PENGARUH PENGGUNAAN TEKNOLOGI BIOFLOK TERHADAP POLUTAN MIKROPLASTIK DAN KUALITAS AIR PADA BUDIDAYA IKAN NILA *(Oreochromis niloticus)*

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ABSTRACT

THE IMPACT OF BIOFLOC TECHNOLOGY ON MICROPLASTIC POLLUTANTS AND WATER QUALITY IN THE CULTIVATION OF NILE TILAPIA (*Oreochromis niloticus*)

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Biofloc technology is an environmentally friendly innovation in aquaculture that balances the C/N ratio by intensively converting organic waste into microbial aggregates (flocs), which can then be utilized by fish as a source of feed. This study aims to investigate the effect of biofloc technology on the presence of microplastic pollutants and water quality in the cultivation of Nile tilapia (*Oreochromis niloticus*). The study examined the influence of biofloc through four treatment groups: Treatment A (without biofloc and without microplastics), Treatment B (with biofloc and without microplastics), Treatment C (with biofloc and 30 µg/L microplastics), and Treatment D (with biofloc and 300 µg/L microplastics). Water and fish samples were collected from each treatment pond and analyzed for dissolved oxygen (DO), biological oxygen demand (BOD), chemical oxygen demand (COD), and metal ion content (Cu, Fe, Zn, and K). Microplastic identification was conducted visually using a stereo microscope to determine the type, size, color, and quantity of microplastics. The polymer types of microplastics were further identified using Fourier Transform Infrared Spectroscopy (FTIR). The results showed that ponds with the biofloc system were able to maintain water quality within safe limits, with DO levels above 3 mg/L. Although BOD and COD values showed fluctuations, they remained within acceptable thresholds. Metal ion concentrations tended to be lower in the biofloc treatments, both in water and in fish tissue. The quantity and size of microplastics found varied, with fragments, fibers, films, and pellets being the dominant types. FTIR analysis identified polyethylene (PE), polyethylene terephthalate (PET), and polyamide (PA) as the primary polymers. This study emphasizes that biofloc technology holds promising potential in maintaining water quality in Nile tilapia aquaculture, thereby enhancing the efficiency and sustainability of aquaculture systems.

***Keywords**: Biofloc Technology, Nile Tilapia Culture, Microplastics, Water Quality, FTIR*