DETEKSI MIKROPLASTIK PADA KERANG (*Polymesoda bengalensis*) SEBAGAI BIOINDIKATOR PENCEMARAN MIKROPLASTIK

TESIS

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UNIVERSITAS ANDALAS
PADANG
2024

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Abstrak

Plastik banyak digunakan oleh masyarakat dalam kehidupan sehari-hari, namun sampah plastik yang dihasilkan menarik perhatian publik karena tingkat penguraiannya yang lambat. Partikel kecil seperti mikroplastik(MP) yang mengapung dan terakumulasi pada sedimen, akan tertelan secara tidak sengaja oleh organisme laut. Kerang (*Polymesoda bengalensis*) sebagai organisme filter feeder dan bioindikator polutan memungkinkan mikroplastik (MP) terakumulasi melalui aktifitas penyaringan partikel pada saat makan. Studi ini bertujuan untuk mendeteksi kelimpahan dan karakteristik MP pada kerang dan sedimen serta menentukan strategi untuk menurunkan kelimpahan MP pada daging kerang. Sampel kerang dan sedimen diambil dari 3 (tiga) stasiun, yaitu di Muara Sungai Batang Arau, Bungo Pasang dan Punggasan Utara. Sampel kerang dan sedimen diekstraksi untuk mendapatkan MP, kemudian dianalisis menggunakan mikroskop stereo trinokuler dan ATR-FTIR. Kelimpahan MP pada kerang (750-1.000 partikel/kg) lebih tinggi dari sedimen (400 dan 500 partikel/kg). Kelimpahan MP untuk sampel kerang dan sedimen tertinggi di Muara Sungai Batang Arau, dan terendah di Bungo Pasang. Bentuk MP yang paling banyak terdeteksi adalah fragmen (82,36%) >film (13,72%) > fiber (3,92%). Ukuran MP yang paling banyak ditemukan adalah ukuran ≥100-300 µm (50,98%). Jenis polimer yang terdeteksi adalah polivinilklorida (PVC), poliamida (PA) dan polietilen tereftalat (PET). Konsentrasi NaCl 30 % dan waktu perendaman 30 menit merupakan hasil terbaik, dengan penurunan kelimpahan MP pada daging kerang 85%, dari kelimpahan MP 1000 partikel/kg menjadi 150 partikel/kg. Hasil penelitian ini dapat memberikan referensi untuk mengurangi pencemaran MP pada daging kerang dengan menggabungkan dua faktor yaitu larutan garam NaCl (%) dan lama perendaman (menit).

Kata kunci : kerang, bioindikator, Mikroplastik, larutan NaCl dan kelimpahan.

DETECTION OF MICROPLASTICS IN CLAMS (*Polymesoda bengalensis*) as a BIOINDICATOR OF MICROPLASTIC POLLUTION

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Abstract

Plastic has been widely used by people in everyday life, and has attracted people's attention because of its slow rate of decomposition. Very small particles such as microplastics (MP) generally measuring less than 5 mm float and accumulate in sediments, and are accidentally ingested by marine organisms. Shelfish (*Polymesoda bengalensis*) as filter feeder organisms and pollutant bioindicators/biomonitorings allow MPs to accumulate through particle filtering activities during feeding. This causes MP to enter the food chain, become a concern for humans and is dangerous to consume. The aim of this research is to analyze the abundance and characteristics of MP (shape, size and type of polymer) in shells and sediments and determine strategies to reduce the abundance of MPs. Shellfish and sediment samples were taken from 3 (three) stations, namely at the Batang Arau River Estuary, Bungo Pasang and North Punggasan. Shellfish and sediment samples were extracted to obtain MP, then analyzed using a trinocular stereo microscope and ATR-FTIR. MP abundance in shellfish ranged between 750 and 1,000 particles/kg, and in sediments ranged between 400 and 500 particles/kg. In shellfish and sediment samples at the Batang Arau River Estuary, the highest abundance of MP was found, and the lowest was in Bungo Pasang. The most frequently detected form of microplastics were fragments (82.36%) followed by films (13.72%) and fibers (3.92%). The most commonly found microplastic size was ≥100-300 µm (50.98%). The types of polymers found are polyvinylchloride (PVC), polyamide (PA) and polyethylene terephthalate (PET). NaCl salt solution concentration treatments (0, 10, 20 and 30%) and soaking time (10, 20 and 30 minutes) were carried out to reduce microplastic contamination in shellfish. The use of a 30% concentration NaCl solution for 30 minutes is the optimal condition which is able to reduce the abundance of MP by 85% from 1000 particles/kg to 150 particles/kg. The results of this study can provide a valuable reference for a better understanding of how to reduce MP pollution in shellfish with salt solutions.

Keyword: shellfish, bioindicators, microplastics, NaCl solutions, and abundance