

Slaughterhouse Waste Management with Biogas Technology

Background

With rapid population growth, the demand for meat, a primary source of protein, is ever-increasing in Bangladesh. Hundreds of formal and informal slaughterhouses are attempting to provide the supply, but in a largely haphazard manner. There are many unauthorised self-made abattoirs outside of municipality run slaughtering facilities. In these establishments, butchers slaughter and dress cattle, sheep and goats in a disorganised and often unhygienic process.

Through a series of steps (such as receiving and resting livestock, slaughtering, removing skin, dressing of animal, removal and cleaning of stomach content and unwanted flesh and fats, transporting of processed materials etc), slaughterhouses produce large amounts solid and liquid waste. Direct disposal of highly polluted wastewater and organic residues into the drains, low lands or sewerage system without prior treatment results in environmental and ecological problems and threaten clogging the wastewater drainage systems.

Our Approach

Producing biogas from slaughterhouse waste could potentially be an environment friendly solution to this issue. This will result in two-fold benefits, not only will it reduce potential health and environment hazards caused by irresponsible dumping of the slaughterhouse waste, the produced biogas can also be used for cooking or for power generation.

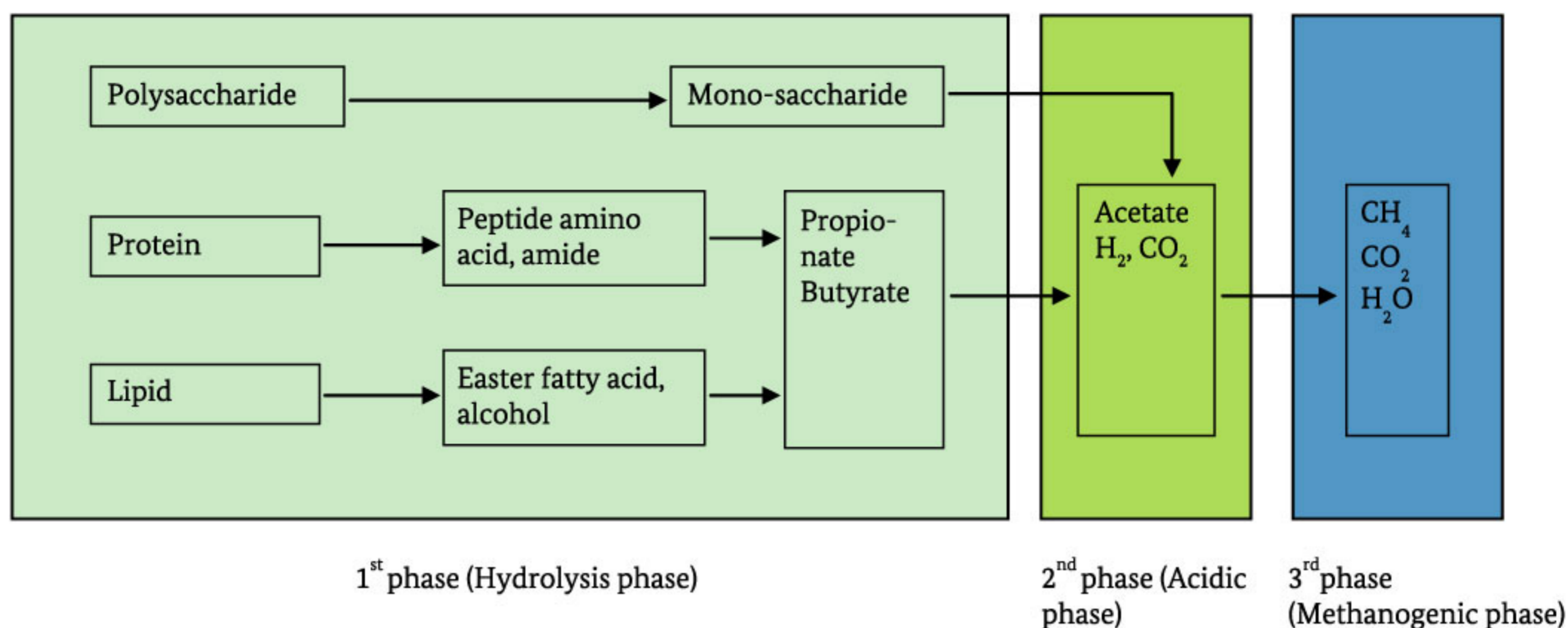
Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ), and together with the Sustainable and Renewable Energy Development Authority (SREDA) of the Ministry of Power, Energy and Mineral Resources (MPEMR) of the Bangladesh Government, is implementing the Renewable Energy and Energy Efficiency Programme (REEEP). The programme has aimed to disseminate renewable energy based technologies that are suitable for the context of Bangladesh. With 88.2% of the population dependent on solid fuels for domestic cooking, utilising the slaughterhouse waste to produce biogas can support in addressing the nation's energy shortage.

Urban centres, where there is a high and steady demand of meat, can potentially be ideal locations for slaughterhouse based biogas production. GIZ, in collaboration with the Local Government Engineering Department (LGED) constructed a slaughterhouse waste based biogas plant in Gazipur in 2011. A Financing Agreement has been signed between LGED and GIZ to implement composite demonstration models of slaughterhouses with biogas plants at Shaheb Bazar area of Rajshahi City Corporation (RCC) and Tongi area of Gazipur City Corporation (GCC). GIZ has signed two separate MoUs with RCC & GCC. Under these MoUs GIZ is providing technical assistance for the implementation of composite demonstration models of slaughterhouse with biogas plant.

Under this proposed model, the waste produced from the slaughterhouse will be fed into an anaerobic biogas digester to produce biogas. Biogas mainly consists of methane (about 55-70% content) and carbon dioxide (about 30-45% content). It is converted from organic waste by microbes. The process of conversion has three phases, i.e., the hydrolysis phase, acidic phase and methanogenic phase respectively.

The bio-slurry will be dehydrated to produce organic fertilizer. The produced biogas will be supplied to selected households/restaurants/student hostels through gas pipelines and the organic fertilizer will be sold to companies who have the license to sell organic fertilizer to farmers. Slaughterhouse waste management business offers three value propositions. It supplies biogas, provides quality compost and delivers waste management service for improved local environment.

At Tongi, the renovation work of slaughterhouse, biogas plant and sand bed filter for dehydrating liquid bio-slurry has been completed. Every day the waste is being charged to an anaerobic digester. The composite model is running on a test basis. Initially 8 households have been connected with the biogas plant through the pipeline with provision for extension to more households in the future. After completion of the test run the business model will be finalised and handed over to GCC authority.



Currently 10 to 15 cows are slaughtered at Tongi slaughterhouse every day. Around 30 to 35 more cows are slaughtered outside the slaughterhouse, beside the road, on the river bank, and near the local market. Efforts are being taken by the City Corporation to streamline the system. GCC plans to enforce a law to ensure that animals are slaughtered inside the slaughterhouse. Therefore, it is estimated that at least 30 cows will be slaughtered at Tongi slaughterhouse every day.

At Rajshahi, The design layout for modification and upgradation of the existing slaughterhouse at Shaheb Bazar area to convert it to a semi-modern slaughterhouse with proper waste management through biogas technology has been finalised. RCC authority has approved the proposal, the construction work will start within November 2017.

Department of Animal Husbandry and Veterinary Science, University of Rajshahi is the knowledge partner of this initiative. Waste Concern Consultants, a leading consultancy firm that provides consulting services including waste management, resource recovery and composting of organic waste, has been assigned for research on dehydrating liquid bio-slurry.

The Way Forward

Although generating biogas from slaughterhouse waste is a relatively new concept in Bangladesh, successful implementation of the initiative at Tongi, Gazipur and Shaheb Bazar, Rajshahi can set an example of how we can transform our slaughterhouses into valuable sources of clean energy and fertilizer. The objective of the showcase project is to garner valuable lessons learnt from implementing the initiative, and to set up a feasible business model, so that a path is paved for replicating the model in other municipalities of the country.

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Registered offices Bonn and Eschborn, Germany
Renewable Energy and Energy Efficiency Programme
PO Box 6091, Gulshan 1
Dhaka 1212, Bangladesh
T + 880 2 5506 8746-52
F + 880 2 5506 8753
giz-bangladesh@giz.de
www.giz.de/bangladesh

Author M. F. Shadikul Islam Talukdar
Layout Ananya Rubayat
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Addresses of the BMZ offices

BMZ Bonn Dahlmannstraße 4 53113 Bonn, Germany T +49 (0) 228 99 535-0 F +49 (0) 228 99 535-3500	BMZ Berlin Stresemannstraße 94 10963 Berlin, Germany T +49 (0) 30 18 535-0 F +49 (0) 30 18 535-2501
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poststelle@bmz.bund.de
www.bmz.de

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