LEMBAR
HASIL PENILAIAN SEJAWAT SEBIDANG ATAU *PEER REVIEW*
KARYA ILMIAH : JURNAL ILMIAH

Judul Jurnal Ilmiah (Artikel)	:	Antibacterial Activity of Microalgae *Dunaliella salina, Tetraselmis chuii* and *Isochrysis galbana* Against Aquatic Pathogens
Penulis Jurnal Ilmiah/ Jumlah penulis	:	Ita Widowati, Muhammad Zainuri, Hermin Pancasakti Kusumaningrum, Yann Hardivillier/ 4 orang
Status Pengusul	:	Penulis Anggota
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Kategori Publikasi Karya Ilmiah/buku (beri v pada kategori yang tepat)	:	[✓] Jurnal ilmiah ~~internasional~~/Internasional bereputasi** [ ] Jurnal ilmiah nasional Terakreditasi [ ] Jurnal ilmiah nasional/nas. terindeks di DOAJ,CABI, Copernicus**

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Total = (100%)	**40,00**			**39,82**
Nilai pengusul = (40% x 39,82)/3 = 5.309				**5.309**

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Semarang, 27 April 2023
Reviewer I

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Semarang, 28 April 2023
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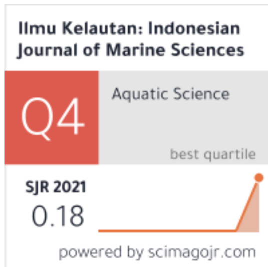

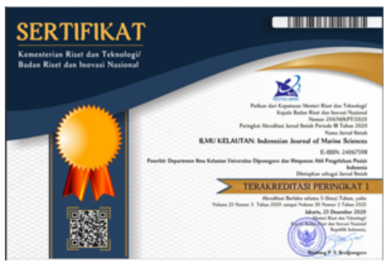

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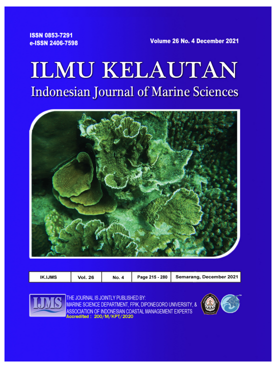

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ILMU KELAUTAN: Indonesian Journal of Marine Sciences *December 2021 Vol 26(4):282-297* *e-ISSN 2406-7598*

Seawater Masses Characteristics of The Bali Sea Based on CTD Yo-Yo Casting

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Abstract

The Bali Sea is located between the Java Sea and the Lombok Strait, which is one of the Indonesian Through Flow exits, especially the western route. These waters are possible to be the meeting place and mixing of two water masses with significantly different characteristics, that is the watermass brings by Indonesian Through Flow and Indian Ocean watermass. This study describes the watermasses and its turbulent mixture in the Bali Sea using CTD Yo-Yo casting data and spatial monsoonal wind distribution. The vertical distribution of energy dissipation rate and diapycnal diffusivity in the Bali Sea was computed based on measurement data during KRI RIGEL 933 expedition on April, 2021. KRI RIGEL is operated by Hidro-Oceanographyc Center Indonesian Navy's. Identified 4 types of water masses in a row, there are Java Sea water masses, mixed water masses between Java Sea and ITF, NPSW and NPIW with modified water mass property characters. The internal tides formed in the sills of the Lombok Strait are thought to contribute to the turbulent mixing parameters in the Bali Sea. The values obtained for energy dissipation and diapycnal diffusivity are 1.58 x 10^{-9} W Kg^{-1} and 5.07 x 10^{-5} m^2 s^{-1}, respectively. The value of this turbulent mixing parameter is confirmed to be smaller than the mixing value in the Lombok strait and is equivalent to the open sea. It is seen that there is a transformation of water mass which is marked by a shift in the density value in the identified water mass type.

Keywords: *Seawater Masses, Bali Sea, CTD Yo-Yo, Indonesian Through Flow, energy dissipation*

Introduction

Indonesia, which has a complex and narrow topography as the only channel of water mass exchange from the tropical waters of the Pacific Ocean to the Indian Ocean, or better known as the Indonesian Traffic Stream (Gordon and Fine, 1996; Sprintall *et al*., 2004). The Indonesian Through Flow (ITF) as formed due to a push due to the difference in sea level between the Pacific and Indian Oceans (Susanto and Song, 2015; Sprintall *et al*., 2019) this difference reached an average of ±20 cm (Mayer and Damm, 2012). The ITF has two routes, the western route which enters through the Celebes Sea and then to the Makassar Strait, Flores Sea, and to the Banda Sea. The second route is the eastern route which passes through the Maluku Sea and the Halmahera Sea and then to the Banda Sea (Fieux *et al*., 1996). The ITF carries water masses of NPSW and NPIW on the western line and SPSW and SPIW on the eastern route to the Indian Ocean through Indonesian waters (Fine *et al*., 1994; Wyrtki, 1961). The thermocline layer (NPSW/SPSW) is centered on isopycnal 24-24.5 with maximum salinity characteristics and intermediate layer (NPIW/SPIW) and centered on isopycnal 25-26.5 with minimum Salinity characteristics (Kashino *et al*., 1996; Atmadipoera *et al*., 2009; Kashino *et al*., 2009).

A lot of research on ITF has been carried out on the west and east routes, mainly on the inlet routes, such as the Makassar Strait and the Lyfamatola Canal and the exit routes, such as the Lombok Strait, Ombai Strait, and the Timor route (Arief and Murray,

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Marine bacterium *Seonamhaeicola algicola* strain CC1 as a potential source for the antioxidant carotenoid, zeaxanthin

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Abstract

Currently, there are only six species in the genus Seonamhaeicola, i.e., Seonamhaeicola aphaedonensis, S. algicola, S. marinus, S. acroporae, S. maritimus, and S. sediminis. These bacteria have typical yellow or orange color. Among the identified strains, only S. marinus that had been reported to have a yellow polyene flexirubin pigment. However, the presence of carotenoid pigments has not been reported in this genus. Recently, we successfully isolated a new strain, S. algicola strain CC1, bacterium that was found in association with a red seaweed, Halymenia sp., collected from the coast of South Malang, Indonesia. The strain was grown well in the Zobell marine agar 2216E producing yellowish pigments. According to the 16S rRNA sequencing analysis and BLAST search, the strain is closely related to S. algicola strain Gy8, with 99.78% identity. The pigment composition was separated and analyzed by a high-performance liquid chromatography with tandem mass spectrometry detection (HPLC-MS/MS) and the strain was found to produce zeaxanthin as the major component, which appeared at a retention time (t_R) of 28.89 min, showing a typical mass spectrum with a molecular ion at m/z 568.5 $[M]^+$ and four product ions at m/z 261.4 $[M−307]^+$, 476.6 $[M−92]^+$, 429.3 $[M−139]^+$, and 536.5 $[M−32]^+$. Other carotenoids, including zeaxanthin cis isomers, β-cryptoxanthin, β-carotene cis isomer, and β-carotene, are as minor components. The novel and noteworthy finding of this report is the identification of a Seonamhaeicola species that produces carotenoids and can be used as a source of zeaxanthin.

Keywords: *HPLC, marine bacterium, mass spectrometry, Seonamhaeicola, Zeaxanthin*

Introduction

Zeaxanthin [(3R,3'R)-dihydroxy-β-carotene] is a fat-soluble antioxidant belonging to the xanthophyll class of carotenoids. It is composed of 40 carbon atoms and contains two β-rings that are substituted at the 3 and 3' carbons. Zeaxanthin contributes to the yellow color of paprika fruit, corn, saffron, wolfberries, and some microorganisms (Pérez-Gálvez *et al.*, 2003; Sajilata *et al.*, 2008; Perry *et al.,* 2009). In plants and algae, zeaxanthin plays a photoprotective role, involves the prevention of singlet oxygen generation due to excess of excitation energy under strong light conditions. Zeaxanthin may be produced in response to long-term environmental stress and for the photoprotection of the photosynthetic apparatus, however, this photoprotection function varies from species to species in plants and algae (Mozaffarieh *et al.*, 2003; Galasso *et al.*, 2017). Zeaxanthin is also called a macular pigment, highly concentrated in the macula region of the retina and is responsible for our fine-feature vision. In the food industry, zeaxanthin, known as E161h food dyes, has considered as a functional food ingredient, that contribute to prevent the progression of age-related macular degeneration (AMD) (Asker *et al.*, 2018).

Microbial pigments have recently garnered an increasing attention, especially that they can be controlled in the culture for high productivity in a limited space and in a short time (Zhang *et al.*, 2018; Ramesh *et al.*, 2019). Several marine bacterial cultures have been reported to produce zeaxanthin (Zhang *et al.,* 2018). At the time of writing this report, 22 marine bacteria have been identified to have zeaxanthin. The majority (82%) of zeaxanthin-producing species are from the family Flavobacteriaceae (Miki *et al.,* 1996; Asker *et al.,* 2007a; Asker *et al.,* 2007b; Kahng *et al.,* 2010; Yoon *et al.,* 2010; Hameed *et al.,* 2012; Hameed *et al.,* 2013; Prabhu *et al.,* 2013; Subhash *et al.,* 2013; Hameed *et al.,* 2014a; Hameed *et al.,* 2014b; Lee *et al.,* 2014; Shahina *et al.,* 2014; Takatani *et al.,*

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Producing Active Secondary Metabolite Against Pathogenic *Vibrio* spp. by Actinobacteria-Sodium Alginate Co-Culture

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Abstract

Vibrio vulnificus, Vibrio parahaemolyticus and Vibrio harveyi have been found in aquatic environments and suspected as the primary trigger of WFD (White Feces Disease) outbreaks in aquaculture. This Vibrio spp. has an antibiotic resistance to Ampicillin, Co-Amoxiclav, Amoxicillin, Azithromycin, Actinobacteria and Ciprofloxacin HCL. Actinobacteria and alginate have been reported to increase the marine biota resistance against diseases through prebiotic and probiotic mechanisms. This study aims to discover and increase the secondary metabolite production of Actinobacteria-Alginate and its ability as anti-vibrio. Alginate extraction in the samples dated September 2020 originally from Teluk Awur Bays, Jepara, Central Java, Indonesia (33.73±1.84%) was considerably higher than in May 2021 (22.67±0.3%). Samples were taken from sediment and mangrove root. Actinobacteria strains are macroscopically and microscopically similar to the genus Streptomyces. The most well-known antibiotics were produced by Streptomyces spp. The anti-vibrio test was carried out by Kirby-Bauer disc diffusion. The results were observed by measuring the inhibition zone surrounding the paper disc using a digital calliper. Co-culture strain 90 together with alginate have an approved antibacterial activity against all Vibrio spp. in the concentration of 10.disc^{-1} mg and 5 mg.disc^{-1}. Co-culture Actinobacteria with alginate has remarkably changed the green-yellow color to olive green/dark red-orange (strains 3, 62, 63, 72, and 90), indicating the transformation of the formation alginate with pigments into other compounds through the biosynthetic pathway. Therefore, alginate enables to support of Actinobacteria by induction the active secondary metabolite as an anti-vibrio to counteract the bacterial pathogen diseases.

Keywords: *Alginate, Actinobacteria, Co-culture, Vibrio spp.*

Introduction

Vibrio spp. live in the high tolerate salinity of aquatic environments (Lee *et al.*, 2018) and mostly pathogens (Baker-Austin *et al.*, 2018). *Vibrio vulnificus* (Jones and Oliver, 2009), *Vibrio parahaemolyticus* (Yeung and Boor, 2004; Letchumanan *et al.*, 2014), and *Vibrio harveyi* (Liuxy *et al.*, 1996; Xu *et al.*, 2017) are pathogens. Predominated of *Vibrio* spp. instead of *Alteromonas* sp. and *Pseudoalteromonas* sp. caused White Feces Disease (WFD) outbreaks in the Pacific *Penaeus vannamei* (Alfiansah *et al.*, 2020) shrimp.

FAO data from 1998-2018 shows that the shrimp family has exported around 1,860,820-4,675,650 tons with a 5.58-5.64 USD.kg^{-1} selling price. Total production in 2012 was 3,349,620 and increased to 3,455,260 tons in 2018. Other data from FAO shows that cultivation yields reached 4,064,000 tons (12,394 million USD) in 2012 and increased to 6,004,000 tons (15,549 million USD) in 2018 (FAO, 2020). On the other hand, disease losses of AHPND and WSSV shrimp (Asia) in 2015 were as big as more than 26 million USD and more than 11 million USD, respectively (Shinn *et al.*, 2018). The bioeconomic model was used to see the impact of AHPND on the production of *Litopenaeus vannamei*. The seven worst-case scenarios of increasing severity are very extreme, with an average loss of -727.56 USD.ha^{-1}, a benefit/cost ratio of 0.52 with a probability loss of 95.9% (Estrada-Perez *et al.*, 2020).

Overuse of antibiotics in shrimp culture will lead to resistance (Davies and Davies, 2010). Schar *et al.* (2020) reported that people antibiotic consumption in the world in 2017 was 10,259 tons and tend to increase up to 33% (13,600 tons) in 2030. The Asia-Pacific region has the largest global antibiotic consumption (93.8%), and China

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Coral Reef Health Index On Sangiang Island

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Abstract

The coral reef is massive deposits of calcium carbonate produced from coral animals that are symbiotic with zooxanthellae. One of the activities carried out as an effort to improve the sustainability of coral reefs is monitoring the health condition of coral reefs. The coral reef health index value is based on benthic components and fish components. The benthic component consists of variable life coral cover and the level of coral reef resilience determined based on macroalgae, rubble, and life coral. Fish component is the total biomass of target reef fish. The highest coral reef health index value is at value 10 and the lowest value is at value 1. This study aimed to determine the value of the health index on Sangiang Island. This research was conducted on 16-18 February 2019 on Sangiang Island on three dive stations are Legon Bajo, Legon Waru, and Tembuyung. Data collection of benthic components uses the Underwater Photo Transect (UPT) method and data collection of fish components uses the Underwater Visual Census (UVC) method. The results showed that the coral reef health index on Sangiang Island was at values 6 and 5, means the live coral cover on Sangiang Island was included in the high and medium category, and the level of coral reef resilience or recovery potential was included in the high category, while the total biomass of the target reef fish is still in the low category, only a few species of fish were found that belong to the target reef fish.

Keywords*: coral reefs, fish, health, resilience, Sangiang Island*

Introduction

Indonesia is the largest archipelagic country in the world consisting of 18,110 islands and an area of coral reefs in Indonesia about 18% of the world's coral reefs and has around 3000 species of reef fish (Suharsono, 2014). Coral reefs are massive deposits of calcium carbonate produced from coral animals with algae and other organisms, then produce calcium carbonate. Coral reef ecosystems very important for biotas as a shelter, a place to provide food, and reproduction (Cahyo, 2017). The coral reef ecosystem is also widely used by coastal communities for tourism purposes such as snorkeling or activities by fishermen (Prasetya *et al*., 2018).

The exploitation of marine resources, especially on coral reefs which is carried out excessively and is not environmentally friendly, will have a negative impact in the form of damage. According to Yusuf (2013), the damage to coral reefs in Indonesia is mostly caused by human activities. Damage to coral reefs can be caused by natural factors and human factors. Damage is caused by natural factors, for example, changes in seawater temperature, global climate change, typhoons, earthquakes, volcanic eruptions, predators, and diseases. Meanwhile, examples of damage caused by humans are capture fisheries that use explosives, toxic chemicals, and fishing gear that are not environmentally friendly (Maynard *et al*., 2008; Uar *et al*., 2016).

The Coral Reef Rehabilitation and Management Program (COREMAP) carried out by the Government of Indonesia to protect, rehabilitate and manage the use of coral reefs is expected to be able to improve coral sustainability and the welfare of coastal communities. One of the activities carried out by this program is monitoring coral reefs to describe the health condition of coral reefs. So far the parameter used is the percentage of live coral cover, where the higher the percentage of live coral cover the healthier the coral reefs. However, the reality is

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