Analisa Kualitatif Air Minum Dalam Kemasan Dan Isi Ulang Yang Dijual Sekitar Universitas Muhammadiyah Kudus

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Abstrak

Penelitian ini bertujuan mengetahui kualitas air minum dalam kemasan (AMDK) dan air minum isi ulang (AMIU) yang dijual di sekitar kampus Universitas Muhammadiyah Kudus, ditinjau dari parameter fisik, kimia dan mikrobiologis pada air minum sesuai SNI 01-3554-2006 dan PMK no 492 tahun 2010. Pengujian dilakukan mengunakan 10 sampel air mineral, meliputi 7 AMDK (Ades, Airmu, Aqua, Cleo, Crystalin, Le mineral dan Vit) dan 3 sampel AMIU diambil dari depot air minum isi ulang disekitar kampus yaitu dari depot Pasuruhan, Prambatan dan Purwosari. Penelitian dilakukan di PT Sariguna Primatirta Kudus, yang merupakan pabrik AMDK di kota Kudus, yang memiliki persyaratan pengujian AMDK. Pengujian yang dilakuan meliputi fisika kimia yang meliputi pengujian TDS, pH, dan tiga unsur logam berat yang meliputi pengujian kandungan unsur Fe, Mn dan Cl2 (klorin)dan mikrobiologi yaitu TPC, keberaadaan E.coli dan Total Coliform.

Hasil penelitian didiskripsikan bahwa hasil pengukuran fisika kimia terdiri dari kandungan total dissolved solid (TDS) menghasilkan Airmu dan Cleo dibawah 10 ppm (demineral) dan 8 sampel air mineral, hal ini sesuai dengan persyaratan TDS dari SNI yaitu > 10 ppm untuk demineral dan >500 ppm untuk air mineral. Pengujian pH berada pada pH normal berkisar diangka 7, dari 10 sampel hanya satu yang bernilai basa 8.37 yaitu sampel dari depot Pasuruhan. Pengujian adanya logam berat Fe, Mn dalam kondisi baik, menunjukan angka nol dengan test kit merk merck. Sedangkan untuk pengujian adanya kandungan klorin menunjukan hasil diatas ambang batas yaitu 0.05 ppm dari sampel air depot Pasuruhan, 0.02 ppm dari depot Prambatan dan depot Purwosari. Hal ini tidak sesuai karena sesuai ketentuan SNI untuk kandungan klorin adalah 0 ppm. Hasil organoleptik dari 10 sampel menghasilkan kondisi normal. Namun secara mikrobiologis hasil TPC sebelum pengeceran hanya Cleo dan Ades yang laik dikonsumsi karena aman dari kontaminasi bakteri. Sedangkan Hasil TPC setelah pengenceran, pengujian keberadaan E.Coli dan Total coliform menghasilkan 7 sampel AMDK aman dan laik sebagai air minum sesuai SNI No.01-3553 tahun 2006 dan 3 sample AIMU tidak memenuhi PMK no 492 tahun 2010, sebagai persyaratan air minum.

Kata kunci: fisik, kimia, mikrobiologis

Literature Study On The Diversity Of Coastal Echinoidea As A Source Of Biology Learning Materials For Biodiversity

PRELIMINARY

Indonesia is a country traversed by the equator so that it has a tropical climate, this causes the level of biodiversity in Indonesia to be high. Biodiversity can be divided into three

levels, namely genetic diversity, species diversity and ecosystem diversity. Indonesia has a very high diversity of ecosystems. according to(Iskandar, 2015)In Indonesia, at least 47 types of ecosystems have been recorded, from the coast to the mountains. The coastal ecosystem itself is influenced by the daily cycle of tides. Organisms that live on the beach have structural adaptations so that they can be tightly attached to hard substrates. The middle of the beach is submerged at high tide and low tide. One of these areas is inhabited by the class Echinoidea which belongs to the phylum Echinoderms(Nyoman, 2014).

Sea urchins are members of the class Echinoidea, which is one of five classes in the Phylum Echinoderms (invertebrates). This animal is round (radial pentamerous) and its entire body is covered with spines. Its habitat is in the sea with a wide distribution area so that it can be found on beaches that have rocky and sandy substrates in various parts of the world. Sea urchins have two phases in their life, namely the larval phase (bilateral symmetry) called fluteus and the adult phase (meruji symmetry) because their bodies are covered with spines. Sea urchin larvae are planktonic. The larvae will swim to follow the mass of water so that the distribution area becomes very wide. Sea urchins, like other invertebrates, are not very popular among the general public in Indonesia,(Umagap, 2013).

Various learning resources around students' lives have not been used optimally in learning. Learning resources are something that contains a message delivered through a tool or by himself or the message is contained in the learning materials provided. On the other hand, learning resources are anything that is designed or utilized either individually or collectively to help students learn(Sitepu, 2014). Based on observations at SMA N 5 Yogyakarta, it was found that teachers tend to use textbooks as the only source of learning and still do not use the surrounding environment as a source of learning biology. The results of research on the level of diversity of Echinoidea can be used as an alternative source of learning biology on biodiversity material.

Research on Echinoidea diversity has not provided much information until the analysis of learning resource requirements. Based on this, it is necessary to conduct research on the level of diversity in the intertidal zone Echinoidea class to determine the Echinoidea diversity index which is analyzed using learning resource requirements based on research results from literature studies.

METHOD

This research is a literature review research with the type of narrative review. The use of narrative review design is to focus the discussion, describe various themes or certain topics. The research begins with a literature search that is relevant to the research topic. The procedure for searching scientific articles is done by accessing official websites such as:*www.schoolar.google.co.id*,*www.sinta.ristekbrin.go.id*,*www.lipi.go.id*, *www.garuda.ristekdikti.go.id*, *www.rama.ristekbrin.go.id*, *www.science.direct.go.id*. The keywords used in searching for scientific articles are Echinoidea diversity, Biology learning resources, biodiversity materials. The scientific articles that were found were then validated and the relevance of the article criteria used in the selection of scientific articles used included: (1) Quality of sources including predatory journals or not; (2) the quality of the research methodology in the article; (3) Quality of data presentation and discussion; (4) Sufficient data for analysis; (5) Up-to-date references, namely articles published in 2010-2010 and relevant to biology learning.

The scientific articles used in this study amounted to 8 scientific articles and have met the criteria consisting of 8 accredited national journals. The technique of presenting data is using a table listing of scientific publication articles that will be analyzed into research data. The data

analysis technique was carried out qualitatively descriptively by analyzing and identifying scientific articles. The data analysis used was adopted from(Gregory & Denniss, 2018)include: (1) Define Topic And Audience, namely determining the topic of the problem; (2) Literature Search, which is looking for articles that are relevant to the topic to be researched; (3) Be Critical, which is to be critical when reading scientific articles which then summarize the relevant literature by analyzing and identifying study problems that are reviewed for gaps; (4) Find A Logical Structure, which is finding a logical structure in the narrative being reviewed by writing a direct and effective review.

The data that has been studied is then analyzed using the analysis of learning resource requirements (Suhardi, 2012) include: Clarity of potential availability of objects and issues raised, conformity with learning objectives, clarity of material objectives and their designations, information to be disclosed, exploration guidelines, and gains to be achieved.

RESULTS AND DISCUSSION

Based on the results obtained from 8 articles, it shows that the articles that fall into the category of moderate Echinoidea diversity level are 8, and there are no articles that are classified as low and high. Scientific articles discuss the diversity index of the Echinoidea Class specifically, namely research conducted by The data of this research article consists of 8 accredited national journal articles, including research(Alwi, Hi, & Tae, 2020) in the waters of Wawama Village, Morotai Island Regency; (Panji, Purnomo, Sila, & Giri, 2019) at Serangan Beach, Bali; (Island et al., 2019) In the waters of the White Sand Island, Bali; (Yudasmara, 2013) In the waters of Menjangan Island; (Laning TH, DS Yusup, 2014) At Merta Segara Beach, Bali; (Wlandewi, Subagio, &Wiryatno, 2015) At Sanur Beach And Denpasar Attack; (Suryanti, 2014) At the Rear Shower, Karimunjawa Jepara; (Ristanto, Yanti, & Setyawati, 2018)In the waters of the Bengkayang Islands;. More clearly can be seen in Table 1.

Research sites	Diversity Index	Category
Morotai Island	H' = 1.009	Currently
Bali Attack Beach	H' = 1.50 - 1.59	Currently
White Sand Island Waters	H' = 1.162	Currently
Menjangan Island Waters	H' = 1.926	Currently
Merta Segara Beach Sanur	H' = 2.43	Currently
Sanur Beach and Serangan	H' = 1.66 – 2.23	Currently
Karimunjawa Rear Shower	H' = 1.054 - 1.279	Currently
Bengkayang Waters	H' = 1.235	Currently

Based on the analysis of the diversity index of sea urchins at the location of 8 research articles, all of the values of the species diversity index (H') belong to the medium category. This happens because the number of species of sea urchins is relatively large and the proportion of high density numbers that make up the community. Diversity is the difference that can be found in a community or group of various species that live in a place(Panji et al., 2019). Diversity index in

research(Alwi et al., 2020)Morotai Island is said to be moderate because there is no competition between species that is so high, the availability of sufficient food and supportive environmental conditions. This is confirmed by research(Yudasmara, 2013). The diversity index value is moderate at(Suryanti, 2014)in the waters of the back shower of Karimunjawa due to the nature of sea urchins and living habits on coral and sandy substrates. Another thing is assumed because in the seagrass beds there are still more human activities in catching fish and tourism compared to coral ecosystems. Low The high value of the diversity index (H') in a waters is influenced by the number of individuals and types of sea urchins found. according to(Krebs, 1989) states that the more species found in each location, the higher the diversity index (H') obtained.

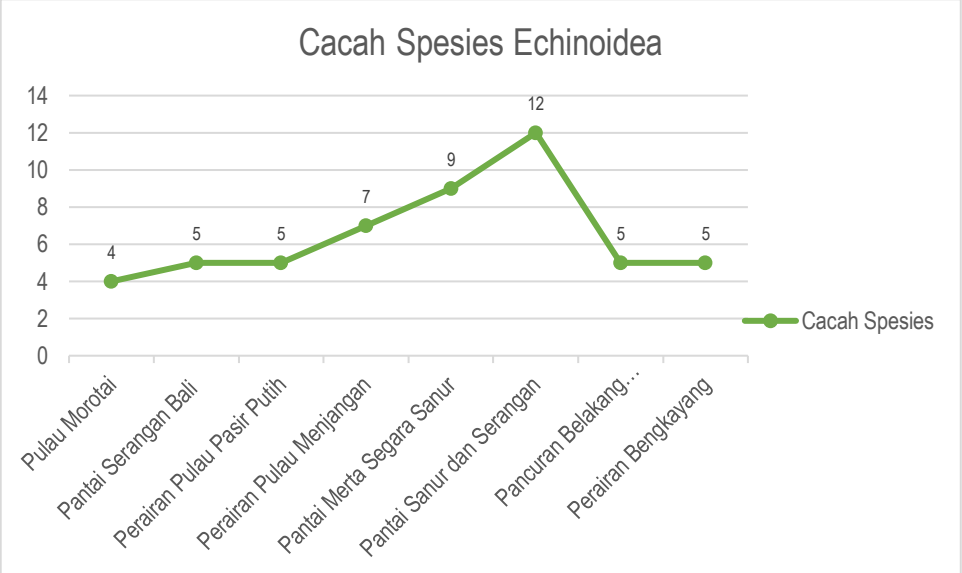

Figure 1. Graph of Echinoidea Species Count

The results also showed that the number of Echinoidea species was the most abundant (Figure 1). It can be seen that the most number of Echinoidea species found in the waters of Sanur Beach and Serangan with the number of species found as many as 12 Echinoidea species. This is because Echinoidea sampling was carried out on three beaches, namely Merta Segara, Mertasari and Serangan beaches. The number of Echinoidea species found was due to the fact that the waters had a bottom substrate condition of sandy, muddy and rocky sediments on the edge of the area. This is in accordance with the opinion that sea urchins (Echinoidea) are found in seagrass and coral reef areas, sandy or muddy sand areas and are also found on coral rubble.(Aziz, 1994). The factors that influence the high and low density of sea urchins in a waters consist of several factors such as the availability of food, a suitable environment, predators of sea urchins and over-exploitation of sea urchins.(Radjab, 2001).

Based on the number of Echinoidea species, there are species that are often found in 8 articles, namely Diadema setosum and Echinometra mathei. The species Diadema setosum was found in all research articles and Echinometra mathei was found in 7 different articles. Diadema setosum species are generally sea urchins Diadema setosum can be found in all coastal waters, from tidal areas to deep waters. Sea urchin Diadema setosum prefers clear waters and the water is relatively calm(Thamrin, Setiawan, & Siregar, 2011). The large number of Diadema setosum is thought to be influenced by the conditions of the aquatic habitat, where this species is often found in rocky zones because it is influenced by dietary factors and how to eat.(Thamrin et al., 2011). Coarse substrate conditions strongly support the survival of echinoidea species, especially Diadema setosum(Ibrahim, Devira, & Purnawan, 2017). This is in accordance with

the statement (Rumahlatu, 2011)stated that Diadema setosum is also tolerant of pollutants in water areas, so its presence is classified as more abundant than other species. According to research(Moningkey, 2010)Echinometra mathaei lives on coral and rock substrates that aim to protect themselves from tides and predators. Sea urchins of the Echinometra mathaei type have a low density, because this species generally lives hiding in holes in rock or rock.(Juliawan, Dewiyanti Irma, 2017).

Table 2. Analysis of Learning Resources Requirements

No.	Learning Resources Terms	description	Information
1.	Clarity of potential availability of objects and issues raised	The obvious object availability potential is the Echinoidea class. The problem to be raised is the level of diversity of the Echinoidea class	Fulfil
2.	Suitability with learning objectives	The learning objectives in KD 3.2 are: To describe the diversity of species and ecosystem levels Describing biodiversity in Indonesia Grouping various types of living things at the level of species and ecosystems from various objects Searching for data on threats to the sustainability of various Indonesian animal and plant diversity and compiling the results in the form of a report	Fulfil
3.	Clarity of the target material and its designation	The material targets have reached the level of species and ecosystem diversity and threats to biodiversity. Biodiversity material is intended for high school students of class X	Fulfil
4.	Clarity of information to be disclosed	Information disclosed: Types of Echinoidea, Echinoidea diversity at the species and ecosystem level and threats	Fulfil
5.	Exploration guide	The field research procedures are: determining the object of research, observation, quadratic transect research method, use of tools and materials, working methods, data analysis, and drawing conclusions.	Fulfil
6.	Earnings to be achieved	In accordance with the learning objectives, which have reached the level of diversity of species, ecosystems and threats	Fulfil

Table 2 shows that the research results obtained were then analyzed for potential requirements as a source of learning biology according to (Suhardi, 2012) including the following:

1. Clarity of potential availability of objects and issues raised

   The object used in this study is the Echinoidea species found in the coastal intertidal area of the 8 articles used. Echinoidea can be used as a learning resource because it has potential as a learning resource, namely Echinoidea are easy to see in terms of morphology and are also easy to identify. The problem raised is the level of diversity of

Echinoidea which is influenced by differences in substrates and activities carried out by humans.

2. Suitability for learning objectives
   The results of the study are in accordance with the learning objectives on the material of biodiversity, namely (1) explaining the concept of gene diversity, species, and ecosystems; (2) describe the biodiversity in Indonesia; (3) classifying various types of living things at the level of genes, species, and ecosystems; (4) analyze the threat of environmental damage and efforts to conserve biodiversity. Based on the results obtained, it shows that the research results have achieved the objectives of studying biodiversity at the species level, biodiversity at the ecosystem level, and threats to biodiversity conservation.
3. Target Material and Purpose
   The target of this research material is biodiversity material which is addressed to high school students in class X. Based on the results of the study, the requirements for clarity of target material and its designation have fulfilled the material for diversity at the level of species, ecosystems and threats to diversity.
4. Disclosed information
   Based on the results of the study, it was found that there was a level of diversity of Echinoidaea, namely the level of species and ecosystems. In addition, there is also biodiversity in Indonesia and threats that can disrupt the sustainability of the level of biodiversity in the environment based on the 8 articles used.
5. Exploration guide
   There are several work steps contained in the article to conduct research, including determining the object of research, conducting a site survey, determining the study area, determining the method used, namely the quadratic transect method, preparing tools and materials, working methods, data processing, and finally drawing conclusions. . This exploration guide can be used as a guide for students to make direct observations in learning.
6. Earnings to be achieved
   The clarity to be achieved is based on the learning objectives to be achieved. Based on KD 3.2, which is analyzing various levels of biodiversity in Indonesia and their threats and conservation, the research results have fulfilled some of the learning objectives to be achieved along with the scope of the material on biodiversity. The results to be achieved by this research have fulfilled the objectives of studying biodiversity at the species and ecosystem level and threats to biodiversity.

CONCLUSION

The results showed that 8 articles had a diversity index that was included in the medium category. The results of the analysis of the potential requirements for learning resources carried out show that this study meets the requirements as a source of learning biology for Class X high school biology material. LiThe surrounding environment can be used as an effective and efficient learning resource.This study aims to determine the level of diversity of Echinoidea in the interidal zone and to analyze the requirements for learning resources. This type of research is a literature study with a narrative review design. The data analysis technique used descriptive analysis.

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