Analisis Penerapan Solusi Pengolahan Sampah Organik Melalui Pendekatan Sosial dan Teknologi Anaerobic Digestion di Pesantren Al Hikam Kota Depok, Jawa Barat = Analysis of The Implementation of Organic Waste Management Solutions Through a Social Approach and Anaerobic Digestion Technology at Al Hikam Islamic Boarding School Depok City, West Java

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Abstrak

Sampah organik merupakan sampah yang paling dominan dihasilkan dari aktivitas di pesantren. Namun, Pesantren Al Hikam Kota Depok belum menerapkan pengolahan sampah organik karena minimnya pemahaman, pemilahan, dan penggunaan alat dalam mengolah sampah organik. Penelitian ini memiliki tujuan untuk mengetahui timbulan dan komposisi sampah, memberikan edukasi melalui pelaksanaan kegiatan sosialisasi, dan transfer teknologi anaerobic digestion. Pada teknologi tersebut dilakukan pengukuran skala pilot dengan massa sampah 7,6 kg/hari sehingga menghasilkan OLR 1,4 kg.VS/m3.hari. Berdasarkan hasil pengukuran timbulan dan komposisi sampah di Pesantren Al Hikam Kota Depok memiliki massa sebesar 33,638 kg/hari, volume sebesar 683,221 L/hari, dan komposisi sampah didominasi oleh 41,831% sampah organik. Pelaksanaan kegiatan sosialisasi dilakukan sebanyak dua kali, dimana kegiatan sosialisasi pertama dihadiri oleh 66 orang, sedangkan kegiatan sosialiasi kedua dihadiri oleh 25 orang. Mengacu kepada hasil pre test dan post-test, kegiatan sosialisasi pertama tidak meningkatkan pengetahuan peserta (sig 2-tailed >0,05). Sementara itu, kegiatan sosialisasi kedua meningkatkan pengetahuan peserta (sig 2-tailed <0,05). Pada penerapan teknologi anaerobic digestion di Pesantren Al Hikam telah melakukan proses seeding, aklimatisasi, dan operasional. Sampah organik memiliki karakteristik pH sebesar 6,1±0,38, suhu sebesar 29,5±1,12oC, TS sebesar 25±0,092%, VS sebesar 95±0,0054%TS, dan COD sebesar 453±188 g/L.COD. Hasil penelitian menujukkan kandungan volatile solid destruction sebesar 91±0,015% dan reduksi COD sebesar 89±0,081% mempengaruhi nilai volume biogas dan metana yang dihasilkan dengan nilai volume biogas sebesar 805±219 L.biogas/hari dan methane yield sebesar 292±130 L.CH4/kg, sehingga mengandung konsentrasi 59±0,035% CH4 dan 41±0,035% CO2. Selanjutnya, kandungan amonia digestat sebesar 1057±378 mg/L.NH3 tidak mempengaruhi proses operasional anaerobic digestion.

.....Organic waste is the most dominant waste generated from activities in Islamic boarding schools. However, Al Hikam Islamic Boarding School has not implemented organic waste processing due to the lack of understanding, sorting, and use of tools in processing organic waste. This study aims to determine the generation and composition of waste, provide education through the implementation of socialization activities, and transfer of anaerobic digestion technology. In this technology, pilot-scale measurements were carried out with a waste mass of 7.6 kg/day so as to produce an OLR of 1.4 kg.VS/m3.day. Based on the results of the measurement of generation and composition of waste at Al Hikam Islamic Boarding School has a mass of 33.638 kg/day, a volume of 683.221 L/day, and the composition of waste is dominated by 41.831% organic waste. The implementation of socialization activities was carried out twice, where the first socialization activity was attended by 66 people, while the second socialization activity was attended by 25

people. Referring to the pre-test and post-test results, the first socialization activity did not increase participants knowledge (sig 2-tailed>0.05). Meanwhile, the second socialization activity increased participants knowledge (2-tailed sig<0.05). In the application of anaerobic digestion technology at Al Hikam Islamic Boarding School has carried out seeding, acclimatization, and operational processes. Organic waste has pH characteristics of 6.1±0.38, temperature of 29.5±1.12oC, TS of 25±0.092%, VS of 95±0.0054%TS, and COD of 453±188 g/L.COD. The results showed that the volatile solid destruction content of 91±0.015% and COD reduction of 89±0.081% affect the value of the volume of biogas and methane produced with a volume value of biogas of 805±219 L.biogas/day and methane yield of 292±130 L.CH4/kg, so that it contains concentrations of 59±0.035% CH4 and 41±0.035% CO2. Furthermore, the ammonia digestate content of 1057±378 mg/L.NH3 does not affect the operational process of anaerobic digestion.