BIO METHANATION AND COMPOSTING FOR MANAGING SUGAR PROCESSING WASTE

By

W.K. HIROMI ARIYARATNE

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DECLARATION

"I certify that this thesis does not incorporate without acknowledge any material previously submitted for a degree or diploma in any university or higher educational institution in Sri Lanka or abroad and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where due reference is made in the text".

UOM Verified Signature

W.K.H. Ariyaratne

UOM Verified Signature

Co Supervisor

UOM Verified Signature

Co-supervisor.

ABSTRACT

In Sri Lanka, two integrated sugar cane based sugar plants cum distilleries are running with satisfying around 12% sugar requirement of the country. As the other countries, we are also facing the waste disposal problem of sugar and distillery waste. At present, few of the wastes generated in the plant are being used by the factory it self as material or energy source, but still some wastes are released to the environment with out any proper treatment.

The major objective of this research is to find out the potential of in vessel high rate composting of sugar press mud along with maximum contribution of spent wash and other wastes generated in an integrated sugar plant cum distillery. The major draw back of high rate composting is high energy requirement and it is expected to satisfy through biomethanation of spent wash.

A series of experiments were carried out in a 210 L compost unit to determine possible feedstock composition for in vessel composting. By in-vessel high-rate method, the composting period could be dramatically brought down to about 12 Press mud: spent wash ratio of 18:1 (spent wash added initially) appeared to be best composition for in vessel high rate composting. However, 9:1 ratio could be achieved if spent wash is applied after reaching the highest temperature in the However 183 T of annual nitrogen supply could be achieved through production compost.

Also a series of experiments were carried out to observe biomethanation potential of distillery spent wash. All the experiments were carried out in specially designed laboratory scale apparatus. It was calculated that energy needed to achieve above rates of composting could be easily achieved by simple, single-stage batch type bio-methanation without mixing. 65-70% COD reduction and 9.4 m^3/m^3 feed to specific gas production could be obtained, by this method with optimum conditions.

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