ABSTRAK

Konsentrasi $PM_{2,5}$ tergantung pada kondisi meteorologi, menunjukkan bahwa perubahan iklim dapat berpengaruh signifikan terhadap kualitas udara $PM_{2,5}$. Dengan adanya tolok ukur baku mutu udara akan dapat dilakukan penyusunan dan penetapan kegiatan pengendalian pencemaran udara. Salah satu contohnya adalah PT KS, pabrik baja yang berada di Kota Cilegon. Faktor meteorologi berperan aktif dalam penyebaran konsentrasi $PM_{2,5}$ antara lain: suhu udara, kelembaban udara, kecepatan angin, dan curah hujan. Penelitian ini bertujuan untuk mengetahui konsentrasi $PM_{2,5}$ serta melihat korelasinya dengan faktor meteorologi di lingkungan kerja Pabrik Baja-Cilegon dan logam berat di udara ambien. Pengolahan dan analisis data pertikulat $PM_{2,5}$ ini dilakukan menggunakan korelasi *spearmanRho* dan data logam berat menggunakan statistik deskriptif. Hasil penelitian ini merupakan analisa korelasi spearman Rho antara hasil selama pengukuran 24 jam, dalam rentang waktu rata-rata pengukuran selama 3 hari, selama 4 hari, selama 7 hari. Pengamatan konsentrasi rata-rata PM2,5 dengan pengaturan ulang setiap area pengambilan contoh yang didapatkan sebagai berikut; pemantauan pengukuran selama 3 hari: 55,48 $\mu g/m^3$, pemantauan pengukuran selama 4 hari: 60,54 $\mu g/m^3$, dan pemantauan pengukuran selama 7 hari: 43,50 $\mu g/m^3$. Pengukuran konsentrasi logam berat selama pemantauan pengukuran paling tinggi adalah logam besi (Fe), dan konsentrasi logam berat selama pemantauan pengukuran paling rendah adalah cadmium (Cd). Berdasarkan pengamatan korelasi selama pemantauan antara temperatur dan konsentrasi PM2,5 sebagian besar berhubungan signifikan, sedangkan pengamatan korelasi antara kelembaban dan konsentrasi $PM_{2,5}$ tidak berhubungan signifikan. Kualitas udara di lingkungan kerja Pabrik Baja-Cilegon rata-rata memenuhi baku mutu udara ambien, namun menurut WHO rata-rata kualitas udara tidak memenuhi baku mutu.

Kata Kunci: Faktor Meteorologi, Pabrik Baja, Korelasi *SpearmanRho*, Logam Berat, $PM_{2,5}$

ABSTRACT

The concentration of PM$_{2.5}$ depends on meteorological conditions, indicating that climate change can have a significant effect on PM$_{2.5}$ air quality. With the presence of air quality standards, it will be possible to formulate and determine air pollution control activities. One example is PT KS, a steel factory located in Cilegon City. Meteorological factors play an active role in the distribution of PM$_{2.5}$ concentrations, including: air temperature, humidity, wind speed, and rainfall. This study aims to determine the concentration of PM$_{2.5}$ and see its correlation with meteorological factors in the work environment of the Steel-Cilegon Factory and heavy metals in ambient air. Processing and analysis of PM$_{2.5}$ particulate data was carried out using spearman Rho correlation and heavy metal data using descriptive statistics. The results of this study are spearman Rho correlation analysis between the results during the 24-hour measurement, in the average time span of the measurement for 3 days, for 4 days, for 7 days. Observation of the average concentration of PM$_{2.5}$ by resetting each sampling area obtained as follows; measurement monitoring for 3 days: 55.48 µg/m³, monitoring measurement for 4 days: 60.54 µg/m³, and monitoring measurement for 7 days: 43.50 µg/m³. The highest concentration of heavy metal during monitoring was ferrous metal (Fe), and the lowest concentration of heavy metal during monitoring was cadmium (Cd). Based on the observation, the correlation between temperature and concentration of PM$_{2.5}$ was mostly significant, while the observed correlation between humidity and concentration of PM$_{2.5}$ was not significantly related. Air quality in the work environment of the Steel-Cilegon Factory meets the ambient air quality standards on average, but according to WHO the average air quality does not meet the quality standards.

Keywords: Meteorological Factors, Steel Factory, spearman Rho Correlation, Heavy Metals, PM$_{2.5}$