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Study of Implementation of Biogas Production in the Fruits and Vegetables Wholesale CEASA-GO, Goiás, Brazil

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Abstract

The Brazilian state owned central distribution centres for fruits and vegetables were created in the sixties and implemented in the state of Goiás in 1975 to attend regional, mostly family owned producers and clients. The goals of this work were to study composition, quantities and disposal of solid residues generated at CEASA-GO along one year, observing seasonal changes, among costs involved in transport and deposit of these, as well as electric energy consumption on place. It was evaluated the monthly potential of the generation of electric and thermal energy from biogas produced from these residues, as well as the use of the generated digestate from biogas fermentation as fertiliser. Systematic bibliographic research, data collection by interviews raising numbers of individual residues sorted by type, like e.g. pineapple or tomato, along a one year period was combined with the biogas potential of these substrates. The biogas potential for special substrates, like the Cerrado fruit "Pequi" (Caryocar brasiliense), where no literature data were available have been determined in the biogas lab by batch experiments with an automated AMPTS-II system, BioProcessControl, Sweden. Transformation of the biogas to energy was simulated and compared to the own consumption. Based on complete data of 2015 the results show the possibility to supply all electric energy consumed by CEASA of over 500 kW by biogas generation from a part of more than 90,000 tons of organic residues remaining annually. A relatively fast return of investment by the reduction of costs for electric energy (approximately 80,000 € per month), reduction of waste transport and deposit costs, and potential gains by selling the generated fertiliser, is expected. Environmental gains could be predicted by avoiding greenhouse gas emissions from deposits on landfills, reduction of transport impacts, raising use of renewable energy and production of organic fertilisers. This could provide an example for the state wholesales of all 26 Brazilian states.

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