

Analysis and characterization of bio-slurry: fertilizer, fuel and pesticide potential of biogas slurry from Anaerobic Digestion systems

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Abstract

Escalated prices of food production and fuel prices raise an alarm. This is caused by the fact that fertilizers are turning out to be very expensive as well as fossil fuels. The same case for pesticides calls for alternative ways since by using conventional pesticides and fertilizers increases the cost of production. Soil contamination is not a new thing and thus may also reduce crop production too. The contamination is due to conventional pesticide and fertilizer residues. The study aims to investigate the pesticide, and liquid fuel molecules that can be present in the bio-slurry in the selected biogas systems in Narok county. The main findings from the study established the use of bio slurry since there was potential pesticide molecules analogues as well as biofuel molecules. The bio slurry containing cow dung substrate as the leading slurry with 8 pesticide analogue molecules as well as 5 fuel molecules. Such molecules included 1,4-Cyclohexanediamine, N-[3-[N-Aziridyl] propylidene]-3-dimethylaminopropylamine, 4-Piperidinone, 1-Ethyl-2-pyrrolidinone, Aziridine, 2H-Azepin-2-one, and Pyrrolidine-2-carboxylic acid for pesticide. The same sample contained 2,2-Dimethoxybutane, 3-Penten-2-one, 2-Hexanol, 2-Pentanone, Boronic acid and, Phenol molecules being responsible for the biofuel capacity. The bio slurry samples from biogas plants containing pig droppings substrate and a mixed substrate made of chicken waste, kitchen waste and cow dung also had pesticidal organic molecules as well as bio fuel molecules but in lower compositions.

Key words: bio-slurry, AD systems, pesticides, fuel potential