EVALUASI INSTALASI PENGOLAHAN AIR SAMPAH (IPAS) UNTUK OPTIMALISASI IPAS 3 DI TPST BANTARGEBANG, BEKASI, JAWA BARAT

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INTISARI

Pengolahan air lindi di TPST Bantargebang, salah satunya dilakukan di IPAS 3 dan akan dibuang ke Sungai Asem. Kualitas *effluent* IPAS 3 cenderung fluktuatif, khususnya parameter Hg yang mengalami kenaikan setelah pengolahan dan belum memenuhi baku mutu air lindi. Ini mengindikasikan pengolahan yang tidak efisien di IPAS 3 sehingga diperlukan penilaian efisiensi pengolahan IPAS 3 dan dianalisis karakteristik air lindi pada *inlet*. Daya tampung beban pencemaran Sungai Asem perlu diketahui sebagai pertimbangan dalam mengelola *effluent* IPAS 3. Salah satu pengelolaan yang dapat dilakukan, yakni dengan memanfaatkan *effluent* IPAS 3 untuk penyiraman tanaman sehingga diperlukan pengolahan lebih lanjut. Oleh karena itu, karakteristik air lindi, efisiensi pengolahan di setiap unit, dan kesesuaian dengan kriteria desain IPAS 3 dievaluasi sehingga dapat direkomendasikan arahan pengelolannya, salah satunya dengan mengolah kembali *effluent* IPAS 3. Oleh sebab itu diperlukan penelitian mengenai potensi pengolahan *effluent* IPAS 3 menggunakan metode *constructed wetland*.

Metode penelitian ini bersifat kuantitatif dan kualitatif. Metode pengumpulan data terdiri dari survei lapangan, studi literatur, eksperimen laboratorium, dan *sampling*. *Sampling* dilakukan menggunakan teknik *purposive sampling*. *Grab Sampling* dilakukan untuk air Sungai Asem sebanyak 3 sampel, air lindi di IPAS 3 sebanyak 7 sampel dari *outlet* setiap unit, dan *effluent constructed wetland* sebanyak 3 sampel. Parameter yang dipilih pada pengujian sampel air, yaitu BOD_5, COD, dan Hg. Arahan pengolahan lanjutan *effluent* IPAS 3 menggunakan *constructed wetland* diteliti dengan variabel bebas berupa waktu detensi, yakni 3 dan 6 hari. Jenis tanaman yang dipilih, yakni *Cyperus papyrus* dengan media tanah, pupuk, pasir silika dan zeolit. Analisis data dilakukan menggunakan metode deskriptif.

Berdasarkan hasil penelitian, didapatkan bahwa daya tampung beban pencemaran Sungai Asem sudah terlampaui untuk parameter BOD_5 dan COD, berturut-turut sebesar 49,8301 mg/L dan 897,6610 mg/L setelah melewati IPAS 3 sehingga sebaiknya *effluent* ini tidak dibuang ke Sungai Asem. Karakteristik air lindi pada *inlet* IPAS 3 cenderung fluktuatif. Berdasarkan pengukuran langsung, didapatkan nilai BOD_5/COD sebesar 0,3 sehingga jenis pengolahan *existing* sudah cukup. Pengolahan setiap unit juga cukup baik, dengan nilai efisiensi pengolahan pada rentang 10,2041– 99,6003% tetapi perlu redesain pada kolam aerasi, *polishing pond* dan kolam sedimentasi. Percobaan pengolahan *effluent* IPAS 3 menggunakan *constructed wetland* belum mampu mengolah *effluent* agar sesuai baku mutu air penyiraman tanaman karena penggunaan pupuk kompos dan tanah sebagai media. Oleh karena itu, direkomendasikan modifikasi media pada unit *constructed wetland*.

Kata kunci: air lindi, pengolahan air lindi, daya tampung beban pencemaran, evaluasi IPAL, *constructed wetland*

EVALUATION OF LANDFILL LEACHATE TREATMENT PLANT (IPAS) FOR THE OPTIMIZATION OF IPAS 3 AT TPST BANTARGEBANG, BEKASI, WEST JAVA

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ABSTRACT

The treatment of landfill leachate at TPST Bantargebang, including at IPAS 3 will discharge effluent into Asem River. The effluent quality of IPAS 3 tends to fluctuate, Hg for instance has increased after treatment and still does not meet the leachate quality standards. This indicates the inefficient treatment at IPAS 3, hence it is necessary to assess the performance of each IPAS 3 unit and analyze its suitability based on leachate characteristics. The pollution load capacity of Asem River is important to be analyzed as a consideration in managing IPAS 3 effluent. One of the management that can be done is utilizing it for watering plants, thus further treatment is necessary. Therefore, an evaluation of IPAS 3 is required by considering leachate characteristics and treatment performance at the entire units besides analyzing the pollution load capacity hence the management can be recommended. One of which is by re-treating the effluent utilized by constructed wetland, thus further research is required.

This research method are quantitative and qualitative. Data collection methods consist of field surveys, literature studies, laboratory experiments, and sampling. The sampling technique was carried out using purposive sampling technique. Grab sampling was carried out for Asem River, leachate from outlet of each unit, and constructed wetland effluent as many as 3,7, and 3 samples respectively. The parameters selected for water sample testing were BOD_5, COD, and Hg. Further treatment of IPAS 3 effluent with constructed wetland was studied with detention time as independent variable, namely 3 and 6 days. The plant species chosen was Cyperus papyrus with soil, fertilizer, silica sand and zeolite as the media. Data analysis was conducted using descriptive method.

To summarize results of the study, the pollution load capacity of Asem River has been exceeded for BOD_5 and COD, accounting to 49.8301 mg/L and 897.6610 mg/L respectively, consequently this effluent should not be emitted into Asem River. The characteristics of the leachate treated at IPAS 3 tends to fluctuate, in this measurement a BOD_5/COD value of 0,3 was obtained, hence that existing treatment type is sufficient. The performance of each unit is adequate with treatment efficiency values in the range of 10,2041– 99,6003% but redesigning for aeration tank, polishing, and sedimentation pond is required. The lab study of IPAS 3 effluent treatment using constructed wetland has not been able to meet the quality standards for watering plants due to the use of compost and soil as media. Therefore, it is recommended to modify the media in the constructed wetland unit.

Keywords*: leachate, leachate treatment, pollution load carrying capacity, WWTP evaluation, constructed wetland*