

Session 2 Q&A

GMI Biogas Subcommittee Training Series: Best Practices for Landfill and Organic Waste Management

1. **Rizwan Jabbar:** How much percentage of residual remains in Anaerobic Digestion plant? percentage of input waste?

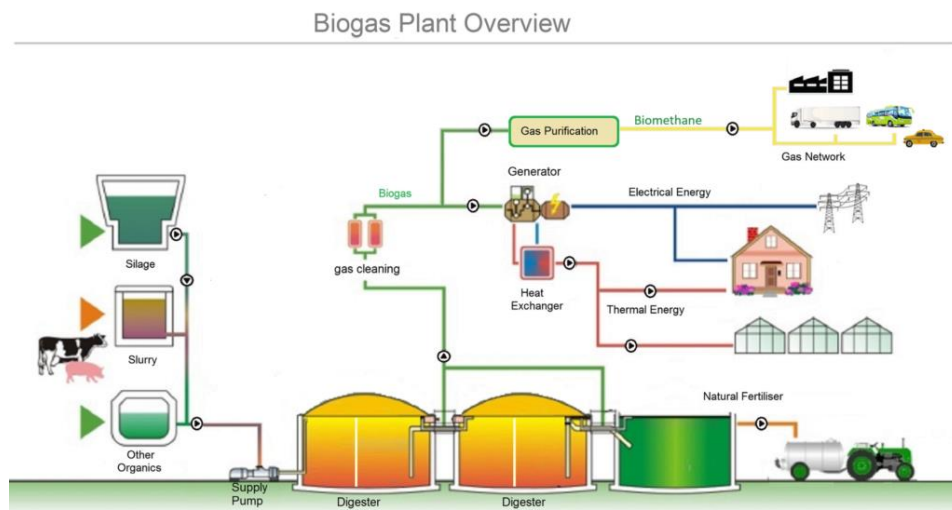
Response: This is very dependent on material type. Material with more inert matter will not be reduced as much as materials like food processing waste or more pure forms of substrate. Typical organic volume reduction can range from 40-80%.

2. **CEO BWMC:** Can we compare the nutritional value of digestate and compost? prepared from same kind of waste?

Response: Yes, has been done. Here is a [link](#) to a paper on the differences between the two.

3. **Rizwan Jabbar:** Can we get the schematic diagram of Anaerobic Digestion Plant? Inter processing??

Response:



4. **CEO BWMC:** How much time is required to complete the Anaerobic digestion process under normal conditions?

Response: The process is continuous, so generally material is always going in and coming out. The reactor itself is designed to circulate the material for 15-22 days.

5. **CEO BWMC:** What should be the preferred method of dumping waste on sanitary landfills? In baled form tightly stripped or in open and loose form? Please advise.

Response: In the US, mostly open and loose form is used

6. **Rizwan Jabbar:** What percentage of wastewater sludge can be used as input waste for anaerobic plant?

Response: Most municipal-run anaerobic digestion systems are designed to take all the wastewater sludge, the material settled from the clarifiers during wastewater treatment.

7. **CEO BWMC:** Microbes required to complete all stages of Anaerobic digestion process will be generated automatically in waste or to be added externally by operators?

Response: Generated naturally as a function of their own cell division.

8. **Rizwan Jabbar:** What is the total duration of this process? how many weeks to produce gas?

Response: Starting an anaerobic digester can take months to the better part of a year to finally reach “steady state” conditions. This will depend on the amount of inoculum used to “seed” the system. Once the system is running, it will be producing methane every second of every day as long as it’s maintained.

9. **CEO BWMC:** Which option of anaerobic digestion dry or wet will have more biogas production from same kind of feedstock? Which option is more productive one?

Response: Wet digestion is much more common because of its reliability and robust nature.

10. **Imtiaz:** can only fresh farm manure be used for AD or old waste used?

Response: Old waste can be used, but the older it is the less valuable organic material is left. As the material sits, it continues to degrade, and the volatile organic compounds eventually evaporate. If it sits outside, more debris and inert material like sand and dirt can get mixed with it.

11. **Aamir:** From an economic point of view, is LFG utilization as energy financially sustainable model or environmentally friendly?

Response: In the US, LFG to energy has had lots of financial success for many projects and is seen by experts as an environmental improvement over flaring methane.

12. **Aamir:** can slaughterhouse waste used with animal manure in AD plant ?

Response: Yes, this is done. Not all waste material can be processed, but the wastewater from the process and certain biodegradable wastes are processed via AD.

13. **Syed Osama Faheem Rizvee:** For waste from fruit and vegetable markets and green waste.. which type of composting technique will you recommend? vermicomposting or aerated stockpile?

Response: For waste from fruit and vegetable markets and green waste, vermicomposting is often recommended. Presence of worms accelerates decomposition and produces higher quality compost. However, if you're dealing with large quantities and have space, aerated static pile can also be effective, since it's easier to manage larger volumes. Ultimately, the choice depends on your scale, available space, and desired compost quality.

14. Syed Osama Faheem Rizvee: Is there any possibility of leachate going into gas collection system?? as gas collection system and leachate is also in between the waste.

Response: No. The design would prohibit it, along with moisture “knock-out” systems inline before reaching gas processing equipment.

15. Rizwan Jabbar: What are the maintenance cost for Black soldier fly to other technologies and on what scale it can be used?

Response: Maintenance costs varies based on scale, technology and labor. BSFL is getting implemented at large scales now. There’s a new BSFL based plant in Europe that can process 100 tons of organic waste per day.

16. CEO BWMC: We are already using BSF larvae for composting but we are unable to market BSF? it is a challenge of marketing

Response: I would recommend converting BSFL into sustainable pet food and market it as organic and sustainable pet food. Another marketing strategy could be creating awareness about the quality of BSFL based animal feed.

17. Aamir: bsfl is best idea....larvae and compost both can be used....how much bsf larvae economic market as protein ?

Response: According to “Geography - Global Forecast to 2033” the black soldier fly market is projected to reach \$3.96 billion by 2033

18. Tayyaba Akhtar: How does vermicomposting compare with other composting methods in terms of efficiency and environmental impact?

Response: Vermi composting is a bit slower than some of the composting techniques. Also proper management of worms is also needed since they can attract pathogens.

19. Tayyaba Akhtar: What infrastructure is required to establish a large-scale vermicomposting facility?

Response: Suitable site, waste sorting area, waste storing area, vermicomposting bins, harvesting area, storage area for worms, equipment to screen worms from compost and water & electricity supply.

20. Tayyaba Akhtar: What are the potential regulatory or health concerns associated with vermicomposting in densely populated areas?

Response: regulatory concerns can vary from city to city and province to province. Some of the health concerns include worms attract pests and pathogens and water runoff.

21. Imtiaz: What is the ideal composition of waste in AD plant for maximum yield?

Response: The ideal mixture is a combination of protein, carbohydrates, fats and oils. In theory, more protein and oil rich material can produce high concentrations of methane, but there are also toxicity limitations for fats. In addition to the composition, micronutrient additions can be critical to consistently producing high yields of methane.

22. Syed Osama Faheem Rizvee: Please comment on Cation Exchange capacity of compost and how to improve it?

Response: It can be improved by the use of high-quality organic materials like manure, kitchen scraps, or green plant material and by the addition of Biochar's, clay minerals or zeolite (a type of mineral with high CEC).

23. Dr. M. Mahboob Alam: What is the ideal summer and winter temperature for composting process?

Response: Composting thrives at 55 to 70C.

24. Rizwan Jabbar: Can someone from panel brief on Bioreactor Landfill sites where organic waste can be converted to Landfill gas in a more rapid manner? what could be the benefits of this type of Landfill as compared to traditional landfill in terms if sustainability?

Response: Bioreactor landfills did not really take off in US because of many technical challenges including physical instability of waste mass due to added moisture.

25. Waqas Ahmed: If incoming food waste is not 100 percent pure. some shopping bags or other materials is included. then how much it effects the composting process?

Response: It will reduce the quality of compost, it can also cause anaerobic spots in the piles, it can clog the pipes in ASP.

26. Terry Cho: What's the average maturation period of composting for food waste from household?

Response: Maturation period ranges from a few weeks to few months based on composting techniques.