

## ABSTRACT

**Laily Isrofiani, 24020122120027.** Application of Biomonitoring for Microplastic Accumulation in the Gill and Stomach of Nile Tilapia (*Oreochromis niloticus*) and Its Biological Impacts. Under the guidance of Sapto Purnomo Putro dan Rizki Sandhi Titisari.

Anthropogenic activities in the coastal area of Teluk Awur, Jepara, have the potential to increase microplastic pollution in aquatic environments. Microplastics accumulated in the water can enter fish through ingestion and inhalation pathways, leading to biological effects; therefore, a biomonitoring approach is required to evaluate exposure levels and their impacts. This study aimed to analyze the accumulation of microplastics in the gills and stomach of Nile tilapia (*Oreochromis niloticus*) and their biological effects using both exploratory and experimental approaches. The exploratory study employed a simple random sampling method on six fish collected from the coastal aquaculture areas of Awur Bay, Jepara. The experimental study was conducted for 21 days using a Completely Randomized Design (CRD) with two treatment groups (control and PP-MP), each consisting of 25 fish. Microplastic abundance and size were analyzed using a stereomicroscope. Histological analysis was performed using Hematoxylin and Eosin (H&E) staining. Cortisol levels were measured using the ELISA method, and water quality parameters were also assessed. Microplastic bioaccumulation was higher in the stomach ( $17.17 \pm 3.27$  particles/organ) than in the gills ( $9.67 \pm 3.76$  particles/organ) ( $p < 0.05$ ), indicating that the primary exposure route occurs through ingestion. Histological damage in the stomach was characterized by disorganization, epithelial thickening, focal epithelial erosion, intercellular edema, and inflammatory cell infiltration. In contrast, the gills exhibited histological damage marked by disorganization, lamellar fusion, clubbing, shortening of secondary lamellae, and congestion. The pattern of histological damage was consistent between exploratory and experimental approaches, indicating that microplastics act as a contributing factor in inducing structural alterations in gill and stomach tissues. In the experimental study, cortisol levels increased on day 14 (7.48 ng/mL), which corresponded with higher accumulation and histological damage, suggesting that Nile tilapia has strong potential to be used as a biomonitor for microplastic pollution in aquatic environments.

*Keywords : microplastics, biomonitoring, tilapia, histology, stomach, cortisol*