Characterization of morphology and identification of bioactive compounds of laor (Eunice viridis) from the waters of Morotai Island

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Abstract. Laor is one of the sea worms consumed by local people of Morotai Island as a source of protein. Laor appears seasonally in April and May. Laor will appear on the surface of the waters to do swarming in the morning. The purpose of this research is to study morphological characterization and the content of bioactive compounds in Morotai Island water. The study was conducted from May to August 2019. A sample of Laor obtained from the waters of Tanjung Dehegila, Wayabula, and Bere-Bere district Morotai Island. The extraction of samples using the maceration method with 96% ethanol solvent. Identification of the group of bioactive compounds include alkaloids, flavonoids, saponin, and steroids. The results showed that laor has the characterization of brownish-red body color and blue-greenish, body-level bodies, having hair/legs along the side of the body, and sensor tentacles in the head. Extracts obtained have textures such as pasta, sticky, and yellow, greenish-yellow to reddish-yellow. ELT extract yields 7.8%, ELW as much as 9.4%, and ELB as much as 19.3%. The identifying of the laor bioactive compounds suggests that ELT and ELW contain alkaloid compounds, flavonoids, saponins, and steroids, whereas ELB contains only flavonoid compounds.

1. Introduction
Laor (Polychaeta) is one of the biotas typical of Maluku, North Maluku, and NTB waters. The worm will encounter swarming, for example, in the entire night, or a few days later, in a specific month [1]. In North Maluku, especially on Morotai Island, Laor will appear outwardly around the water surface in April and May to make a marriage. Morotai Island residents arrest Laor on a coral beach using the siu-siu (Nets) device.

Laor has been used for a long time by Morotai local people, but only for a limited consumption, so that use as pharmaceutical material has not been made. Research into Indonesian worm is still very limited in its application. Laor's presence is seasonal, so people in multiple places such as Ambon, NTB, and including North Maluku are still limited in utilization.

Laor has many advantages, such as ecology, Macrobentos role, and water bioindicators [2]. Some types of laor also used by the locals on Morotai Island as a source of protein substitute fish.
Furthermore, Laor is also believed to have health benefits and to encourage natural medicine. As a traditional medicine, Laor from China is used in the treatment of tuberculosis, gastric, and spleen function and health recovery caused by pathogens [3]. The laor of ethanol extract has the potential for antidiabetic treatment [4]. Practical community experience mentions that Laor can be used as a natural remedy for healing (inflammation) of deep wounds.

In order to study the morphological characteristics and see the content of bioactive compounds from the Morotai Island Regency, work is required based on the details.

2. Material and methods
2.1. Time and place of research
The study was carried out in April through August 2019. Laor samples were collected from Bere-Bere (ST1), Tanjung Dehegila (ST2), and Wayabula (ST3), respectively. Analysis of bioactive compound samples undertaken at Universitas Pasifik Morotai's FPIK Laboratory.

2.2. Research procedure
2.2.1. Laor collection
Laor was obtained from the village of Tanjung Dehegila, Wayabula, and the island of Bere-Bere Morotai. Eudora Laor's sampling was recorded using freshwater and washed, dried in the light, and covered with a black cloth. Drying took the biomass to constant.

2.2.2. Laor characterization
Samples of fresh laor from the waters have been injected into the alcohol and taken to the Pacific University Morotai FPIK Laboratory to classify it. The laor morphology study uses a 62.5-fold light microscope with a magnification.

2.2.3. Laor extraction
The extraction of Laor is done according to the Purwaningsih procedure [4]. The dried laor transforms into powder. Laor powder is macerated 90 percent (ratio 1:3) with ethanol solvent and left for 24-48 hours while stirring periodically. The laor extract suspension is filtered with a filter paper, and the

Figure 1. Map of research location. St1. Bere-Bere; St2. Tanjung Dehegila; St3. Wayabula.
filtrate is glazed until a paste is produced. Extracts shall be collected, scraped, and deposited in a bottle of the flacon.

2.2.4. Identification of bioactive compounds
To assess the quality of bioactive compounds found in the Laor, identifying the bioactive compound is performed. Measures are the alkaloid, flavonoid, saponin, and hormone measures.

2.3. Data analysis
Data collected in the form of Laor's morphology, extract Lowen, and the results of bioactive compound recognition are presented in the manner of drawings and tables, then analyzed descriptively. The additional extract weight is determined by using the following formula as a percentage of the yield (percent) extract.

\[
\text{Yield (\%)} = \frac{\text{extract (g)}}{\text{simplicia (g)}} \times 100\%
\]

3. Results and discussions
3.1. Characterization of Laor
The body is beautiful in color (brownish and turquoise), the body is segmented and has beautiful hair/legs along the side body, based on morphological characterization (see Figure 2b). There are also 2-3 beautiful hair/legs strands in the Head area. Length of body: 5.5 cm (see Figure 2a). Ahead is the anterior part of the body, fitted with eyes, tentacles, and mouths.

![Figure 2. Laor worm (magnification 62.5 times); A. Long worm; B. There are foot/motion tools along the side body](image)

Laor is identical with two muzzles, three antennas, and a shovel-shaped head and absence of Hook's mouth. Adult Laor is approximately 40 cm in size. Laor is divide into segments, and each of them has a spray-foot of hair. There are also many sensor tentacles growing on the head. The male laor is brownish-red while the females are turquoise [5].

In the county of Morotai Island, every full day or a few days later in April and May, the Laor will appear to the surface and clustered (swarming) to do the marriage (see Figure 3). When swarming, Laor seems brownish-red and turquoise. Besides, Laor also looks shiny.
Laor shaped like a regular worm that has diverse skin tones. The color is green, orange to red with shiny, slippery skin. When collected will look beautiful color alloy [6]. The color of the laor itself is generally colorful green on the female and brown color on the male type [7]. Some of the lathes are yellow and red. Laor moves his body (danced) when it comes out to the water surface.

3.2. Extraction of bioactive compounds of Laor

Laor extraction is done by the maceration method using ethanol solvent. The method of the maceration is chosen because this method does not use heat, so the likelihood of damage thermolabile compounds can be avoided. Ethanol is used as a solvent because ethanol is polar and can filter more bioactive compounds.

In the maceration process, all the Simplisia powder is injected with a solvent in the lid bottle, permitted for at least three days at room temperature, as often stirring until the compound is dissolved in a solvent, and the mixture is filtered [8]. The time of soaking simplistic during maceration ranges from 15-30 minutes to Twenty-four hours, which can be achieved at room temperature or solvent boiling temperature [9]. Extraction by the maceration process, however, involves a significant solvent, varying from 10-20 times the number of samples.

One of the factors influencing extraction success is the type of solvent used. Extraction solutions such as methanol, ethanol, acetone, propanol, and ethyl acetate are typical solvents used to extract fresh ingredients in the phenolic form [10]. The choice of extraction solutions is based on the degree of politeness of the compound components desired.

Extracts obtained have a texture like pasta, sticky, and yellow, greenish-yellow to reddish yellow (Table 1). The resulting yield differs from the three types of samples extracted using the ethanol solvent. ELT results were obtained 7.8% with a sticky paste texture and colored yellow. ELW's 9.4% yield, has a paste-like texture, sticky, and greenish-yellow. The ELB's yield is 19.3%, has a sticky texture, and is reddish yellow (see Figure 4).
Table 1. Extraction result of the bioactive compound of Laor from Morotai island water

| Sampel Lokation/code | Simplicia (g) | Extract (g) | Yield (%) | Color extract |
|----------------------|---------------|-------------|-----------|---------------|
| Tanjung Dehegila (ELT) | 30            | 2.34        | 7.8       | Yellow        |
| Wayabula (ELW)       | 30            | 2.82        | 9.4       | Greenish-yellow |
| Bere-Bere (ELB)      | 30            | 5.8         | 19.3      | Reddish-yellow |

3.3. Identification of bioactive compounds

Identification of the bioactive compounds of the laor includes saponins, alkaloids, flavonoids, and steroid compounds. The identification of bioactive compounds is qualitatively using chemical reagents. The results of identifying the laor bioactive compounds can see in Table 2.

Table 2. Result of identifying bioactive compounds of Laor from the waters of Morotai Island

| Extracts               | Alkaloid | Flavonoid | Saponin | Steroid |
|------------------------|----------|-----------|---------|---------|
| Tanjung Dehegila (ELT) | +        | +         | +       | +       |
| Wayabula (ELW)         | +        | +         | +       | +       |
| Bere-Bere (ELB)        | -        | +         | -       | -       |

Note: (+) contains bioactive compounds. (-) does not contain bioactive compounds.

Table 2 above indicates that the laor extracts from Cape Dehegila (ELT) and Wayabula (ELW) contain the alkaloid, flavonoid, saponin, and steroid compounds. The Bere-Bere Laor (ELB) extracts contain only flavonoid compounds. The bioactive compounds on sea worm type Eunice sicilienis of alkaloids, flavonoids, saponins, triterpenoids/steroids, and tannins [11]. That Eunice viridis (laor) marine worm ethanol extract comprises a group of alkaloid compounds, flavonoids, saponins, triterpenoids/steroids, and tannins [12].

Temperature, light radiation, air (especially oxygen, carbon dioxide, and water vapor) and humidity are environmental factors that affect the stability of the bioactive compounds. Other factors that may actively affect the stability, i.e., pH, water properties, biotic conditions, and the presence of certain chemicals that are pollutants or from the mixing of various products that affect the stability of active ingredient preparation [13]. Bad environmental conditions impact species processing of bioactive compounds. Sea worms will be releasing bioactive compounds for survival under poor environmental conditions.

Certain bioactive compounds in the laor have pharmacological effects. The flavonoids are one of the bioactive compounds that function on wounds, antifungals, antivirals, anticancer, and antitumor as antimicrobial, infectious drugs [14]. Besides, flavonoids may also be antibacterial, antiallergic, cytotoxic, and antihypertensive.

Saponin is a potent bioactive surface compound that elevates foam when shaken in water and often causes hemolysis at low concentrations [15]. The Steroid used as an ingredient for the manufacture of drugs [16]. The steroid compounds are active components that have been used to treat diabetic disease, menstrual, antibacterial, and antiviral disorders [17].

Alkaloids are among the secondary metabolite compounds that can be used in cancer care. Once metaphase, the Alkaloid can break the spindle yarn that results in cell division stopping. The alkaloids are often toxic to humans and that they have such widespread physiological activity in the treatment area [12]. The alkaloids are capable of being analgesic, anti-inflammatory, antihypertensive, antiarrhythmic, and antimalarial at the same time [18]. Alkaloids also show anticancer activity [19].

4. Conclusion

The study results show Laor has characterization of red-brown and blue-green body, its body Beruas-segments, and has fine hair/legs along the side body. In addition to the head of the Laor there is also
hair. The yield obtained from ELT (7.8%), ELW (9.4%), and ELB (19.3%). Classes of bioactive compounds contained in ELT and ELW are alkaloids, flavonoids, saponins, and steroids. Whereas ELB contains only flavonoid compounds.

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Acknowledgment
The author thanked Mr. Asy’ari for the morphological characterization provided a sample of a laor. We also wish to thank the Faculty of Fisheries and Marine, Khairun University, which hosted the International Conference Fisheries and Marine Science (ICFM) 2020.