Analisis Kualitas Udara Mikrobiologis di Gedung dan Laboratorium Departemen Teknik Sipil FTUI = Microbiological Indoor Air Quality Analysis in the Building and Laboratory of Civil Engineering Department (Faculty of Engineering, University of Indonesia)

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Abstrak

Kualitas udara di dalam ruangan perlu diperhatikan karena banyak pekerjaan yang dilakukan di dalam ruangan dan kualitas udara yang buruk akan memicu adanya penyakit dan menurunkan kinerja pekerja. Penelitian dilakukan untuk meningkatkan kualitas udara di dalam ruangan yang ditinjau berdasarkan konsentrasi bakteri dan jamur yang terdapat pada ruang uji coba. Tujuan dari penelitian ini adalah menganalisis pengaruh konsentrasi bakteri dan jamur, menganalisis air purifier dan sistem ventilasi terhadap kualitas udara, dan menganalisis korelasi antara konsentrasi bakteri dan jamur dengan suhu ruangan, kelembapan, dan intensitas cahaya di ruang uji coba. Penelitian dilakukan dengan cara mengambil sampel udara dengan metode impaction menggunakan alat EMS E6 Bioaerosol Sampler selama 3 menit di pagi hari dan siang hari pada masing-masing ruang uji coba dengan debit pompa sebesar 28,3 L/menit. Pengambilan sampel pada konsentrasi bakteri dan jamur menggunakan media pertumbuhan Tryptic Soy Agar (TSA) untuk bakteri yang diinkubasi selama 24 jam dan Potato Dextrose Agar (PDA) untuk jamur yang diinkubasi selama 48 jam. Ruang uji coba memiliki jenis ruangan yang berbeda, yaitu ruang rapat, laboratorium, dan mushola. Hasil penelitian menunjukkan bahwa konsentrasi bakteri tertinggi yaitu ruang Mushola Dosen sebesar 1943 CFU/m3 dan terendah yaitu ruang tengah lantai 1 sebesar 71 CFU/m3. Konsentrasi jamur tertinggi yaitu ruang Mushola Dosen sebesar 883 CFU/m3 dan terendah yaitu 188 CFU/m3. Parameter pendukung lain yaitu suhu ruangan (24,3–30,5?) sudah memenuhi kriteria yang telah ditetapkan Permenaker Nomor 5 Tahun 2018, terdapat beberapa ruangan yang tidak memenuhi kelembapan (54,6–82,6%) dan intensitas cahaya untuk tiap ruangan (5,3–261 Lux) telah sesuai dengan kriteria masing-masing jenis ruang kerja. Uji korelasi yang dilakukan yaitu Uji Spearman yang menunjukkan bahwa data tidak terdistribusi normal. Terdapat korelasi positif antara pertumbuhan bakteri dengan suhu ruangan dan intensitas cahaya serta jamur dengan kelembapan. Korelasi negatif didapatkan pada pertumbuhan bakteri dengan kelembapan dan jamur dengan intensitas cahaya.

.....Indoor air quality needs to be taken into consideration because many tasks are performed indoors, and poor air quality can lead to illness and decrease workers' performance. The research was conducted to improve indoor air quality based on the concentration of bacteria and fungi present in the test rooms. The objectives of this study were to analyze the influence of bacteria and fungi concentrations, assess the effectiveness of air purifiers and ventilation systems on air quality, and examine the correlation between bacteria and fungi concentrations with room temperature, humidity, and light intensity in the test rooms. The research was conducted by sampling air using the impaction method with an EMS E6 Bioaerosol Sampler for 3 minutes in the morning and afternoon in each test room, with a pump flow rate of 28.3 L/minute. Bacterial and fungal samples were collected using Tryptic Soy Agar (TSA) growth medium for bacteria, which were incubated for 24 hours, and Potato Dextrose Agar (PDA) for fungi, which were incubated for 48 hours. The test rooms consisted of different types of rooms, including meeting rooms, laboratories, and

prayer rooms. The results of the study showed that the highest concentration of bacteria was found in the Lecturers' Prayer Room at 1943 CFU/m3, while the lowest was in the central room on the first floor at 71 CFU/m3. The highest concentration of fungi was found in the Lecturers' Prayer Room at 883 CFU/m3, while the lowest was at 188 CFU/m3. Other supporting parameters such as room temperature (24.3–30.5°C) met the criteria set by the Ministry of Manpower Regulation No. 5 of 2018. However, some rooms did not meet the humidity requirements (54.6–82.6%), and the light intensity in each room (5.3–261 Lux) complied with the respective workspace criteria. The correlation analysis, using Spearman’s test, indicated that the data was not normally distributed. There was a positive correlation between bacterial growth with room temperature and light intensity, and between fungal growth with humidity. Negative correlations were observed between bacterial growth with humidity and fungal growth with light intensity.