DISTRIBUSI PENCEMARAN MIKROPLASTIK BERDASARKAN KARAKTERISTIK UKURAN DAN PENGARUHNYA TERHADAP KUALITAS AIR DITINJAU DARI PARAMETER FISIKOKIMIA DI SUNGAI PROGO

ABSTRAK

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Sungai Progo diestimasikan menjadi salah satu sungai di Indonesia yang masuk dalam 20 teratas tercemar sampah plastik secara global. Penelitian distribusi mikroplastik di Sungai Progo masih terbatas pada sedimen. Penelitian ini bertujuan untuk, 1) mengkaji kelimpahan mikroplastik, 2) mengkaji karakteristik distribusi mikroplastik berdasarkan persebaran ukuran, 3) mengkaji kualitas air di Sungai Progo berdasarkan parameter fisikokimia (kekeruhan, salinitas, dan total padatan terlarut), 4) mengkaji potensi korelasi distribusi mikroplastik terhadap kualitas air parameter fisikokimia di aliran permukaan air Sungai Progo. Pengambilan sampel dilakukan di delapan titik Sungai Progo. Sampel mikroplastik diambil dan diberi perlakuan menggunakan metode sesuai dengan standar *National Oceanic and Atmospheric Administration*. Kualitas air diambil dan diukur dengan menggunakan metode sesuai Standar Nasional Indonesia. Korelasi Pearson digunakan untuk menguji korelasi antara kelimpahan mikroplastik dan parameter fisikokimia. Hasil penelitian menunjukkan kelimpahan mikroplastik di Sungai Progo berkisar 75,02 – 435,35 partikel/m^3. Berdasarkan ukuran, mikroplastik terdiri dari *large microplastics* (LMP) (1-5 mm) berkisar 63,00 -83,99% dan *small microplastic* (SMP) (<1 mm) berkisar 16,01-37,00%. Nilai kekeruhan, salinitas, dan total padatan terlarut di Sungai Progo yang diperoleh bervariasi 0,30 - 147,50 NTU; 0,10 - 1,29 $^{o}/_{oo}$; dan 70,00 - 106,50 mg/L, masing-masing. Terdapat korelasi positif antara kelimpahan mikroplastik terhadap kekeruhan (r = 0,186) dan salinitas (r = 0,253). Namun, kelimpahan mikroplastik berkolerasi negatif terhadap total padatan terlarut (r = -0,279).

Kata kunci: Mikroplastik, Salinitas, Kekeruhan, Total Padatan Terlarut, Kelimpahan

DISTRIBUTION OF MICROPLASTIC POLLUTION BASED ON SIZE CHARACTERISTIC AND ITS EFFECT ON WATER QUALITY CONSIDERING PHYSICOCHEMICAL PARAMETERS IN PROGO RIVER

ABSTRACT

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The Progo River is estimated to be one of the Indonesian rivers that included in top 20 plastic polluted rivers globally. Research on the distribution of microplastics in the Progo River is still limited to the sediment. This study aimed to 1) assess the abundance of microplastics, 2) assess the characteristics of microplastic distribution based on size, 3) assess water quality in the Progo River based on physicochemical parameters (turbidity, salinity, and total dissolved solid), 4) assess the potential correlation of microplastic distribution to water quality physicochemical parameters in the surface water of the Progo River. Sampling was conducted at eight points of the Progo River. Microplastic samples were taken and treated using National Oceanic and Atmospheric Administration standards. Water samples were taken and measured using methods according to Indonesian National Standards. The results showed the abundance of microplastics in the Progo River ranged from 75.02 - 435.35 particles/m^3. Based on size, microplastics consisted of large microplastics (LMP) (1-5 mm) ranged 63.00 -83.99% and small microplastics (SMP) (<1 mm) ranged 16.01-37.00%. The turbidity, salinity, and total dissolved solids values in the Progo River were obtained varied 0.30 - 147.50 NTU; 0.10 - 1.29 $^{o}/_{oo}$; and 70.00 - 106.50 mg/L, respectively. There was a positive correlation between microplastic abundance and turbidity (r = 0.186) and salinity (r = 0.253). However, microplastic abundance was negatively correlated to total dissolved solids (r = -0.279).

Keywords: Microplastics, Salinity, Turbidity, Total Dissolved Solid, Abundance