Science of The Total Environment, vol.726, pp.138567-1-138567-24, July, 2020.

Anaerobic digestion in wastewater reactors of separated organic fractions from wholesale markets waste. Compositional and batch characterization. Energy and environmental feasibility

C. Morales Polo; M.M. Cledera Castro; K. Hueso Kortekaas; M. Revuelta Aramburu

Abstract-

The food industry is one of the major industrial sectors in Europe and Spain, and therefore one of the major waste emitters, especially organic ones that can be classified into three different fractions (fruit and vegetables, meat and fish). One way to treat this waste environmentally responsible, energy-sustainable and economically cost-effective is anaerobic digestion. The generated biogas can be used as fuel and renewable energy source (providing a solution to the energy problem from an environmental point of view). As there must be a sewage treatment plant with anaerobic digesters in the wholesale markets, and if waste is treated on it, these facilities can be converted into power generators. It has been studied that, when treated along with sludge from a UASB reactor, the residue of fruit and vegetables produces about 900 ml per 100 g of residue with a stable and robust process; the meat residue generates 1300 ml of biogas per 100 g with a process that is slightly affected by the accumulation of acidic elements, internally reversed by the buffer effect of ammonia released; and the fish residue generates 700 ml of biogas, but with very low novels of methane since the process is inhibited early by excessive accumulation of ammonia. The proposed solution is positive, and the methods used to determine it are novel and robust, such as the use of hydrogen as an indicator of process stability. A deep characterization of the development of the process is provided, and feasibility for its application at the industrial level is studied. It is thus proven that wholesale markets can be converted into power generating plants up to 600 kW, assuming a reduction of up to 70 tons of CO2 equivalent (50%) if the generated biogas is used, replacing a conventional source such as natural gas.

Index Terms- Wholesale market residue; Biochemical methane potential; Material degradability; Anaerobic indicators; Energy feasibility; Biogas emissions

Citation:
Morales-Polo, C.; Cledera-Castro, M.M.; Hueso-Kortekaas, K.; Revuelta-Aramburu, M. "Anaerobic digestion in wastewater reactors of separated organic fractions from wholesale markets waste. Compositional and batch characterization. Energy and environmental feasibility", Science of The Total Environment, vol.726, pp.138567-1-138567-24, July, 2020.