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Life cycle assessment of water reuse in Laguna international industrial park, Philippines

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Life Cycle Assessment was applied to assess the water balance of selected locators in Laguna international industrial park Inc. and as a management tool to evaluate the overall impacts of each of the processes involved. The knowledge about life cycle assessment and industrial ecology is one of the building blocks of sustainability of water reuse in LIIP. Most of the locators do not consider yet ecological sustainability due to their limited knowledge of industrial ecology. Although most of the Pollution Control Officers are not that informed about industrial ecology and life cycle assessment, they are willing to disclose their data on volume of ground freshwater consumption and wastewater discharge. There are locators who have pre-treatment process due to their high quality requirements of water and they just discharge this pre-treated water directly to the Centralized Sewage Treatment Plant. In consonance to this, there are locators who are using water for their auxiliary operations which do not require high quality of water. Evaluation results showed that industrial ecology can be applied to selected locators so they can reduce their groundwater consumption and volume of discharged wastewater. It was identified that barriers in closing the water loop in LIIP are due to abundance of freshwater supply and its cheaper cost.

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Feasibility of sugarcane molasses as co-substrate for chicken manure anaerobic digestion

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Anaerobic digestion is mature technology to convert organic waste in biogas, a mixture between CH₄ and CO₂. Chicken manure (CM) is an attractive substrate for anaerobic digestion due to high available organic matter mainly composed by proteins. When proteins degrade anaerobically produce ammonia that in excess decrees yields of the process. Process inhibition is mitigated by co digestion of CM with carbon-rich organic waste. Anaerobic co digestion (AcoD) improves nutrient balance represented in better C/N ratio. Thus, it is important to choose a blend ration with synergisms effect since improvements in methane production is mainly a result of increasing in organic loading rate. This study evaluated the feasibility of sugarcane molasses (SCM) as a co-substrate for anaerobic digestion (AD) of chicken manure (CM). Different CM to SCM ratios (1:0, 3:1, 1:1, 1:3 and 0:1 on volatile solid basis) were evaluated through biomethane potential assays (BMP) (39°C). 95% confidence regions (biodegradability vs. hydrolysis kinetic) were determined for a statistical comparison between BMPs. Total reducing sugar, total volatile fatty acids, total ammonia nitrogen, pH and alkalinity were also analyzed as response variables of process performance. Interactions between substrates were evaluated by increment on degradation extent and rate of the both substrates. According to results, all mixtures showed a synergistic effect. The highest methane yield of 0.54 m³ CH₄/kg VS was observed with CM to SCM ratio of 1:3. It is concluded SCM is a promising co-substrate to foster CM anaerobic digestion.

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