Potential Test Of Antimicroba Seeds Mangrove Plant (*Avicennia Marina SP.*) As A Reservation For Mangrove Crab (*Scylla Serrata*)

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Abstract- The amount of natural resources in Langsa is mangrove plant which is can be utilized for health especially in searching raw materials of medicines like an antimicrobial drug. Besides that, the availability of mangrove crab is also one of local potentials which are loved by local community. However, the people should take care in consuming mangrove crab because of its bacteria is very harmful as a damage both in short and long term. This study aimed to assess the potency of mangrove as an antimicrobial and to indicate bioactive components of mangrove in overcoming the disease in mangrove crab. Data were collected by taking Avicennia marina mangrove seeds in Kuala Langsa village. The samples were 1 kg of old and intact mangrove seeds. The phytochemical screening test showed that there were a few of bioactive compounds contained in mangrove seeds such as triterpenoid, tanin, phenol and alkaloid. Test of mangrove seeds as inhibitory was conducted by using agar diffusion method in methanol and n-hexane. Respectively, extract of that sample in methanol and n hexane obtained average clear zone of 3.13 mm and 3.03 mm over its positive zone. Furthermore, the clinical symptoms of mangrove crab after soaked by extract of mangrove seeds exhibit several changes like the decreasing of melanosis in carapace, the waning of swimming to be red and the color of carapace begins to be greenish.

Keywords: *antimicrobial, mangrove plant seed (Avicennia marina sp.), Mangrove crab (Scylla serrata)*

I. INTRODUCTION

Development and search for the source of bioactive compounds is continuously carried out by the increasing number of new diseases such as infection, cancer and others. Bioactive compounds can be obtained from several sources, including from plants, animals, microbes and marine organisms (Prihatiningtias and Sri 2011). Mangrove plant has secondary metabolites which is very useful for human. It is known because of its lot of benefits. Basically, the secondary metabolite of mangrove plants has the potency as an antimicrobial, antimalarial, anticancer, antioxidant and others.

Data form previous studies reported that there is the active compounds anti-inflammatory, anti-oxidant, anti-bacterial and anti-virus from extracts of various species of mangroves (Withanawasam, 2002). Several previous studies have been conducted to determine the bioactive compounds produced by Avicennia marina seeds by doing some phytochemical analysis on various plant tissues of Avicennia spp. It indicated that the seeds of plant seeds contain small amount of alkaloids, saponins, glycosides, tannins, flavonoids in seeds and sap. Triterpenoids are presented in all parts, especially in seeds and roots. Steroids are not found in all parts of plants (Cahyo, 2009).

Purwaningsih et al. (2013) has examined the characteristics of mangrove seeds derived from the mangrove forest of PulauSeribu, Jakarta. Hipocotyl ethanol extraction of mangrove indicated a very strong antioxidant activity. Hardiningtyas (2014) states that mangrove root extract can be used as a hepatoprotective, an alternative herbal remedy to treat liver damage. According to Revathi, et al. (2014), the bark of mangrove trees can also be used to cure diabetes.

The great potential of the Avicennia marina mangroves in the form of bioactive compounds should be developed which can later be used for health, especially for seeking raw materials of drugs such as antimicrobials. One of the most important types of drugs is the antimicrobial drug because a lot of food consumed by humans derived from the ocean contains microorganisms or bacteria and other harmful chemicals. The bacterial microbes are frequently contaminate food (crabs, shellfish, shrimp and other marine products), causes food poisoning and gastroenteritis (acute diarrhea) is the Vibrio Parahaemolyticus (Suardjana, 2013) bacteria.

Therefore, one of the paths that can be pursued is looking for other biological sources such as microbes that are symbiotic in the mangrove plant tissue to produce the same secondary metabolite compounds without sacrificing their host plants. That is why very crucial to review about the role of mangroves Avicennia marina sp. as antimicrobial pathogens for mangrove crabs, in order improve productivity in the fishery industry sector.

Based on the mentioned problems, the problem statement in this study is how is antimicrobial potency of

mangrove seed extract of Avicennia marina sp. as an effort to eradicate the disease in mangrove crabs.

II. RESEARCH METHOD

This research was conducted in Langsa city at Samudra University Basic Laboratory from April 2017 until December 2017. Collecting samples of mangrove seeds of Avicennia marina sp. conducted in the Port of Kuala Langsa and surrounding areas this research used experimental method. Initially, it is begun by producing extract of bioactive microbial and testing of its activity to the bacteria of vibrio sp.

Samples that will be extracted from mangrove plants (Avicennia marina) are available in Kuala Langsa mangrove forest, Langsa Barat District, Langsa City. The seeds of mangrove palnt were brought to the laboratory for the extraction of antimicrobial biactive components and the activity to bacteria of vibrio sp., and the final test is antimicrobial test of active extract to mangrove crabs.

III. RESULT AND DISCUSSION

Here is the discussion of study included the extracting of antimicrobial bioactive components, test of inhibitory activity of mangrove seed extract, seed potency of mangrove plant as antimicrobial on mangrove crab.

Extraction of Antimicrobial Bioactive Components

The maceration process obtained two extracts of methanol extract and n-heksan seed Avicennia marina. Seed extract of A. marina extract methanol: 13.56 g, n-hexane extract: 2.38 g). The weight value of the extract was obtained from the weighing of the cup by reducing the initial weight of the cup. Based on the solvent used, methanol produced more extract than the n-hexane. This is presumably because the compounds contained in Avicennia marina seeds tend to polar. The solvent used depends on the nature of the component to be isolated. It is also found by Darwis, (2000) which states that the methanol solvent is widely for isolation of organic compounds, since it is totally dissolve many kinds of secondary metabolites.

Power Activity Barrier of Mangrove Seed Extracts

The inhibitory test of Avicennia marina seed extract to bacteria of vibrio sp. with agar diffusion method indicated the presence of inhibitory power of the extract on test bacteria. The positive test is shown by a clear zone visible around the extract disc paper. According to Pratama (2005), the clear zone around the disc paper indicates the presence of antibacterial activity.

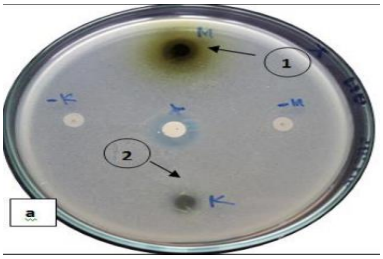

Figure 1. The clear zone of Avicennia marina seed extract (1: methanol extract, 2: n-hexane extract).

Potential Test of Avicennia marina as Antimicrobial to Mangrove Crabs.

According to inhibitory activity of methanol and n-hexane extract of Avicennia marina, showed the antibacterial potency in extract to Vibrio Sp bacteria. (Table 1).

Table 1. Inhibitory power of Avicennia marina seed extract by location and solvent.

Solvent	Repeat	Deuteration of Inhibition Zone		Positive of control (mm)
		White zone	Mean	
Methanol	1	4,00	3,13	6,65
	2	3,00		
	3	2,40		
n-hexane	1	3,10	3,03	
	2	4,00		
	3	2,00		

Table 1 showed that the methanol extract and n-hexane seeds of A. marina clear zone of 4.00 mm (1), 3.00 mm (2) and 2.40 mm (3) with an average of 3.13 mm in the extract methanol and 4.00 mm (2), 3.10 (1), 2.00 mm (3) with an average of 3.03 in the clear zone produced by the n-hexane

extract. The results show the average value of positive control inhibitory is 8.30 mm.

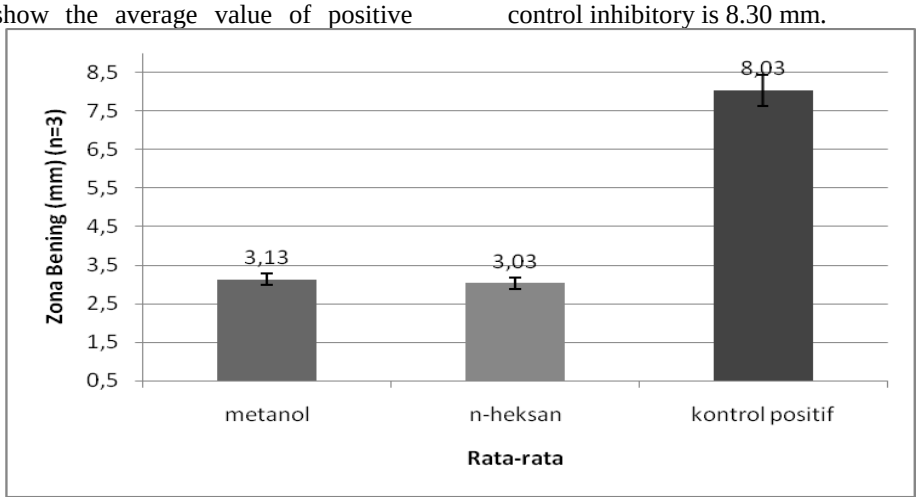

Figure 2. Graph of Zone Flow Zone of Avicennia marina Seed Extract In Various Solvent

For duplication and the average values of the extract of methanol and n-hexane of A. marina seed showed that a clear zone was close to even exceed the positive control used. After the potency of antimicrobial was found, the reservation test for mangrove crabs can be applied. Clinical symptoms that appear in post-bacterial mangrove shoots Vibriosis were characterized by morphological changes such as stretching the legs of the path and swimming legs, blackened carapace, there are white spots, passive movement, the presence of wounds on the carapace, and the appearance of red spots (melanosis). Morphological changes in post-infection mangrove crab are shown in Figure 3.

Figure 3. Clinical Symptoms of Post-Infectious Mangrove Crab Description: (a) Melanosis, (b) Swimmer's feet, and (c) Karapas black

The morphological condition of mangrove crabs after 60-90 min post infection Vibriosisharveyi is characterized by the appearance of melanosis in the carapace (Fig. 3a) as well as the stretching of the swollen foot limbs and legs (Fig. 3b). This clinical symptom appears almost in all treatments followed by a blackened carapace change (Fig. 3c). Further clinical symptoms of mud crab post-immersion are shown in Figure 4.

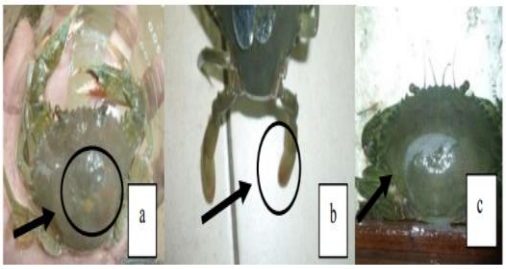

Figure 4. Clinical Symptoms of Post-Immersion Mangrove CrabDescription: (a) Melanosis shrinks, (b) Red swim legs fade, and (c) Faded black carapace

Clinical symptoms of post-immersion mud crabs began to show a change in clinical symptoms in treatments B, C and D. But different with treatment A, the appearance of wounds on the crab's carapace is not supported by closing the wound to death. The morphological condition of mangrove crabs on the 5th day after soaking the extracts showed the changes such as the decreasing of melanosis in the carapace (Figure 4a), the fading of the swimmer pool (Figure 4b), and the color of the carapace (Figure 4c).

IV. CONCLUSION

According to the result and data, it can be concluded that:

1. Phytochemical screening tests is applied to knowbiochemical compounds and types of bioactive compounds contained in the extraction of maize seeds Avicennia marina such as triterpenenoid, tannin, phenol and alkaloids. The extracts of n-hexane predicted the component of triterpenoids.
2. Test of inhibitory power of methanol and n-hexane extract of A. marina seeds was done by diffusion

method so that in some repetition of methanol and n-hexane solvent extract the samples of Avicennia marina mangrove seeds obtained an average clear zone of 3.13 mm and 3.03 mm from the positive control. This shows the nature of the extract as a potential antibacterial against bacteria Vibrio sp. with a clear zone value approaching a positive control (8.03 mm).

3. The results of clinical symptoms in mangrove crabs after soaking showed that mangrove seed extracts were visibly changed such as reducing of melanosis in the carapace, the fading of the pool swim, and the color of the carapace began to greenish.

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