve cases of death due to asphyxia, especially if there is a suspicion of unnatural death. Drowning is a type of asphyxia death caused by water blocking the airway to the lungs.[3]

The existence of diatoms in various waters can be used as an indicator or indication of the place of death and the cause of death of a person either by drowning or drowning.[4] When a person sinks or drowned in a waters, diatoms in those waters will enter the body together with the inhalation of water. 5 Diatoms inside the victim's body can be used as supporting evidence in showing the place of death of the victim or crime scene (crime scene) [6]

II. RESEARCH PURPOSES

The general objective is to determine the types of diatoms found in rivers in Tebing Tinggi City. Specific objectives are to determine the types of diatoms found in the Kelembah river and determine the types of diatoms found in the Sibarau river. The benefit of this research is knowing the types of diatoms that exist in the Kelembah river and the Sibarau river in Tebing Tinggi City, as reference data for determining the case location (TKP) if the victim is found drowning along the Kelembah and Sibarau rivers, adding insight to the investigator in assisting the site case crime (TKP) victims drowned.

III. DIATOM

Diatoms are unicellular algae, which are found everywhere, where there is water and enough light to stimulate photosynthesis. More than 10,000 species have been described. Diatoms are generally long or 40-200 µm in diameter, but can be smaller (4-5 µm) or larger (up to 1 mm). They have a variety of shapes, ranging from shapes such as needles to round. The most meaningful forensic aspect of diatoms lies in its ability to surround itself with silica shells.[7]

Diatoms are unicellular algae that have cell walls from silica. They are widely distributed in the ocean, and can also be found in water or humid environments such as soil in plants. There are more than 16,000 species of diatoms, with many more being continuously identified. Because there are so many diatoms, they are an important part of the food chain, serving as a food source for most marine animals, both directly and indirectly. Like many other algae species, diatoms photosynthesize to get energy. They also have very limited movement, some diatom species are able to

make slow movements, but others rely on currents to move. When they die, diatoms sink to the bottom of the sea, contributing to the layer of mud that forms the seabed. This mud forms a layer of diatomaceous earth fossils, substances used in manufacturing and natural pesticides.[8]

IV. RIVERS

Rivers are places and containers and networks of water flowing from springs to estuaries, bounded by the right and left side and along the drainage by a border line.[9]

The river can also be interpreted as a part of the earth's surface that is located lower than the surrounding land and becomes a place where fresh water flows into the sea, lakes, swamps or other rivers. The river is part of the surface of the earth which, because of its nature, becomes a place for water to flow.[10]

V. DROWNING

Drowning is death caused by aspiration of fluid into breathing due to the sinking of all or part of the body into the liquid, while near drowning is a state of physiological disorders due to drowning, but there is no death.[11]

Another mechanism states that serum electrolyte imbalances affect cardiac function (cardiac reflexes) and can also be caused by laryngospasm as a result of vagal reflex.[12]

In the event of drowning (drowning), the whole body does not have to sink in water. Provided that the nostrils and mouth are below the surface of the water, it is sufficient to meet the criteria as a sinking event. Based on this understanding, drowning can not only occur in the sea or river but can also occur in the sink or bucket of water. The amount of water that can be deadly if inhaled by the lungs is as much as 2 L for adults and 30-40 ml for babies.[13]

VI. RESEARCH METHODS

The material used in this study is river water taken at 2 rivers in Tebing Tinggi City in different locations, namely in the upstream, middle and downstream areas at a depth of 1 meter and 2 meters from the river surface. In one place on the river 2 times the water is taken up so that in the upstream 4 places, the middle part 4 sample and the downstream part 4 sample. In this case 12 samples were taken so that for 2 rivers 24 samples were obtained in the study.

The sampling technique in this study uses stratified random sampling in the upstream, middle and downstream sections for the types of diatoms in rivers in Tebing Tinggi City used as samples.

Procedure

1. Take water from the river with a plankton net (plankton net), then the plankton netted samples will be collected in a bucket which is then poured into a bottle of 20 ml, enter 20 ml of concentrated H2SO4 and leave it for 24 hours.
2. Heat with low heat until it boils, then pour into it a few drops of concentrated HN03, until the color is clear yellow.
3. The liquid is centrifuged for 15 minutes at a speed of 2000-4000 rpm. The sediment (sediment) is washed with distilled water and then centrifuged again the sediment (sediment) is seen under the microscope.
4. Check the shape of the diatoms found, then identify.

VII. RESEARCH RESULT

The results of research conducted on river water taken in 2 rivers in Tebing Tinggi City are the Kelembah River and the Sibarau River in different locations, namely in the upstream, middle and downstream areas, at one place in the river one time was taken which was then made into 3 slides . In this case 1 river was taken 3 samples which in total were made into 9 slides. So the number of samples in this study was 6 samples of 18 slides with the following results:

Types of Diatoms in the Kelembah River.
- Types of diatoms found at Hulu station are: Navicula sp, Fragilaria, Nitzschia sp,
  Cychlotella sp, Achnanthes sp, Cymbella sp.
- The type of diatoms found at the Central station are; Navicula sp, Nitzschia sp,
  Cymbella sp, Frustulia sp, Plagiotropis sp, Rhopalodia sp.
- Types of diatoms found at the Hilir station are: Navicula sp, Synedra sp, Caloneis sp,
  Fragilaria sp, Cymbella sp, Pinnulaia sp, Eunotia sp, Amphora sp.

Types of Diatoms in the Sibarau River.
- Types of diatoms found at the Hulu station are: Synedra sp, Navicula sp, Cymbella sp,
  Asterionela sp, Frustulia sp.
- Types of diatoms found at the Central station are: Navicula sp, Caloneis sp, Pinnularia
  sp, Frustulia, Cyclotella sp.
- Types of diatoms found at Hilir station are: Synedra sp, Caloneis sp, Nitzschia sp,
  Fragilaria sp, Cyclotella sp, Eunotia sp, Asterionella sp.

Distribution of Diatom Types in the Kelembah river at upstream, middle and downstream stations

Location	**Station**		
	Upstream	**Middle**	**Downstream**
Kelembah River	Navicula sp	+	+

	Fragilaria sp	-	+
	Nitzschia sp	+	-
	Cyclotella sp	-	-
	Achnantes sp	-	-
	Cymbella sp	+	+
	-	Frustulia sp	-
	-	Plagiotropis sp	-
	-	Rhopalodia sp	-
	-	-	Synedra sp
	-	-	Caloneis sp
	-	-	Pinnularia
	-	-	Eunotia sp
	-	-	Amphora sp

Information : + : found

\- : not found

Distribution of Diatom Types in the Sibarau river at upstream, middle and downstream stations

Location	**Station**		
	Upstream	**Middle**	**Downstream**
Sibarau River	Synedra sp	-	+
	Navicula sp	+	-
	Asterionela sp	-	+
	Cymbella sp	-	-
	Frustulia sp	+	-
	-	Caloneis sp	+
	-	Pinnularia sp	-
	-	Cyclotella sp	+
	-	-	Fragilaria sp
	-	-	Eunotia sp
	-	-	Nitzschia sp

Information : + : found
\- : not found

VIII. Discussion

In general, the presence of phytoplankton, especially the abundance of diatoms in waters is influenced by several factors, namely the type of water, whether flowing or inundated, and the physical and chemical quality of waters such as light intensity, temperature, brightness, current speed, dissolved oxygen, free carbon dioxide, PH, depth, predator and nutrient content (nitrogen and phosphate levels).

In this study it can be seen that in the Kelembah river, diatom species found at the Hulu station there are 6 species namely: Navicula sp, Fragilaria sp, Nitzschia sp, Cyclotella sp, Achnantes sp, Cymbella sp. At the Central Station there are 6 species namely: Navicula sp, Nitzschia sp, Cymbella sp, Frustulia sp, Plagiotropis sp, Rhopalodia sp, At the Downstream station there are 8 species namely: Navicula sp, Fragilaria sp, Cymbella sp, Synedra sp, Caloneis sp, Pinnularia sp. sp. Eunotia sp. Amphora sp.

In the Sibarau river, diatom species found at the Hulu station there are 5 species, namely: Synedra sp, Navicula sp,

Asterionela sp, Cymbella sp, Frustulia sp. At the Central Station there are 5 species namely: Navicula sp, Frustulia sp, Caloneis sp, Pinnularia sp, Cyclotella sp. At the Hilir station there are 7 species, namely: Synedra sp, Asterionela sp, Caloneis sp, cyclotella sp, Fragilaria sp, Eunotia sp, Nitzschia sp. From the above data found in the Kelembah river and Sibarau river there are some different types of diatoms at each station, but several types of the same diatoms are found at each station.

Likewise from the table above, it is found in the Kelembah and Sibarau Rivers that there are some different types of diatoms in the two rivers, but several types of the same diatoms are found in both rivers. This is consistent with the theory which states that the type of diatoms and the amount / abundance of diatoms differ in each location. Phytoplankons in waters tend to be diverse and abundant in environmental conditions that support their growth, while several types of the same diatoms are found at each station and each river, this is also in accordance with the theory that some species of diatoms have very rapid adaptability with the condition of the environment in which he lives.

These different fluctuations are very possible to be influenced by the presence of surface currents and also by different current speeds at each station. These different movements and speed of currents cause changes in fluctuations in diatom abundance, because these currents carry plactons that will be distributed and can accumulate in a place certain. Changes in water content density may affect the overall plankton density, because the condition of the water content is a factor that affects the biological plankton.

IX. CONCLUSIONS AND SUGGESTIONS

CONCLUSIONS

1. From the results of the study found 14 species of diatoms in the Kelembah river,namely: Navicula sp, Fragilaria sp, Nitzschia sp, Cyclotella sp, Achnanthes sp, Cymbella sp, Frustulia sp, Plagiotropis sp, Rhopalodia spp, Synedra sp, Caloneis sp, Pinnularia sp, Achnanthes sp, Cymbella sp, Frustulia sp, Plagiotropis sp, Rhopalodia spp, Synedra sp, Caloneis sp, Pinnularia sp, Eunotia sp, Amphora sp.
2. Found 11 species of diatoms in the Sibarau river, namely: Synedra sp, Navicula sp, Asterionela sp, Cymbella sp, Frustulia sp, Caloneis sp, Pinnularia sp, Cyclotella sp, Fragilaria sp, Eunotia sp, Nitzschia sp.
3. Types of diatoms in the Kelembah river that are not found in the Sibarau river are Achnantes sp, Amphora sp, Plagiotropis sp, Rhopalodia sp.
4. Types of diatoms in the Sibarau river that are not found in the Weak river are: Asterionela sp.
5. Found in the Kelembah river and the Sibarau River there are some different types of diatoms in the two rivers, but some of the same diatoms are found in both rivers, this is because some diatoms have the ability to adapt quickly so that they are able to live in various environmental conditions , while some are only able to live in certain conditions.

SUGGESTIONS

1. The results obtained in this study have not provided a comprehensive result of the types of diatoms in the Kelembah River or the Sibarau River in Tebing Tinggi City given the limited duration of the study. This causes the need for further research at different times, circumstances and locations.
2. To get a clearer result of diatoms, further research needs to be done with better tools and instruments.
3. The same research needs to be done for other rivers in Tebing Tinggi City.

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