

Analisis pengaruh pencampuran fraksi organik terhadap dinamika populasi mikroorganisme pada proses biodrying lumpur tinja = Analysis of organic fractions mixing to dynamic of microorganism population in faecal sludge biodrying process

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Abstrak

ABSTRAK

Pengembangan energi terbarukan merupakan salah satu tantangan yang harus dihadapi. Lumpur tinja menjadi salah satu alternatif pilihan dalam pengembangan energi tebarukan karena memiliki nilai kalor hingga 19,1 MJ/kg TS. Sehingga, berpotensi diubah menjadi Refused Derived Fuels (RDF). Akan tetapi, lumpur tinja masih memiliki nilai kadar air yang tinggi sehingga perlu proses pengeringan terlebih dahulu dengan menggunakan metode biodrying. Penelitian ini bertujuan untuk mengetahui karakteristik pertumbuhan mikroorganisme ketika terjadi variasi fraksi organik terhadap pengeringan lumpur tinja dengan metode biodrying. Berdasarkan pengujian tersebut diperoleh fakta bahwa bakteri mesofilik cenderung meningkat pada dua minggu pertama sedangkan bakteri termofilik meningkat pada satu minggu pertama dan ditemukan kolerasi yang lemah antara pertumbuhan mikroorganisme terhadap perubahan variabel volatile solids. Sementara itu, reaktor dengan penambahan fraksi organik terbesar menghasilkan nilai kalor paling baik, yaitu sebesar 14.66 MJ/Kg, kadar air paling rendah, sebesar 37.15%, dan volatile solids paling besar, 30.93%.

ABSTRACT

Developing a renewable energy is one challenge that we have to face in the future. Faecal sludge could be an alternative solution in developing renewable energy sources since it has heating value up to 19.1 MJ/Kg TS. Hence, faecal sludge could be processed to Refused Derived Fuel. In the other side, faecal sludge has a high moisture content and should be dried before. This study tried to analyze the characteristics of faecal sludge biodrying and see the microbes activity behind the drying process with different organic fraction mixing. To answer the objectives, this experiment using several key parameters such as temperature, moisture content, volatile solids, and the amount of mesophilic and thermophilic bacteria. The result of this study shows that mesophilic bacteria increased in the first two weeks while thermophilic bacteria increased in the first week and found a low correlation between the growth of microorganisms to changes in volatile solids. Meanwhile, the reactor that with the highest organic fraction shows the best result with calorific value up to 14.66 MJ/Kg, lowest moisture content, 37.15%, and has the highest volatile solids, which is 30.93%.