RINGKASAN

SYARIFAH AZZULFA. Respon Fisiologis Kerang Bulu (*Anadara antiquata*) Terhadap Paparan Mikroplastik. Dibimbing oleh ADITYA HIKMAT NUGRAHA dan FADHLIYAH IDRIS.

Peningkatan akumulasi sampah plastik di perairan, terutama dalam bentuk mikroplastik menimbulkan risiko bagi organisme bentik, termasuk kerang bulu (*Anadara antiquata*). Kerang bulu sebagai *filter feeder* dan *deposit feeder* berpotensi mengakumulasi mikroplastik melalui konsumsi sedimen dan partikel tersuspensi di air yang dapat mempengaruhi respon fisiologisnya. Penelitian ini bertujuan untuk mengidentifikasi kelimpahan mikroplastik pada kerang bulu yang diberikan paparan mikroplastik dan menganalisis pengaruh pemberian mikroplastik terhadap respon kerang bulu melalui laju konsumsi oksigen dan tingkat sintasan kerang bulu. Eksperimen dilakukan dengan tiga (3) perlakuan konsentrasi mikroplastik: Kontrol A (0 g/L), B (6,23 g/L), dan C (15,02 g/L), masing-masing dengan 10 individu dan 10 pengulangan selama 7 hari. Kelimpahan mikroplastik dianalisis pada sedimen dan jaringan kerang, sedangkan laju konsumsi oksigen dan tingkat sintasan digunakan untuk menilai respon fisiologis. Analisis statistik menggunakan uji *Kruskal–Wallis* dengan $\alpha = 0,05$. Hasil menunjukkan bahwa kelimpahan mikroplastik pada sedimen meningkat secara signifikan seiring konsentrasi perlakuan (0,48-0,74 partikel/gr, $p < 0,05$). Akumulasi mikroplastik pada kerang bulu meningkat seiring konsentrasi perlakuan (8,47-12,05 partikel/gr), namun perbedaan antar perlakuan tidak signifikan ($p > 0,05$). Laju konsumsi oksigen juga menunjukkan perbedaan nyata antar perlakuan ($p < 0,05$), dimana pola peningkatan dan penurunan terlihat pada perlakuan tinggi akibat kematian individu. Selanjutnya, tingkat sintasan menurun signifikan seiring dengan meningkatnya konsentrasi mikroplastik, dari 60% pada kontrol hingga 0% pada perlakuan tertinggi pada hari ke-7 ($p < 0,05$). Kesimpulannya, paparan mikroplastik terbukti meningkatkan akumulasi pada sedimen dan menurunkan kelangsungan hidup kerang bulu, dan secara signifikan mempengaruhi laju konsumsi oksigen. Temuan ini menegaskan potensi efek toksik mikroplastik terhadap organisme bentik dan menyoroti perlunya pengelolaan limbah plastik untuk menjaga keberlanjutan ekosistem pesisir.

Kata kunci: Kerang Bulu, Laju Konsumsi Oksigen, Mikroplastik, Respon Fisiologis, Tingkat Sintasan

SUMMARY

SYARIFAH AZZULFA. Physiological Response of Feather Clams (*Anadara antiquata*) to Microplastic Exposure. Supervised by ADITYA HIKMAT NUGRAHA and FADHLIYAH IDRIS.

The increasing accumulation of plastic waste in aquatic environments, particularly in the form of microplastics, poses a risk to benthic organisms, including the feather clams (*Anadara antiquata*). As both filter feeders and deposit feeders, feather clams have the potential to accumulate microplastics through the consumption of sediments and suspended particles in the water, which may affect their physiological responses. This study aims to identify the abundance of microplastics in feather mussels exposed to microplastics and to analyze the effects of microplastic exposure on the feather clams's responses through oxygen consumption rates and survival rates. The experiment was conducted with three (3) microplastic concentration treatments: Control A (0 g/L), B (6.23 g/L), and C (15.02 g/L), each with 10 individuals and 10 replicates over 7 days. Microplastic abundance was analyzed in sediments and feather clams's tissues, while oxygen consumption rates and survival rates were used to assess the physiological response. Statistical analysis used the *Kruskal–Wallis* test with $\alpha = 0.05$. Results showed that microplastic abundance in sediment increased significantly with treatment concentration (0.48–0.74 particles/g, $p < 0.05$). Microplastic accumulation in feather clams increased with treatment concentration (8.47–12.05 particles/g), but differences among treatments were not significant ($p > 0.05$). Oxygen consumption rates also showed significant differences among treatments ($p < 0.05$), with patterns of increase and decrease observed in the high-concentration treatment due to individual mortality. Furthermore, survival rates decreased significantly as microplastic concentrations increased, from 60% in the control to 0% in the highest treatment by day 7 ($p < 0.05$). The conclusion is, microplastic exposure was shown to increase accumulation in sediments and reduce the survival of feather clams, and significantly affected the oxygen consumption rate. These findings confirm the potential toxic effects of microplastics on benthic organisms and highlight the need for plastic waste management to maintain the sustainability of coastal ecosystems.

Keywords: Feather Clams, Oxygen Consumption Rate, Microplastics, Physiological Response, Survival Rate