

METHANE POTENTIAL ASSAY

Gold miners assay rocks to determine the wealth hidden within. Gas drillers survey the depths before boring test holes. Before any significant investment, investigations are made to gather information permitting a projection of how the investment is to perform.

AVAILABLE: Simple inexpensive test to predict methane production of a waste. Interested?

Peak into the future Testing the raw material will permit a better understanding of what the raw material will yield.

Not all manure and organic waste are created equal Bacteria produce most of the methane contained in

digester biogas, acting on only certain compounds. Water is not a good methane producer. Gravel is not a good methane producer. Biogas production potential is usually viewed as a function of the quantity of volatile solids in the waste, which can be degraded by microorganisms. While this is a rough approximation, consideration has to be given to the source of the volatile solids. Some woody products are better producers of methane than others. Very thick manure that barely flows, with large quantities of eucalyptus sawdust, will produce very little methane. Other hardwood sawdust, paper or chopped straw beddings are far superior methane producers. Food processing plant piping system flush water will produce large quantities of methane. Oils and fats in small quantities are superb methane producers; in larger quantities, however, fats, oils and greases suppress methane. Certain chemicals inhibit methane production.

The greater the thickness of the manure or organic waste, the greater the methane production potential.

- Right
 Wrong

“A lot” of methane rich biogas means different things

A gallon of each of these wastes could produce this amount of biogas:

Waste	Biogas, Cubic foot
Hog manure	3
Dairy cow	4
Milk	7
Cooking Oil	>100

How the waste is managed can potentially have great impact on the actual outputs. The “bang” in a biogas buck is a function of the methane content. Biogas from some wastes will contain 80% methane, while other wastes will result in 50% methane.

The Best Methane Production Indicator: “Go for it” Full SCALE

Operating a full-scale system is the best indicator of how a digester is to perform with a certain waste or waste mix. Almost always, this would be regarded as a poor business practice unless there is a reasonably good indication of the anticipated digestibility of the waste. Few owners, investors or clients will engage in a project without sound output projections.

Projecting the Methane Production Potential

Laboratory determination of waste volatile solids concentrations will permit a rough

**Are volatile solids
democratic?**

Yes

No

approximation of methane production potential. Unfortunately, a pound of volatile solids in a pencil is not the same as a pound of volatile solids in a carton of cottage cheese. Volatile solids based gas prediction techniques are only as good as the experience the engineer has had with that particular type of waste, in that particular mix.

An engineer inexperienced with a particular waste or waste combination will likely find gas yields are at levels different than anticipated. Sewage treatment plant volatile solids biologically degrade at a rate and level considerably different from the rate and level of some food processing wastes. High fiber aged cattle feedlot manure, though still containing volatile solids, will biologically breakdown at a much different rate and level.

Though rules of thumb may apply, all volatile solids are not created equal.

Assay Waste for Methane Potential

By far the better approach to projecting methane to be expected from a certain waste or mix of wastes is to secure “real numbers” by permitting bacteria to digest that waste or mix of wastes.

Pilot Scale Testing: Usually constructed at 5% or more the scale of the anticipated future installation, pilot scale systems are quite expensive to build and operate. Results are reliable.

Large Laboratory Scale Testing: Operating lab scale digesters provide good approximation of waste degradation performance. Typically the test will last three months once the digester is acclimated to the waste stream. Daily small digesters are fed, system performance readings taken. The procedure is fairly expensive.

Small Scale Laboratory Testing: Reasonably good test results are possible by one time introduction of the waste into small heated laboratory vials. Periodically, over 30 to 45 days, gas production is measured and analyzed. At the end of the test period, methane production is illustrated on a simple graph. Engineers will have a basis for projecting methane yield from the anticipated waste stream. Financial analysis is possible. Cost of this approach is reasonable.

**Predicting
methane
production in
30-45 days**

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