

ABSTRACT

The improvement of leachate water quality by raising the dissolved oxygen value will enhance the bacteria to break down the chemical content in leachate water. The application of microbubble generator has started to be used as an effective way to increase water dissolved oxygen. The wastewater treatment by using Microbubble Generator at Piyungan TPST has been tested previously in 2017. However, the study only tested microbubble generator in leachate water. There is no additional aerobic bacteria and standard treatment of wastewater treatment. In this study, wastewater treatment operation has started running, by running Anaerobic Fluidizer Bed Reactor and addition of aerobic bacteria in the aerator tank, then the operation goes in accordance with waste treatment standards. With the operation and use of microbubble in aerobic process in leachate water treatment system. Hence, an evaluation for the microbubble application in the aerobic process is needed.

A microbubble generator is installed in 1 m³ tank and operated continuously for 24 hours non-stop. With these conditions, to evaluate performance, there should be some consideration parameters as an evaluation material, such parameters are how much the increase of Dissolved Oxygen (DO) after microbubble generator is installed, how thoroughly dissolved microbubble dissolves oxygen distributed, how much decrease in Chemical Oxygen Demand (COD), and by comparing all these parameters with previous study by Hans et al for further evaluation.

After performing the data processing, the overall average DO increase value is 6.02 mg / L, and MBG successfully increase dissolved oxygen uniformly, and managed to reduce COD although not too significant. There are several factors that cause the decrease in COD to be insignificant. Among them are bacteria can not adapt to leachate water environment, treatment for less bacteria, electricity is often dead and unstable, and others. However, when compared with the performance of microbubble generators in previous study by Hans et al, the present study is significantly better in some aspects such as increased DO and decreased COD.

Keywords: Microbubble Generator, Dissolved Oxygen (DO), Chemical Oxygen Demand (COD)

INTISARI

Peningkatan kualitas air lindi dengan menaikkan kadar oksigen terlarut akan mengacu bakteri untuk mengurai kandungan zat kimia pada air lindi. Penerapan *microbubble generator* sudah mulai digunakan sebagai salah satu cara efektif untuk meningkatkan kadar oksigen terlarut air. Pengolahan limbah dengan *microbubble generator* di TPST Piyungan sudah pernah diuji sebelumnya di tahun 2017. Namun, pada penelitian tersebut hanya menguji *microbubble generator* di air lindi. Belum ada pemberian tambahan bakteri aerob dan perlakuan standar operasi pada wastewater treatment. Pada penelitian ini, operasi wastewater treatment sudah mulai berjalan, dengan menjalankan *Anaerobic Fluidizer Bed Reactor* dan penambahan bakteri aerob pada tangki aerator, maka operasi berjalan sesuai dengan standar pengolahan limbah. Dengan berjalannya operasi dan penggunaan *microbubble* pada proses aerobik di sistem pengolahan air lindi tersebut. Maka perlu evaluasi kinerja *microbubble generator*.

Microbubble generator dipasang di tangki berukuran 1 m³ dan dioperasikan selama 24 jam secara *non-stop*. Dengan kondisi tersebut untuk mengevaluasi kinerja, perlu ada beberapa parameter pertimbangan sebagai bahan evaluasi, parameter tersebut diantaranya adalah seberapa besar peningkatan *Dissolved Oxygen* (DO) setelah dipasang *microbubble generator*, seberapa menyeluruh *microbubble* mendistribusikan oksigen terlarut, seberapa besar penurunan kadar *Chemical Oxygen Demand* (COD), dan dengan membandingkan seluruh parameter tersebut dengan penelitian sebelumnya oleh Hans dkk.

Setelah dilakukan pengambilan dan pengolahan data, didapat nilai kenaikan DO rata-rata keseluruhan sebesar 6.02 mg/L, dan MBG berhasil mendistribusikan oksigen terlarut dengan baik. Serta berhasil menurunkan COD walaupun tidak terlalu signifikan, ada beberapa faktor yang menyebabkan penurunan COD tidak signifikan. Diantaranya adalah bakteri tidak dapat adaptasi dengan lingkungan air lindi, perlakuan untuk bakteri kurang, listrik sering mati dan tidak stabil, dan lain-lain. Namun apabila dibandingkan dengan performa *microbubble generator* pada penelitian sebelumnya oleh Hans dkk, penelitian sekarang lebih baik dalam beberapa aspek seperti peningkatan DO dan penurunan COD.

Kata Kunci: *Microbubble, Microbubble Generator, Chemical Oxygen Demand (COD), Dissolved Oxygen (DO)*