Pengaruh Keberadaan Instalasi Pengolahan Air Limbah (IPAL) Rumah Sakit Terhadap Kualitas Udara Mikrobiologis di Sekitarnya. Studi Kasus : Rumah Sakit Umum Pusat Nasional Dr. Cipto Mangunkusumo = Study of Microbial Air Quality at Hospital Wastewater Treatment Plant. Case Study : Wastewater Treatment Plant at RSUPN Dr. Cipto Mangunkusumo

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Abstrak

Rumah Sakit, yang merupakan salah satu fasilitas kesehatan bagi publik, tentu akan menghasilkan limbah, salah satunya adalah limbah cair. Limbah cair tersebut tentu harus diolah terlebih dahulu di Instalasi Pengolahan Air Limbah (IPAL) Rumah Sakit agar sesuai dengan baku mutu air limbah rumah sakit dalam Keputusan Menteri Kesehatan RI No. 58 Tahun 1995. Namun demikian, dalam proses pengolahan air limbah, tidak dapat dihindari kemungkinan terlepasnya pencemar udara mikrobiologis (bioaerosol) ke udara sekitar. Penelitian ini bertujuan untuk mempelajari pengaruh proses pengolahan pada unit pengolahan penghasil bioaerosol serta parameter fisik udara terhadap konsentrasi bioaerosol, khususnya bakteri dan fungi, selama proses pengolahan air limbah. Hasil pengukuran yang didapatkan menunjukkan bahwa di IPAL Terpadu 1, konsentrasi bakteri tertinggi terdapat di bak aerasi, yaitu 17.385±10.044 CFU/m3 sedangkan konsentrasi fungi tertinggi terdapat di bak ekualisasi yaitu 2.968±1.349 CFU/m3; dan di IPAL Terpadu 2, konsentrasi bakteri tertinggi terdapat di bak ekualisasi, yaitu 6.784±4.198 CFU/m3 sedangkan konsentrasi fungi tertinggi terdapat di bak sedimentasi yaitu 2.544±899 CFU/m3. Hasil pengukuran tersebut melebihi ambang batas konsentrasi bioaerosol pemukiman yang digunakan sebagai acuan baku mutu lingkungan, yaitu konsentrasi bakteri sebesar 1.272 CFU/m3 dan fungi sebesar 388 CFU/m3. Tingginya konsentrasi bioaerosol dipengaruhi oleh beberapa parameter fisik udara. Parameter yang paling dominan memengaruhi mikroba tumbuh dan bertahan hidup di udara, yaitu temperatur dan Kelembaban udara. Untuk mencegah penyebaran bioaerosol yang berlebihan yang dapat menimbulkan dampak negatif bagi lingkungan sekitar, diperlukan jarak penyangga IPAL RS dari lingkungan sekitar, yaitu lebih dari 50 meter. Selain itu, upaya pencegahan lain yang dapat dilakukan adalah menanam tanaman pagar atau pepohonan di sekitar IPAL RS.

.....Hospital, which is one of health facilities for public, will produce waste, such as wastewater. The wastewater must be processed at Hospital Wastewater Treatment Plant (WWTP) to comply with the hospital wastewater quality standard based on the Indonesia’s Ministry of Health Decree Number 58 at 1995. However, in the treatment process, it is inevitable for the possibility of microbial air pollutants (bioaerosol) released to surrounding air. The objective of this research are to study the effect of treatment processing in the unit where produced bioaerosol and the physical parameters to the concentration of bioaerosol, particularly bacteria and fungi, during the treatment processes. The measurement results show that in the Integrated WWTP 1, the highest concentration of bacteria is found in the aeration basin, which is 17.385±10.044 CFU/m3 while fungi concentration was the highest in the equalization basin which is 2.968±1.349 CFU/m3; and in the Integrated WWTP 2, the highest concentration of bacteria is found in the equalization basin, which is 6.784±4.198 CFU/m3 while fungi concentration was the highest in the

sedimentation basin which is 2.544±899 CFU/m3. These measurements exceeds the threshold concentration of bioaerosol at residential area which used as a reference for environmental quality standards, which is the concentration of bacteria is 1.272 CFU/m3 and fungi is 388 CFU/m3. The high concentration of bioaerosol are affected by several physical parameters of air. The most dominant parameters that affect the microbial growth and survival in the air are temperature and humidity. To prevent excessive dispersion of bioaerosol that can cause negative impacts on the surrounding area, it is required some buffer distance from the hospital WWTP to surrounding environment, which is more than 50 meters. In addition, other preventive efforts are planting trees around the fence or surrounding the hospital WWTP area.