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Anaerobic Co-Digestion of Wastewater Activated Sludge with Rice Straw and Cow Manure

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With expansion in the fields of renewable energy sources, generating power from the anaerobic digestion (for some environmentally harmful substances) is a promising trend. Thus, we could treat more than one problem at the same time (cheaper energy and pollution reduction) by utilizing harmful substances like: activated sludge (AS), cow manure (CM), and rice straw (RS).

An investigation was carried out to study the effect of mixing AS with RS/CM on the volume of biogas released. RS was shredded into 2 cm length and mixed with AS in reactors. The mixing ratio was 6% RS/CM to AS based on weight. A reactor model, that contained AS only, was operated as a control (reference) unit and known as "AS model". Other two reactors were operated by mixing AS with RS (ASRS model) and AS with CM (ASCM model). The three reactors were in anaerobic conditions and mesophilic digestion at 35°C with mixing. It was found from this research that the biogas produced from AS alone was very little due to its very low carbon-to-nitrogen (C/N) ratio. Meanwhile, the co-digestion of AS with CM improved biogas production with a little percentage as C/N ratio increased by a little percentage in case of ASCM model. On the other hand, ASRS model increased significantly the amount of biogas released in comparison to AS alone because of the high C/N ratio of RS that balances the ratio needed to anaerobic digestion in ASRS model.