

## DEGRADASI LIMBAH ASETONITRIL SECARA ANAEROB DENGAN SISTEM *BATCH* MENGGUNAKAN BAKTERI KULTUR CAMPURAN

Allif Olviani  
16/398537/PA/17498

### INTISARI

Penelitian ini telah dilakukan dengan tujuan untuk mempelajari degradasi limbah asetonitril secara anaerob dengan sistem *batch* menggunakan bakteri kultur campuran pada variasi pH, konsentrasi asetonitril, dan penggunaan media bambu. Sampel limbah asetonitril sisa analisis HPLC telah didegradasi menggunakan bakteri kultur campuran yang mengandung konsorsium bakteri metanogen. Beberapa variasi sampel dibuat seperti variasi pH yaitu pH awal sampel (4) dan pH netral (7), variasi konsentrasi asetonitril (0 (kontrol), 5, 10, dan 15%), serta penggunaan media bambu. Reaktor diinkubasi selama 28 hari pada temperatur ruang dan analisis dilakukan secara duplo. Sampel limbah asetonitril hasil degradasi diambil secara periodik (tujuh hari sekali) untuk dilakukan beberapa analisis seperti pengukuran pH, konsentrasi asetonitril menggunakan kromatografi gas, TOC, TS, OTS, COD, dan produksi gas yang dihasilkan selama penelitian.

Hasil penelitian menunjukkan bahwa pH sampel pada semua perlakuan dari hari ke-0 sampai hari ke-28 nilainya fluktuatif dan berada pada rentang 4-8. Kadar TS, OTS, TOC, COD, dan konsentrasi asetonitril dari hari ke-0 sampai hari ke-28 mengalami penurunan yang menandakan telah terjadinya degradasi limbah oleh bakteri kultur campuran. Produksi gas terbanyak diperoleh pada reaktor dengan kondisi konsentrasi asetonitril 5%, pH awal sampel 7, volume inokulum 1 L, dan temperatur ruang yaitu sebesar 1486 mL. Efisiensi degradasi terbesar (berdasarkan penurunan kadar COD) adalah 85% yang diperoleh pada kondisi sampel dengan konsentrasi asetonitril 5%, pH awal 4, dan penggunaan media bambu.

Kata kunci: anaerob, asetonitril, bakteri kultur campuran, *batch*, degradasi.

## **ANAEROBIC DEGRADATION OF ACETONITRILE WASTE BY BATCH SYSTEM USING MIXED CULTURE BACTERIA**

Allif Olviani  
16/398537/PA/17498

### **ABSTRACT**

*This experiment had been performed to study the anaerobic degradation of acetonitrile waste by batch system using mixed culture bacteria in the variation of pH, acetonitrile concentration, and the utilization of bamboo media. The residual acetonitrile waste sample from HPLC analysis had been degraded using mixed culture bacteria that contained a consortium of methanogenic bacteria. Some sample variations were performed such as pH that was initial sample pH (4) and neutral pH (7), concentration variation of acetonitrile (0 (control), 5, 10, and 15%), and utilization of bamboo media. The reactor was incubated during 28 days at room temperature and the analysis was done by duplicate. Acetonitrile waste sample from degradation product was taken periodically (every seven days) to be carried out some analysis such as the measurement of pH, acetonitrile concentration with gas chromatography, TOC, TS, OTS, and gas production during the experiment.*

*The experiment result shows that the sample pH in all treatments from day 0 to day 28 are fluctuative and in the range 4-8. The value of TS, OTS, TOC, COD, and acetonitrile concentration from day 0 to day 28 have decreased which indicates the waste degradation by mixed culture bacteria has occurred. The most significant gas production was obtained in the reactor with a 5% acetonitrile concentration, an initial pH of sample 7, 1 L of inoculum volume, and at room temperature that equals to 1486 mL. The highest degradation efficiency (based on the decreasing of COD values) is 85% that was obtained in the condition of the sample with a 5% acetonitrile concentration, an initial pH of 4, and the utilization of bamboo media.*

*Keywords: acetonitrile, anaerobic, batch, degradation, mixed culture bacteria.*