

BIOPLASTIC PRESERVATION TRAINING FOR TEACHERS AND STUDENTS OF SMAN 9 LUWU

(Pelatihan Bioplastik untuk Guru dan Siswa SMAN 9 Luwu)

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Abstrak

Materi keanekaragaman hayati di SMA membutuhkan pemahaman dan pengamatan langsung di lingkungan. Namun, sebagian besar contoh dalam buku teks berupa hewan atau tumbuhan yang tidak dapat diamati secara langsung sehingga menyebabkan proses pembelajaran cenderung berupa teoritis. Oleh karena itu, awetan makhluk hidup sebagai media pembelajaran sangat perlu disiapkan. Penggunaan awetan makhluk hidup tersebut dapat membantu dalam pengamatan terhadap hewan atau tumbuhan liar dan spesies yang aktif bergerak. Selain itu, awetan bioplastik dapat menjadi alternatif cara pengawetan makhluk hidup yang ramah lingkungan dan tahan lama. Kegiatan ini bertujuan untuk mengajarkan metode pengawetan bioplastik kepada guru dan siswa SMAN 9 Luwu. Kegiatan ini dilaksanakan dalam 3 tahapan, yaitu observasi dan analisis, pelatihan, dan analisis hasil kegiatan. Pelatihan dilaksanakan dengan cara memperkenalkan metode pengawetan bioplastik dengan metode caramah dan praktik pembuatan awetan bioplastik. Hasil kegiatan dianalisis melalui pemberian *post-test* dan dianalisis secara deskriptif untuk memperoleh gambaran tingkat pemahaman peserta terhadap materi yang telah disampaikan. Hasil pengabdian menunjukkan bahwa kegiatan yang dilaksanakan berhasil yang ditandai dengan sebanyak 80% partisipan telah memahami tentang metode pengawetan bioplastik.

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Abstract

Biodiversity material in high school requires direct understanding and observation in the environment. However, most examples in textbooks are animals or plants that cannot be directly observed, making the learning process largely theoretical. Therefore, the preparation of preserved living creatures as a learning medium is very necessary. The use of preserved specimens can assist in observing wild animals or plants and actively moving species. In addition, preserved bioplastics can be an environmentally friendly, long-lasting alternative for preserving living creatures. This activity aims to teach the bioplastic

preservation method to teachers and students of SMAN 9 Luwu. This activity was carried out in three stages: observation and analysis, training, and analysis of activity results. The training was carried out by introducing the bioplastic preservation method using the caramah method and practicing making bioplastic preservation. The results of the activity were analyzed through a post-test and analyzed descriptively to obtain an overview of the level of participants' understanding of the material that had been presented. The results of the community service showed that the activity was successful, with 80% of participants understanding the bioplastic preservation method.

Kata Kunci: Awetan bioplastik, SMAN 9 Luwu, pengawetan makhluk hidup, pelatihan untuk guru, pelatihan untuk siswa

1. INTRODUCTION

Biodiversity is one of the subjects in Senior High School (SMA) that requires an in-depth study of the material through direct observation of living things in nature (Zamroni et al., 2019; Kamilah et al., 2023). Animals and plants around the school can be a primary source of learning materials in biology (Kamilah et al., 2023). However, the facts at SMAN 9 Luwu show that several obstacles arise in studying the subject, including the use of foreign animals in textbooks that are difficult to find in the school environment, and the fact that not all species of living things can be easily found there. In addition, according to Kamilah et al. (2023), some species are wild and species are actively moving. This leads to learning being generally theoretical (Setiati et al., 2021). Therefore, preserved specimens need to be provided to support learning activities.

Preservation of living things involves wet and dry preservation. Wet preservation is a technique that involves soaking living-creature specimens in formalin or an alcohol solution. Dry preservation can be achieved with taxidermy, herbarium, insectarium, or bioplastic (Setiati et al., 2021; Kamilah et al., 2023). Bioplastic is an environmentally friendly preservation method that uses resin blocks to preserve living things, preventing deterioration for hundreds of years (Surahman et al., 2018). Bioplastic can be made from a mixture of resin and catalyst, producing clear or cloudy resin, depending on the type of resin. The advantages of bioplastic compared to other methods are that specimens can be observed from all sides (Setiati et al., 2021), are not easily damaged, can be used repeatedly, do not cause odor, are easy to store, easy to maintain, easy and cheap to make (Kamilah et al., 2023), clean resin blocks, and can be formed into various shapes (Surahman et al., 2018). The nature of bioplastics allows their use as learning media, souvenirs, or decorations with economic value (Surahman et al., 2018). Making bioplastic preservation can improve students' understanding and creativity (Kamilah et al., 2023; Surahman et al., 2018), develop students' interests, talents and character (Sari et al., 2023), improve students' skills and entrepreneurial spirit, foster a sense of belonging and maintain diversity in the surrounding environment (Zamroni et al., 2019).

The results of observations at SMAN 9 Luwu showed that the school did not yet have preserved living things as a learning resource for students. Students' knowledge regarding how to make preserved objects is also limited, namely, making herbaria (Cambaba et al., 2026) and preserving with formalin. Meanwhile, the method of bioplastic preservation has never been known to students or teachers at the school. Therefore, training on making bioplastic preservation needs to be carried out at SMAN 9 Luwu. teachers and students of SMAN 9 Luwu. The results of the activity are expected to provide additional knowledge for teachers and students of SMAN 9 Luwu and increase students' interest in learning biology.

2. METHODS

The training activities were carried out on February 4th, 2025 in the Science Laboratory of SMAN 9 Luwu. The training participants were 2 science teachers and 17 12th-grade students from SMAN 9 Luwu.

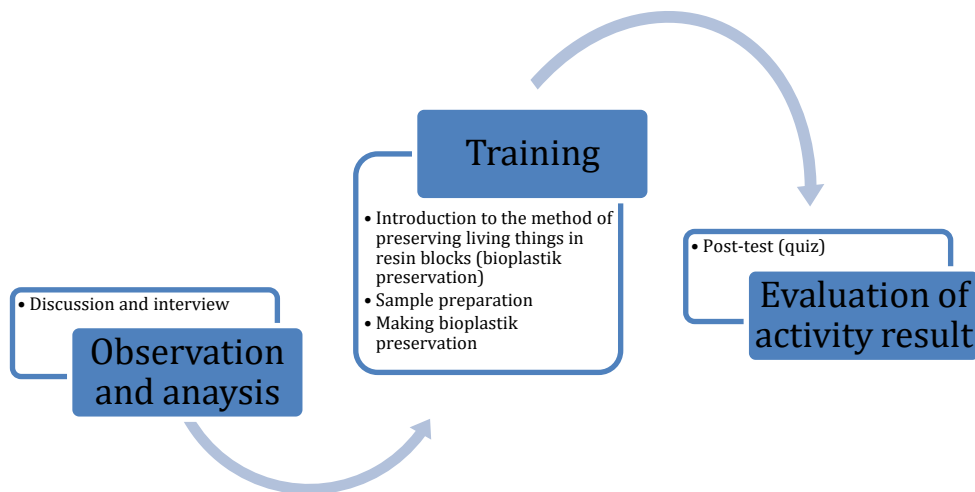


Figure 1. Activity Stages

The training on making bioplastic preservation was carried out in stages: (1) observation and analysis of the needs of SMAN 9 Luwu, (2) training, and (3) evaluation of the results of the activity (Figure 1). At the observation stage, discussions were held on the obstacles faced in learning biology at school. At this stage, the making of bioplastic preservation was also offered. The discussion's results served as the basis for determining the action.

The training stages were implemented by introducing the method for preserving living things and the practice of making bioplastic for preservation. Teachers and students were divided into 4 groups, each accompanied by an instructor. Each group was given a silicone mold and reagents. Each group was asked to prepare plant samples for preservation from the school environment. During the preservation process, participants were asked to work under an instructor's supervision. Participants were welcome to ask questions at each stage of the process.

The last stage was the evaluation of the activity's results (post-test). This stage involved evaluating the activity's results (Magdalena et al., 2021). This stage was conducted as a quiz to assess participants' understanding of the bioplastic preservation method. The instrument consists of two questions: procedures and the reagent name. The answers were categorised into: totally understood, understood but forgot the reagent name (if the participants wrote the wrong name), understood the procedures, and did not understand. The results obtained were analyzed descriptively to obtain the percentage of each category.

3. RESULTS AND DISCUSSION

The results showed that the method of preserving living things in resin blocks (bioplastic preservation) had never been implemented at SMAN 9 Luwu. The most common method of preserving living things is in herbaria. The training activities on bioplastic preservation for teachers and students of SMAN 9 Luwu were conducted in 4 groups. The first material presented was an introduction to the methods of preserving living things, including the types of methods and their purposes. This material also discussed the ethics of preserving living things, including doing so in limited quantities (not exploiting) and without torturing them. Preservation in resin blocks allows observation of living things from various angles (Setiati et al., 2021), can last for hundreds of years, odorless and requires simpler maintenance (Kamilah et al., 2023). During the presentation, it was evident that the participants still did not pay close attention to the explanation and were easily distracted. Therefore, to attract participants' interest, bioplastic products were displayed not only in pictures but also in preservation products. Participants began to focus on the explanation after seeing the results of bioplastic preservation packaged in various key chain models.

In addition to the introduction to bioplastics and its process, participants were also given the opportunity to make their own bioplastics. In this activity, the living things used as objects to be preserved were the grass around the laboratory. The objects were cleaned and prepared. Participants were directed to make a mixture of resin and catalyst with a ratio of 3:1 (in mass), which was slowly homogenized so as not to produce air bubbles. The mixture was then poured thinly into the silicone mold that had been provided. The resin-catalyst mixture was poured into 3 layers: (1) the first layer as a base, (2) the second layer to position the object to be preserved, and (3) the top layer to ensure that the preserved object was completely submerged in the resin-catalyst (Kamilah et. al., 2023). This activity also explained the types of resin that can be used and the level of clarity of the resulting resin block. In addition, it explained the reaction between the resin and the catalyst, which causes the initially liquid solution to turn solid.



Figure 2. Participants and event committee

The final stage of this training activity was the evaluation, which was conducted as a quiz. Participants were asked to answer several questions about the material covered. The evaluation results (Figure 3) showed that 80% of participants understood the material, 15% understood but had difficulty remembering the reagent names, and only 5% understood the procedure for making bioplastic preservation.

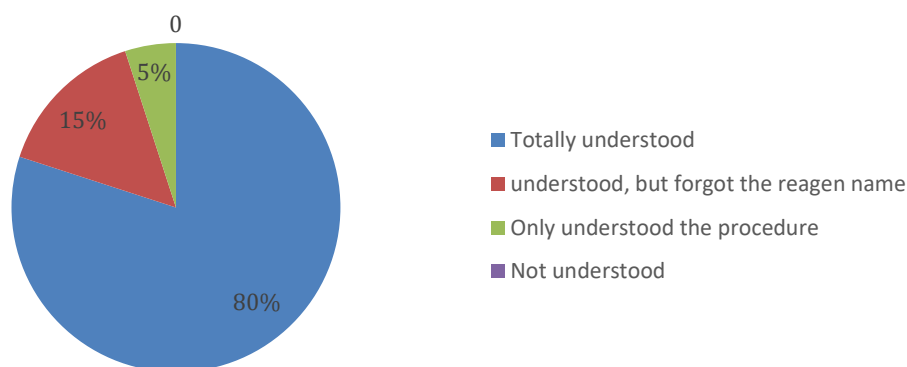


Figure 3. Evaluation Result of Bioplastic Preservation Training

The training on bioplastic preservation showed that 80% of participants understood the material very well, and 5% understood only the procedure. This is thought to be because the method used to present the material is a small-group practicum with 5 participants. The small number of participants, accompanied by an instructor, allows for maximum information delivery.

In this training, participants are equipped with the basics of preservation with bioplastics, then continue with making bioplastic directly. Lubis et al. (2017) stated that lectures followed by practicums are effective in training activities. According to Setianingsih

(2023), the application of the practicum method in learning activities enables students to build their understanding independently and reduce boredom, thereby increasing learning motivation. In addition, practicums can increase curiosity and improve students' skills (Wahyudiati, 2016).

The instructor's role is also a determinant of the training's success (Eldyani & Wardoyo, 2018). In this bioplastic-making training, each group is accompanied by 1 trainer so participants can work independently and remember the procedures they follow. Instructor assistance also enables participants to interact and ask questions when parts are unclear. The presence of an instructor can increase participants' motivation during training (Kurniastuti, 2019).

The success of the training is also supported by examples of bioplastic preservation products presented in the introduction to the bioplastic preservation material. This can be seen from changes in participant behavior, namely from not paying attention and carrying out other activities to focusing after seeing one of the preserved leaf products with bioplastic in the form of a key chain. This aligns with the opinion of Lubis et al. (2017), namely that training activities will be effective if participants perceive them as beneficial to themselves. In addition to serving as a learning medium, bioplastic can also be used to make various handicraft products, such as keychains and table decorations (Surahman et al., 2019).

4. CONCLUSSION AND RECOMMENDATIONS

The bioplastic preservation training activity for teachers and students at SMAN 9 Luwu was successfully conducted, with 80% of participants demonstrating understanding of bioplastics. Bioplastic products have been handed over to SMAN 9 Luwu as learning media. The training activity on preserving living things needs to be taught in schools to increase students' motivation to learn biology and to provide learning media for the biodiversity subject.

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