Potential Environmental Impact of Chemical and Microbial Characteristics of Sewage for Energy Production in Secondary Schools of Kakamega County, Kenya

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Abstract

It is strongly believed that secondary schools can generate energy from sewage to supplement biomass energy thereby protecting the environment. However, potential beneficiaries are sceptical about environmental health risks posed by sewage due to its characteristics. This study assessed the potential environmental impact of the chemical and microbial characteristics of sewage for energy production in secondary schools of Kakamega County, Kenya. Sewage influents and effluents samples were collected in specimen bottles and analysed in the laboratories for TKN, P_2O_5, heavy metals and *E.coli* and faecal coliforms. It was established that the chemical characteristics in the sewage generated are: TKN 8.30 mg/l with SE of 0.45; pH 5.75 with SE of 0.13; P_2O_5 1.15mg/l with SE of 0.46; Cd 0.0249 mg/l; Pb 0.0046 mg/l; DM 13.80% with SE of 0.66. The microbial characteristics in the sewage generated are: *E.coli* 390 MPN/100mls and faecal coliforms 450 MPN/100 mls. The anaerobically digested effluent increased its concentration of TKN and P_2O_5 by 8.2% and 1.7% respectively. Its pH also increased by 26.1%. However, the DM, *E.coli* and faecal coliforms reduced by 61.8%, 74.4% and 88.89% respectively. The traceable quantities of heavy metals remained unchanged in the effluent after the AD process. The microbial characteristics of the sewage generated in secondary schools have a negative impact on the environment by causing pollution of the soils and water. Environmentally, AD of sewage for energy generation reduces the *E.coli* and faecal coliforms concentrations in the effluent to harmless trace levels. The decrease in DM means that less space will be required hence reduced rate of refilling. It also means that some biological process is going on and this is environmentally beneficial as evidenced by the decrease in *E.coli* and faecal coliforms. The increase in P_2O_5 and TKN as well as the pH will benefit the soils as bionutrients. Generally, use of sewage bioenergy will help reduce the effect of methane on the biosphere.

***Keywords**: Anaerobic digestion, environmental protection, microbial characteristics, chemical characteristics, sewage.*