Utilization of Ecoenzymes and Probiotics in Hydrilla Culture as Practicum Support in Biology Study Program

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Abstract. The aim of this study was to determine the effect of ecoenzymes on the growth of Hydrilla Water Plants, to determine the effect of the addition of probiotics on Hydrilla Water Plant Growth, and to determine the water quality in terms of pH, Temperature, and DO Levels. This type of research is experimental. Data collection was carried out in a green house with 3 treatments without fertilizer as control, with 5% ecoenzyme, and 5% probiotics with 4 replications. The study was conducted for one month and at the end of the study, growth was measured by measuring biomass. Data in the form of growth of the three treatments were analyzed with one-way Anova. There was an increase in biomass with all types of water sources and all treatments. Among the three types of water, the highest increase in biomass in river water with the addition of ecoenzymes amounted to 12.94 g, then well water amounted to 9.39 g and the lowest in tap water amounted to 4.89 g. The largest increase in biomass with the addition of probiotics in river water amounted to 9.59 g, then well water by 7.42 and the lowest in tap water by 3.90. Eco Enzyme is able to convert Ammonia into Nitrate (NO3), natural hormones, and natural nutrients for plants so that Eco Enzyme-based liquid fertilizer has no negative effects in the long run. In addition, the liquid is also able to convert CO2 into carbonate (CO3) which is beneficial to help the natural cycle to facilitate plant growth by acting as a fertilizer.

Keywords: ecoenzymes ,probiotic,*Hydrilla*.

1 Introduction

Ecoenzymes are the result of fermentation of kitchen organic waste into materials that have many benefits for nature and humans. The benefits of ecoenzyme for agriculture are as an air filter, natural herbicide and pesticide, water filter, natural fertilizer for plants, and can reduce the greenhouse effect.

This is based on the results of research conducted by Dr. Rosukan Poompanvong from Thailand, that Eco Enzyme is able to convert Ammonia into Nitrate (NO3), natural hormones, and natural nutrients for plants so that Eco Enzyme-based liquid fertilizers have no negative effects in the long run. In addition, the liquid is also able to convert CO2 into carbonate (CO3) which is beneficial to help the natural cycle to facilitate plant growth by acting as a fertilizer.

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Chemical fertilizers contain substances such as nitrates and phosphates, which can be toxic to aquatic life. In addition, chemical fertilizers also contain methane, carbon dioxide, ammonia and nitrogen which can cause global warming. The serious impact on the environment leads to a decrease in production quality due to the destruction of soil nutrients bound by chemical residues in the soil.

Thus, the use of Eco Enzyme-based liquid fertilizer is very important to be used as a substitute for chemical fertilizers. Apart from being a solution to reduce the amount of organic waste that is increasingly piling up, Eco Enzyme can also be used as a natural liquid fertilizer to save soil damage due to the continuous use of chemical fertilizers. Therefore, the use of Eco Enzyme-based liquid fertilizer is one form of realizing SDGs goals to achieve a clean, comfortable and healthy environment. Hopefully, we can jointly succeed the SDGs in order to maintain and improve the quality of a sustainable environment.

The high need for Hydrilla aquatic plants for practicum in biology study programs must be dealt with independently by culturing Hydrilla plants. To accelerate the increase of Hydrilla plant biomass naturally and pay attention to the environment to keep it clean, Ecoenzymes and Probiotics are used. Ecoenzymes and probiotics are expected to be an alternative way to meet the high demand for Hydrilla aquatic plants.

2 Material and Methods

The acclimatization process is carried out by preparing a new container using river, well, and PDAM water media for 7 days. First acclimatization is done with 50% original habitat water composition and 50% new container water. Second acclimatization is done by moving hydrilla from the first acclimatization results to the second acclimatization with 100% composition.

During hydrilla culture, physical and chemical factors such as temperature, light intensity, pH, and dissolved oxygen were measured. After 30 days of hydrilla culture harvesting is done by rinsing the hydrilla with clean water. Then weigh the biomass. Then calculate the addition of the final biomass

3 Result and Discussion

Hydrilla plants with two treatments of ecoenzym and probiotik addition in three types of water media, namely tap water, well water and river water after 1 month of weighing the plants. Then obtained the difference in plant mass after and before treatment.

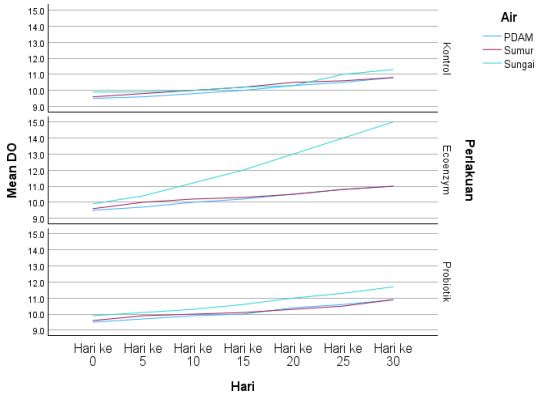

Fig 1. Effect of ecoenzym and probiotic on dissolved oxygen

Dissolved oxygen levels increased in the treatment of probiotics and ecoenzymes addition.

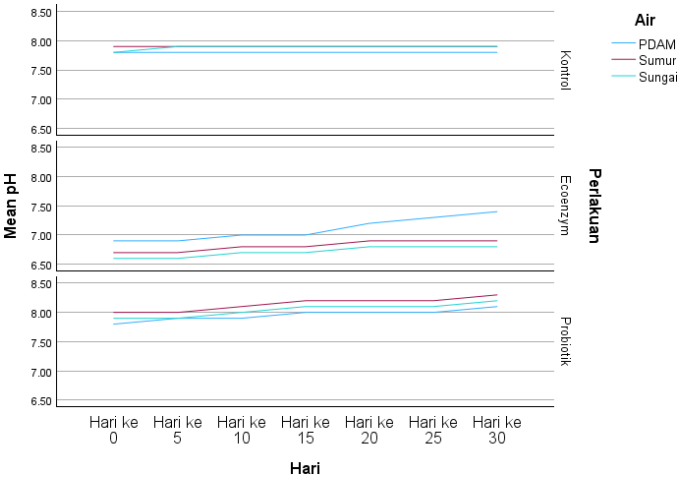

Fig 2. Effect of ecoenzym and probiotic on degree of acidity

The degree of acidity (Ph) increased for the ecoenzym and probiotic treatments addition.

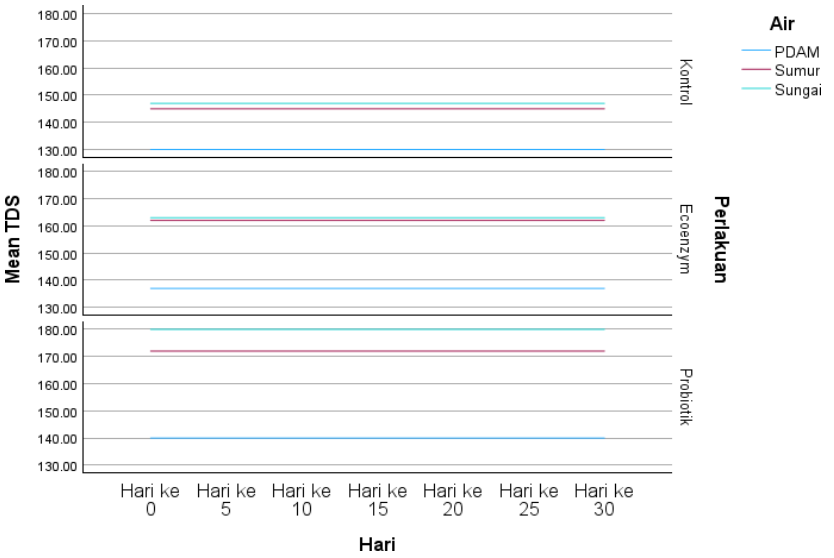

Fig 3. Effect of ecoenzym and probiotic on total dissolved solution

There was no change in total dissolved solution for all treatments and water types. The observation table of hydrilla biomass development can be seen in graph 4.1 below :

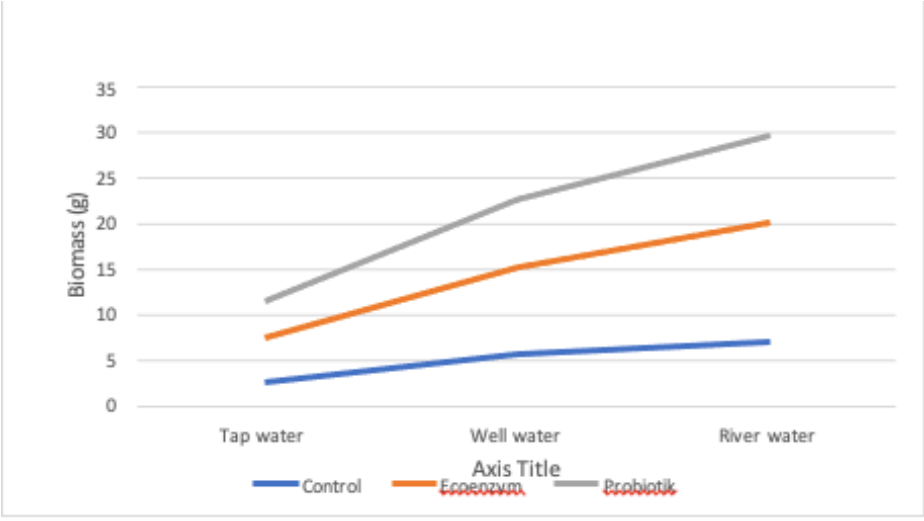

Fig 4. Effect of ecoenzym and probiotic on biomass

There was an increase in biomass with all types of water sources and all treatments. Among the three types of water in eco enzyme, the highest increase in biomass in river

water amounted to 12.94 g, then well water amounted to 9.39 g and the lowest in tap water amounted to 4.89 g.

The highest increase in biomass with the addition of probiotics in river water amounted to 9.59 g, then well water by 7.42 and the lowest in tap water by 3.90.

Eco Enzyme is able to convert Ammonia into Nitrate (NO3), natural hormones, and natural nutrients for plants so that Eco Enzyme-based liquid fertilizers have no negative effects for the long term. In addition, the liquid is also able to convert CO2 into carbonate (CO3) which is beneficial to help the natural cycle to facilitate plant growth by acting as a fertilizer [4]

Based on the NPK content in ecoenzyme fertilizer, eco-enzyme fertilizer is still below the quality standard for liquid organic fertilizer but the enzymes contained in ecoenzymes can also spur growth in plants [3].

Efforts to maintain water quality have been carried out, there is an effective way to maintain water quality, especially in aqua-ponic system cultivation, namely with probiotics, because probiotics contain bacteria that can help the process of breaking down ammonia so that it can be utilized by kale for growth and does not poison the fish that are kept

[5] . If Photosyntetic bacteria is combined with fermented fertilizers such as eco enzyme, it will improve fertilizer quality and crop productivity [6].

4 Conclusion

The highest Biomass was found in addition of ecoenzym in river water at 12,94 g. The lowest biomass in tap water without the addition of treatment was 2.63 g.

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