

ABSTRACT

Indonesia is the second largest waste contributing country in the world after China. The influence of ultraviolet rays, heat, microbes and physical abrasion causes plastic waste to degrade into microplastics which can be found in fish and consumed every day so that they can spread to secondary tissues, such as the liver, muscles and brain. For this reason, the design of REMITY (Reduce Microplastic Turbidity) based on electrocoagulation is portable and integrated with IoT through applications that can be accessed from various devices. This tool focuses on reducing microplastic and turbidity in water where the current speed can be adjusted according to the level of turbidity in the water. Additional parameters such as temperature, pH, and H₂O levels are added to support the habitat requirements of the fish. The main objective of this study was to determine differences in the quality of fish in electrocoagulated water and those in general water, as well as differences in water turbidity.

Experimental quantitative methods using electrocoagulation techniques were carried out involving samples of brackish water pond water and tilapia (*Oreochromis niloticus*). This research was conducted at MAN 1 Laboratory in Malang City, Halmahera Workshop, and Manufacturing Automation Laboratory, Faculty of Engineering, Universitas Brawijaya. Furthermore, Raman spectroscopic testing is located at the Serpong Physics Research Center Laboratory, BRIN. This research activity was carried out for 5 months. The materials used for testing were brackish water and fish from ponds in Malang Regency. To see reduced microplastics in brackish water, Raman Spectroscopy and microscopic visual tests were carried out. This test was carried out using a digital microscope with a magnification of 500 times. The images were then analyzed using the box counting method with a scale of 2 nb in Image J software. The black color in Figure 11-13 represents microplastics.

REMITY is proven to be able to reduce microplastics in water by 94% based on Raman Spectroscopy testing and reduce microplastics in fish by 53% based on digital microscope testing of the dissection, depuration and digestion processes. Sensor measurements also show that the effectiveness of reducing turbidity using REMITY for 1 hour is 43%. The results of the REMITY sensor test show no significant difference compared to the turbidity meter. The same thing can be seen in additional parameters such as temperature, pH, and H₂O level.

Keywords: electrocoagulation, tilapia, microplastics, fish ponds, turbidity