

**KAJIAN DISTRIBUSI PENCEMARAN DAN KARAKTERISTIK
UKURAN MIKROPLASTIK SERTA HUBUNGANNYA TERHADAP
STATUS MUTU KELAS AIR UNTUK IRIGASI BERDASARKAN
METODE STORET DI SUNGAI JUWANA**

INTISARI

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Sungai Juwana (± 61 km) mengalami pencemaran yang berasal dari aktivitas industri, pertanian, dan rumah tangga. Salah satu potensi sumber pencemaran yaitu sampah plastik yang sulit terurai dan dapat terfragmentasi menjadi mikroplastik. Kondisi ini dapat berdampak pada ekosistem dan kualitas air. Penelitian ini bertujuan untuk 1) mengkaji kelimpahan mikroplastik di aliran permukaan dan kaitannya dengan kecepatan aliran air, 2) mengkaji karakteristik mikroplastik berdasarkan persebaran ukuran, 3) mengkaji korelasi parameter kualitas air (logam berat, deterjen, total *coliform*) terhadap kelimpahan mikroplastik di Sungai Juwana, 4) mengkaji status mutu kualitas air Sungai Juwana berdasarkan metode STORET (*Short-Term Hydrologic and Water Quality Data Retrieval Team*), 5) mengkaji seberapa besar pengaruh mikroplastik terhadap status mutu kualitas air Sungai Juwana berdasarkan metode STORET. Pengambilan data dilakukan saat musim kemarau (14-21 Oktober 2023), dengan 6 titik lokasi sampling dari hulu hingga hilir Sungai Juwana. Pengambilan sampel mikroplastik menggunakan *neuston trawl net*. Kemudian dilakukan ekstraksi dan sortasi sampel berdasarkan karakteristik ukuran. Analisis data dilakukan menggunakan korelasi pearson untuk menguji korelasi antara kecepatan aliran air, kelimpahan mikroplastik dan parameter kualitas air. Selain itu juga dilakukan penilaian status mutu air dengan metode STORET berdasarkan Kepmen LH Nomor 115/2003. Hasil penelitian menunjukkan kelimpahan mikroplastik di Sungai Juwana berkisar 15,98-34,86 partikel/m³ dan berkorelasi positif terhadap kecepatan aliran air sebesar ($r = 0,478$). Karakteristik ukuran, mikroplastik terdiri dari *large microplastics* (LMP) (1-5 mm) berkisar 71,34 -81,81% dan *small microplastic* (SMP) (<1 mm) berkisar 18,19-28,66%. Kelimpahan mikroplastik menunjukkan korelasi positif dengan deterjen ($r = 0,643$), total *coliform* ($r = 0,487$), logam Pb ($r = 0,491$), dan logam Zn ($r = 0,660$). Namun, antara kelimpahan mikroplastik dan logam Cu tidak menunjukkan nilai korelasi. Untuk penilaian status mutu air Sungai Juwana diperoleh skor STORET antara -34 hingga -158 yang menunjukkan kondisi air tercemar berat. Kelimpahan mikroplastik berkorelasi negatif terhadap skor STORET sebesar ($r = -0,625$). Peningkatan jumlah mikroplastik di setiap titik secara signifikan berpotensi memiliki keterkaitan dengan semakin negatif atau rendahnya skor STORET.

Kata kunci: mikroplastik, kualitas air, STORET, kecepatan aliran air

**STUDY OF POLLUTION DISTRIBUTION AND SIZE
CHARACTERISTIC OF MICROPLASTICS AND THEIR RELATION TO
WATER QUALITY STATUS FOR IRRIGATION BASED ON
STORET METHOD IN JUWANA RIVER**

ABSTRACT

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The Juwana River (± 61 km) has been polluted due to industrial, agricultural, and household activities. One potential source of pollution is plastic waste, which is difficult to degrade and can fragment into microplastics. This condition can impact the ecosystem and water quality. The study aimed to 1) assess the abundance of microplastics in surface water and its relationship with water flow velocity, 2) examine the characteristics of microplastics based on size distribution, 3) investigate the correlation between water quality parameters (heavy metals, detergents, total coliform) and microplastic abundance in Juwana River, 4) assess the water quality status of Juwana River using the STORET (Short-Term Hydrologic and Water Quality Data Retrieval Team) method, 5) evaluate the influence of microplastics on the water quality status of Juwana River using the STORET method. Data collection was conducted during the dry season (October 14-21, 2023), with sampling at 6 locations along Juwana River from upstream to downstream. Microplastic samples were collected using a neuston trawl net, followed by extraction and sorting based on size characteristics. Data analysis utilized Pearson correlation to test relationships between water flow velocity, microplastic abundance, and water quality parameters. Additionally, water quality assessment was performed using the STORET method according to the Ministry of Environment Regulation No. 115/2003. Microplastic abundance in Juwana River ranged from 15.98 to 34.86 particles/m³ and exhibited a positive correlation with water flow velocity ($r = 0.478$). Based on size characteristics, microplastics consisted of large microplastics (LMP) (1-5 mm) ranging from 71.34% to 81.81% and small microplastics (SMP) (<1 mm) ranging from 18.19% to 28.66%. Microplastic abundance showed positive correlations with detergents ($r = 0.643$), total coliform ($r = 0.487$), lead (Pb) ($r = 0.491$), and zinc (Zn) ($r = 0.660$), but no correlation was found with copper (Cu). The water quality assessment using the STORET method scores ranging from -34 to -158, which indicates that the water is heavily polluted. Microplastic abundance negatively correlated with STORET scores ($r = -0.625$). Increased microplastic abundance at each point significantly correlate with lower or more negative STORET scores.

Keywords: microplastics, water quality, STORET, water flow velocity