ABSTRACT

One of the most important environmental issues today is water pollution by heavy metals. Water pollutions by heavy metals have occurred in various regions. Heavy metals are parameters that can be toxic even at low concentrations. The Purposes of this study are to analyze the Water Quality Index of heavy metals (Pb, Cd, Fe, and Mn) along the Opak River and to determine influence factors on heavy metals (Pb, Cd, Fe, and Mn) fluctuations in water bodies. In this study, 8 sampling points were selected to represent area condition along Opak River watershed. The water sample from each site was taken twice a month from January to May 2018. The Analysis of heavy metals was conducted using Atomic Absorption Spectrofotometry (AAS). The sampling points are taken by using sample survey method, which is a sampling method that divides the areas or segments of the study. Each of these sampling points is expected to represent the population. The water sampling locations are based on access availibility, time and also cost for this study. Each water sample is taken twice a month starting from January to May 2018. Heavy metal analysis uses the Atomic Absorption Spectrophotometry (AAS). The results of this study, metal concentrations of Pb, Cd, Fe, and Mn of 0.038-0.107 mg / L, 0.009-0.011 mg / L, 0.03-0.18 mg / L, and 0.0001-0.0012 mg / L. Pollution Index Method (IP) and Storet method are used to determine the condition of the status of water quality in Opak River. The Pollution Index (PI) method was used in order to determine the water quality conditions in the Opak River. The statistical analysis was performed using One-way ANOVA to know the correlation between heavy metal data concentrations against locations and seasons. The results of WQI IP and Storet value showed that the quality of Opak River was entering a light polluted level. The One-way ANOVA analysis between seasons and heavy metal concentrations was a significant difference in concentrations Pb, Cd, and Fe.

Keywords*: Heavy Metal, One-Way ANOVA, Opak River, Pollution Index, Water, Water Quality Index.*

ABSTRAK

Salah satu isu lingkungan yang paling penting saat ini adalah isu pencemaran air oleh logam berat. Pencemaran air akibat logam berat telah terjadi di berbagai wilayah. Logam berat merupakan parameter yang memiliki toksisitas atau sifat racun yang kuat meski pada konsentrasi rendah. Tujuan dari penelitian ini adalah untuk menganalisis Water Quality Index kandungan logam berat (Pb, Cd, Fe, dan Mn) di sepanjang Sungai Opak dan faktor yang dapat mempengaruhi fluktuasi kandungan logam (Pb, Cd, Fe, dan Mn) di badan air. Dalam penelitian ini, delapan titik sampling dipilih untuk mewakili kondisi daerah di sepanjang daerah aliran Sungai Opak. Penentuan titik sampling yang diambil menggunakan sample survey method merupakan metode pengambilan sampel dilakukan dengan cara membagi daerah atau segmen penelitian. Tiap titik ini diharapkan dapat mewakili populasi penelitian. Penentuan lokasi titik pengambilan air ini didasari atas kemudahan akses, waktu ataupun biaya dalam penelitian ini. Pengambilan sampel air masing-masing diambil dua kali sebulan mulai dari bulan Januari hingga Mei 2018. Pengujian logam menggunakan alat Atomic Absorption Spectrofotometry (AAS). Hasil penelitian ini didapatkan konsentrasi logam Pb, Cd, Fe, dan Mn sebesar 0.038-0.107 mg/L, 0.009-0.011 mg/L, 0.03-0.18 mg/L, dan 0.0001-0.0012 mg/L. Metode Indeks Pencemaran (IP) dan metode Storet digunakan untuk menentukan kondisi status mutu kualitas air di Sungai Opak. Analisis statistik dilakukan menggunakan One-way ANOVA untuk mengetahui korelasi antara konsentrasi data logam berat terhadap lokasi dan musim. Hasil WQI nilai IP dan Storet menunjukkan bahwa status mutu kualitas Sungai Opak termasuk kedalam kategori tercemar ringan. Hasil analisis One-way ANOVA hubungan antara musim dengan konsentrasi logam berat berpengaruh signifikan dalam konsentrasi Pb, Cd, dan Fe di perairan Sungai Opak.

Kata Kunci*: Air, Indeks Pencemaran, Logam Berat, One-way ANOVA, Sungai Opak, Water Quality Index*