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BIOPLASTIC PRESERVATION INNOVATION FROM INVERTEBRATE ANIMAL RESINS: A SUSTAINABLE SOLUTION TO INCREASE ECONOMIC VALUE IN KENJERAN COASTLINE

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ABSTRACT

Kenjerann Beach is one of the beaches in Surabaya, located in Bulakbull village, Kenjeran sub-district, which has a tourist attraction and is very beneficial for the community around the beach. Kenjeran Beach has potential biological resources such as marine biota and intervertebrate animals. This research aims to produce preserved invertebrates using bioplastic techniques and to increase the knowledge and economic value of Kenjeran Beach. Bioplastic innovation from invertebrate animal resin is one of the potential sustainable solutions in increasing the economic value of the coastal community of Kenjeran Beach, Surabaya. This research was conducted from December 2023 to January 2024 in two main stages. The first stage was field observation to collect invertebrate biota on the coast of Kenjeran Beach. The second stage involved the development of preservation technology to produce environmentally friendly bioplastics. The bioplastic produced has the potential to be used as a base material for accessories, decorations, and other trinkets, which can be developed as a business opportunity for coastal communities. The results of the research are snaking stars (Ophiuroidea), crabs (Crustacea), snails (Gastropoda), insects (Insects) which are used as materials and preserved as keychain bioplastic.

Keywords: bioplastics, invertebrates, Kenjeran beach, economic value, preservation.

ABSTRAK

Pantai Kenjerann merupakan salah satu pantai di Surabaya yang terletak di kelurahan Bulakbull kecamatan Kenjeran yang memiliki daya tarik wisata dan sangat bermanfaat bagi masyarakat sekitar pantai. Pantai Kenjeran memiliki potensi sumber daya hayati seperti biota laut dan hewan intervertebrata. Penelitian ini bertujuan untuk menghasilkan invertebrata yang diawetkan dengan menggunakan teknik bioplastik dan untuk meningkatkan pengetahuan dan nilai ekonomi Pantai Kenjeran. Inovasi bioplastik dari resin hewan invertebrata menjadi salah satu solusi berkelanjutan yang potensial dalam meningkatkan nilai ekonomi masyarakat pesisir Pantai Kenjeran, Surabaya. Penelitian ini dilakasanakan bualn Desember 2023-Januari 2024 dalam dua tahap utama. Tahap pertama adalah observasi lapangan untuk mengumpulkan biota invertebrata di pesisir Pantai Kenjeran. Tahap kedua melibatkan pengembangan teknologi pengawetan untuk menghasilkan bioplastik yang ramah lingkungan. Proses penelitian ini sampai pada tahap implementasi dan pengujian model bioplastik.Bioplastik yang dihasilkan memiliki potensi untuk digunakan sebagai bahan dasar aksesoris, hiasan, dan pernak-pernik lainnya, yang dapat dikembangkan sebagai peluang usaha bagi masyarakat pesisir. Hasil penelitian yaitu Bintang mengular (Ophiuroidea),Kepiting (Crustacea),Keong (Gastropoda), Insekta (Serangga) yang digunakan sebagai bahan dan diawetkan sebagai bioplastic gantungan kunci.

Kata kunci : bioplastik, invertebrata, pantai Kenjeran, nilai ekonomi, awetan

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I. INTRODUCTION

The capital city of East Java is Surabaya, which is one of the cities in Indonesia that has the potential of coastal areas because it is located right next to the Madura Strait. The Kenjeran coastal area in Surabaya, known for its diversity of marine biota, has great potential to be developed through product innovation based on local natural resources. One innovation that can contribute to increasing economic value and environmental sustainability is the utilization of resin from invertebrates. The potential/resources of coastal areas include: biological resources, non-biological resources, artificial resources, and environmental services. Biological resources include fish, coral reefs, seagrasses, mangroves, and invertebrate animals around the coast. Inanimate natural resources include: sand, seawater, seabed.

The potential / resources owned by coastal areas are: biological resources, non-biological resources, artificial resources, and environmental services. Biological resources include: fish, coral reefs, seagrass beds, mangroves and other marine biota (Prasetyo et al., 2020). Judging from the potential of resources can be utilized to add economic value to the surrounding community, such as for the utilization of invertebrate animals. Invertebrate animals are animal species that do not have a spine. In preserving these invertebrates, there is a theory of preservation using liquid resins and catalysts. Then known as bioplastic preservation. Bioplastics can be one of the efforts for entrepreneurship and can generate large profits. Bioplastic is a form of plastic derived from biological resources that is biodegradable (Handayani, 2013).

Bioplastics are dry preserves of living things in plastic so that they will not be damaged within hundreds of years and can be formed in various forms such as key chains, table decorations, and learning media. Therefore, bioplastics can be made by developing the creativity and innovation of the maker according to the needs and desires of the maker (Surahman et al., 2019). Usually in the keychain (accessories) business, this technique is often used, to beautify and strengthen the keychain, and it turns out that it can be applied in preserving invertebrates. The manufacture is almost the same as the manufacture of other resin accessories, only different in the type of material preserved, bioplastics tend to preserve invertebrates while resin accessories in the industry use many variations of inanimate objects such as paper, plastic and so on. However, it is possible that bioplastic products can be more popular than other products.

Bioplastics are used for the preservation of animals with small sizes (Maneking, 2020). In addition, the invertebrates used can be varied according to desire, only some biologists are familiar with this technique. For the community, there is a need for direction on the relationship between this product and the surrounding entrepreneurial opportunities. The use of resin used can be used as a bioplastic preservation material to become a source of learning media and can offer an alternative to environmentally friendly plastic materials as a new business opportunity for coastal communities.

II. METHODE

This research used an experimental approach with two main stages involving field observations and the development of bioplastic technology from invertebrate animal resins. The methods used in this research can be detailed as follows:

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1. Field Observation Stage

a. Research Location: Observations were conducted on the coast of Kenjeran Beach, Surabaya. The selection of this location is based on the presence of various types of invertebrate biota that have the potential as a basic material for bioplastics.

b. Data and Sample Collection: The research was conducted through surveys and collection of invertebrate biota samples. The purposive sampling method was used to select and identify invertebrates present in the coastal area. The biota taken were selected based on their suitability for the potential use of their resins in bioplastic processing.

c. Identification of Invertebrate Families: After sample collection, identification was carried out to determine the families of invertebrates that can be used as a base material for bioplastics.

d. Morphological analysis and resin characteristics of the invertebrates were conducted to assess their suitability..

2. Stages of Bioplastic Preservation

In bioplastic preservation is the preservation of animals that have been dried in resin blocks.

a. The initial stage is to store the specimen in a dry state as a base material and make resin molds.

b. The next stage is made a mixture of resin and catalyst as a base layer and specimen arrangement. The specimen is then covered again with resin. The dried resin block is smoothed. the process of making bioplastics is to first make a mixture of catalyst and resin with the following 100 ml of resin mixed with 0. 4 ml of catalyst (1-5 drops) (Amrianto, 2022), then stirred slowly so that not many air bubbles appear. placed on the table, then poured a mixture of resin and catalyst on the mold (as the bottom layer), after a few minutes a little mongering insects are included in the mold and poured again a mixture of resin and catalyst until all covered. and then left to dry, then opened from the mold.

c. Data Collection

Data was collected from several tests of mixing percentages of different mold materials, drying time, brightness, pouring method.

III. RESULTS AND DISCUSSION

1. Identification of Potential Invertebrates

From the results of field observations on the coast of Kenjeran Beach, three families of invertebrate animals were found that have potential as a source of resin for the development of bioplastics. Animals that can be found and preserved around the coast of Kenjeran are invertebrate animals that do not have bronze bones so as to facilitate the preservation process are snake stars (Ophiuroidea), crabs (Crustacea), snails (Gastropoda), insects (Insects).

2. Development of Bioplastic Preservation

Bioplastic is the preservation of animal or plant specimens in resin blocks to be used as research media. In addition to being an educational object, animal or plant specimens grown on resin blocks can be used as decoration and can make a business opportunity. Before molding, the resin is in a viscous liquid state.

The manufacture of bioplastics for intervertebrate animals:

Preservation Process

1. Observe the shape of the snake star then inject alcohol into its oral system (Ficture 1a).

2. Put the snake star and liquid resin into the mold. (Ficture 1b).

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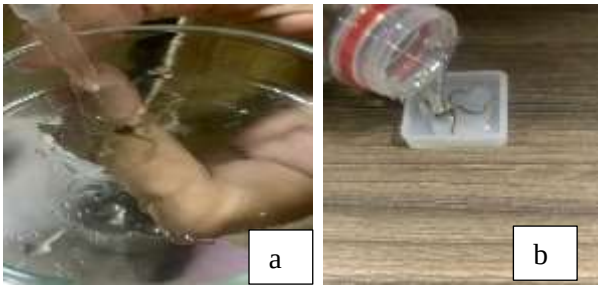

Ficture 1. Preservation Process

3. For this third step, to make the bioplastic more beautiful, decorate it as you like, for example, decorate it with glitter (Ficture 2).

Ficture 2. Decorate it with glitter.

4. After all is done let stand for 24-48 hours in a safe place from sun exposure (Ficture 3).

Ficture 3 Bioplastic preserved products.

The mixing of resin and catalyst must be precise, the ratio for every 100 ml of resin only needs 2 - 3 drops of catalyst or 100 ml : 10 ml (Purwanto & Suparman, 2020).The use of resin from local invertebrates to produce bioplastics provides an innovative solution for the Kenjeran coastal community. With relatively low production costs and abundant natural resources, this bioplastic can be a superior product that improves the local economy. Bioplastic-based products have high aesthetic appeal and good selling value, especially in the tourism and creative industry sectors.

The use of resins is an organic compound derived from secondary organisms and composed of carbon. These compounds undergo polymerization under appropriate conditions. The polymerization reaction is exothermic so heat is generated. If left unchecked, the polymerization process will slow down. Catalysts are used to accelerate polymerization(Rasid et al., 2024). The amount of liquid catalyst added affects the speed of the polymerization process and the effect is the amount of heat released. The more catalyst added, the faster and hotter. Resin curing can be performed on fresh materials, fresh curing, dry curing, or wet curing. This preservation can be used to observe morphological, anatomical, tissue and life cycle aspects.

Table 1. Observation of Mold Results

Test	% mixture/100 ml	Result
Print 1	100 ml/100 ml	Solid, unpatterned shape
Print 2	15ml/ 100ml	Slightly hard and regular shape
Print 3	20ml/ 100ml	Hard and regular shape

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The quality of the resin varies from one manufacturer to another, all the work is done through testing (Table 1). Based on the test results, a ratio of resin and catalyst was made for fast, medium, and slow reactions. Too much catalyst will cause the pnas and block specimens to crack or break. Too little catalyst can also cause the block formation to be slow or not dry in the desired time. Under normal conditions without catalyst the resin will solidify in about 24-48 hours. Room temperature also affects the length of resin solidification.

This technique of preserving animals / plants with bioplastics has several advantages including: strong and durable, cheap, attractive and practical in storage. However, this technique also has the disadvantage that the actual object cannot be touched directly (because perception is only based on vision). Resins are organic compounds resulting from secondary metabolism, composed of carbon. This compound undergoes polymerization under the right conditions. In addition, the polymerization reaction is exothermic so that it will cause heat (Budiwati, 2015)

The utilization of bioplastic preserves as one of the applications of biological science in the preservation of living things is in great demand by some people because the results of the preserved products created have high selling power. Making bioplastic preserves can later be integrated into the application of PjBl is one of the things that can improve the science literacy of students on biodiversity material (Handayani *et al*, 2023). Preservation in resin blocks has a variety of advantages including that it can describe the object of the organism in real terms so that it becomes more attractive, and the media is not easily damaged and can last long for continuous use (Pratami, 2022). Therefore, it can be said that this preservation can be used as an effort to motivate the community around the coast of Kenjeran beach to entrepreneurship.

This research provides a strong basis for future development of bioplastics from invertebrate resins. Further development directions could include: a) Development of bioplastic formulas that are more durable but still environmentally friendly, b) Diversification of various new bioplastic-based products that can meet wider market needs, c) Collaboration with Local Industry: Strengthening collaboration with local industries and government to support mass production and marketing of bioplastic products. Animal preservation collections can be used not only for educational media but also as souvenirs in entrepreneurship.

IV. CONCLUSION

The development of bioplastic preserved products from the resins of snake stars (Ophiuroidea), crabs (Crustacea), snails (Gastropoda), and insects has great potential to create environmentally friendly products with high economic value. This innovation not only supports environmental sustainability, but also opens up new business opportunities for coastal communities through processing local biota into high-value products, such as accessories, home decorations, and other creative products. Preserved specimens using resin are safer, more durable, cheaper and easier to maintain and store.

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