INTISARI

Instalasi Pengolahan Air Limbah (IPAL) Kamar Mandi Umum *Wisdom Park* telah beroperasi selama 2 tahun sejak dibangun tahun 2019. IPAL tersebut dibangun dengan sistem aerobik terdiri dari bak sedimentasi, tangki aerasi, dan *secondary clarifier*. Namun, IPAL yang ada tidak beroperasi dengan baik dan berpotensi mencemari badan air penerima sehingga perlu dilakukan modifikasi IPAL.

Modifikasi IPAL dilakukan dengan memperbaiki reaktor sedimentasi dan aerasi. Pada *primary treatmen*t, modifikasi dengan menambahkan tangki sedimentasi 1, bak kontrol, tangki sedimentasi 2, untuk menggantikan bak sedimentasi eksisting. Pada *secondary treatment*, menambahkan tangki anaerobik, tangki aerasi dan mengganti peralatan untuk resirkulasi menjadi pompa sentrifugal. Pada tangki aerasi yang baru, aerator yang digunakan adalah *microbubble generator* dengan aerasi *intermittent*. Rentang waktu *on-off* aerasi yang dipilih adalah 15:15 menit. *Start-up* dan evaluasi dilakukan selama 3 bulan.

Evaluasi kinerja IPAL dilakukan saat pandemi Covid19 yang menyebabkan pengunjung *Wisdom Park* berkurang, sehingga IPAL beroperasi ±10% kapasitas desainnya (*underloading*). Debit aktual modifikasi IPAL 82,06±17,79 l/hari (X±SD). Beban influen TSS, COD, dan NH_3-N (X±SD) untuk *primary treatment* masing-masing sebesar 89±19,24 g/hari, 108±23,37 g/hari, dan 12±2,54 g/hari. Pada *secondary treatment* beban influen TSS, COD, dan NH_3-N masing-masing sebesar 0,78±0,66 g/hari, 8±4,52 g/hari, dan 5±5,08 g/hari. Evaluasi kinerja IPAL dalam penyisihan COD, TSS, dan NH_3-N ditinjau pada sistem *primary treatment* dan *secondary treatment*. Rerata *removal efficiency* (X±SD) COD pada *primary treatment* 93,72±3,99% dan pada *secondary treatment* 70,55±20,08%. Rerata *removal efficiency* TSS pada *primary treatment* 99,21±0,65% dan pada *secondary treatment* 52,62±27,44%. Rata-rata *removal efficiency* NH_3-N sebesar 83,7±19,7%. Konsentrasi COD dan TSS efluen sudah memenuhi baku mutu Permen LHK No.68/2016, namun 42% sampel konsentrasi NH_3-N efluen tidak mencapai baku mutu.

Kata kunci: modifikasi, *microbubble generator*, aerasi *intermittent*, resirkulasi

ABSTRACT

The waste water treatment plant (WWTP) of Wisdom Park Public Toilet has been operating for 2 years since 2019. The WWTP was built with aerobic system consisting of sedimentation tub, aeration tank, and secondary clarifier. The existing WWTP aren't operating properly and has the potential to pollute river, so it's necessary to modify the WWTP.

The modified WWTP improved sedimentation and aeration reactors. The primary treatment was modified by adding sedimentation tank 1 and 2, and control tub. The secondary treatment was modified by adding anarobic tank, aeration tank, and changing the equipment for recirculation to centrifugal pump. Intermittent aerattion by microbubble generator with cycle time was 15:15. Start-up and WWTP evaluation were carried out for 3 months.

WWTP performance was evaluated when park visitors decrease, due to the Covid19 pandemic. WWTP was operated ±10% design capasity (underloading). The actual wastewater flowrate of the modified WWTP was 82.06±17.79 l/day (X±SD). In primary treatment, influent loads of TSS, COD, and NH_3-N (X±SD) were 89±19.24 g/day, 108±23.37 g/day, and 12±2.54 g/day. In secondary treatment, the influent loads of TSS, COD, and NH_3-N were 0.78±0.66 g/day, 8±4.52 g/day, and 5±5.08 g/day, respectively. The removal efficiency (X±SD) of COD in the primary treatment was 93.72±3.99% and in the secondary treatment was 70.55±20.08%. The emoval efficiency of TSS in the primary treatment was 99.21±0.65% and at the secondary treatment 52.62±27.44%. The removal efficiency of NH_3-N is 83.7±19.7%. The concentration of COD and TSS of the effluent already met the quality standard according to Permen LHK No.68/2016, but 42% of the NH_3-N effluent sample didn't reach the quality standard.

Keywords: modification, microbubble generator, intermittent aeration, recirculation