

[Stoves] Dissemination - What's the Score?

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Peter,

Before we get all "frothy" over the biogas issue and start handing out Nobel

Peace Prizes, we need to get down to the biochemistry of biogas.

As I had told you in other emails, biogas has been around for thousands of years and is in widespread use around the world in most rural temperate or tropical climates. It is a great method of reducing the energy content of manure wastes especially in confined areas. The process depends upon the ability to dissolve starches and sugars in a water solution because the microbes do not have any teeth to chew solids. They glean their livelihood from "organic soup".

You can try to dissolve a tree by putting it in water and still have almost a complete tree left in six months. If you puree flour in water, it dissolves almost instantly into "organic soup" and the microbes can begin to digest it. The key to measuring how fast and how much gas you will get from a feedstock is to look at the % Volatile Solids because that is an estimate

of the part which can be dissolved in water as food for the microbes to eat.

You want to use feedstocks which have a high volatile solids content and dissolve quickly to have an economical anaerobic process. Nature did not have any problem producing natural gas from wood because it had alot of time to do it in. We seem not to have that advantage. To speed up the dissolution of the solid, use small particles or thin sheets of the feedstocks and raise the temperature to improve the solubility rate. Bagass is not the best feedstock for methane production because it has low volatile solids and it takes a very long time to dissolve in water. It will work but the storage volume for the dissolution will be very high and the methane production rate will be quite low. Flour, on the other hand, meets our need for speed and can be economic.

Any soluble feedstock (sugar, starch, cellulose, etc) will decompose by microbial action when dissolved in water and a broadband source of microbes from a source such as manure is added. The most efficient microbe species for that food source, temperature, pH, dissolved salt, etc will become dominant and they will produce a specific range of digestion products.

Sugars are a special feedstock for this decomposition and the process is called fermentation - used to make beer. To prevent the competition between microbes, only select yeasts are fed into the sugary beer wort in an effort to make a pure, tasty brew. IF you added manure to the cane juice, you would get a wide range of products which could include methane and some alcohol (but not alot) and a not-so-tasty beverage. The controlled

fermentation process, where cleanliness, the introduction of a select yeast and minimum of contaminants is paramount, is a special subset to anaerobic decomposition and it produces a drinkable product. DO NOT DRINK THE PRODUCT OF A MANURE BASED FERMENTATION! Sorry, I got carried away there - I must be watching too much FEAR FACTOR on TV. :-)

The question is - which product has the most value in the society you live in when it comes to the proper process for cane juice - beer or methane.

I was waiting for Tom Miles to enter the foray since I believe he is the moderator on the biogas listserve as well. I had to act as a humble substitute.

----- Original Message -----

From: "Peter Singfield" <snkm at btl.net>

To: <STOVES at listserv.repp.org>

Sent: Sunday, October 17, 2004 8:41 AM

Subject: Re: [Stoves] Dissemination - What's the Score?

>
> *Dear AD;*
>
> *Regarding:*
>
> *"compact biogas digester"*
>
> *and this line:*
>
> *>With feedstock containing starch or sugar, they work very*
> *efficiently*
>
> *How well would raw sugar cane juice work? Would it need to be*
> *concentrated*

> further (easy to achieve) or diluted more?
>
> As sugar cane abounds in my area and is freely available (for such small
> amounts as would be required for home cooking purposes) I can imagine many
> that would be interested in acquiring your "compact biogas digester".
>
> In the past I have ordered numerous items from India (including the small
> cane crusher I operate now) and found no problems in arranging payments or
> receiving goods -- though it takes an average of 6 to 10 months to
> complete a transaction.
>
> Still -- we could do an honorable technology exchange and pay a reasonable
> royalty for every unit made here in Belize -- under your guidance.
>
> This guidance could be accomplished through Email only.
>
> You might even consider opening a small company here in Belize for
> manufacturing for central American market -- specializing on just a cane
> juice fed "compact biogas digester"
>
> All of the above could be arranged economically in time and costs by internet.
>
> Further -- we have many late arrivals -- now Belizean Citizens -- most of
> these merchants with much family still in India -- all could be arranged
> through people such as this as well.
>
> The operate shops here selling items imported mostly from China and India.
>
> But it would "cost" to do such -- simpler to deal direct -- if possible.
>
> Peter Singfield

>
> Belize, Central america
>
>
> At 07:52 AM 10/17/2004 +0530, adkarve wrote:
> >Dear Tom,
> >here's a gist of the progress achieved so far by ARTI.
> >In January 2003 we launched, under sponsorship of Shell Foundation,
London,
> >a programme called Commercialisation of Improved Biomass Fuels and
Cooking
> >Devices in India. Two Phases of the programme, namely test
marketing and
> >training of potential entrepreneurs, are over. Because it requires
dry
> >weather both for charcoal making and also for drying the clay
cookstoves,
> >the commercial production and sale of our fuels and cooking
devices would
> >begin earnestly now, after the end of the monsoon. Till date our
trained
> >entrepreneurs have sold slightly more than 20,000 stoves. The
charcoal,
made
> >from sugarcane leaves and other agricultural waste, is in such big
demand,
> >that we cannot produce enough of it. The target set for this
project is
that
> >by the end of the year 2005, we should have at least 100 trained
> >entrepreneurs in the field, and each of them should have sold
cookstoves
to
> >at least 1000 families. Our field staff are of the opinion that the
> >programme would achieve double the target.
> >Our compact biogas digester is still in the prototype stage. It
works on
> >feedstock having a physiologically high calorie content. The
conventional
> >models use feedstock such as dung, distillery waste or other
organic
wastes,
> >which do not have much of a nutritional value as far as the

bacteria are

> >concerned. So naturally the bacteria are reluctant to work for you. With

> >feedstock containing starch or sugar, they work very efficiently. While a

> >ton of the conventional feedstock yields only 10 kg of methane, a ton of

> >our feedstock yields 250 kg of methane, with the result that our biogas

> >system is 25 times as efficient as the conventional one as far as quantity

> >of feedstock is concerned and 40 times as efficient as far as the time is

> >concerned. We could thus reduce the size, and therefore, the price of a

> >biogas digester. About 100 such biogas plants are already in operation in

> >the state of Maharashtra, India.. After having failed to get the Rolex

award

> >for this discovery, we submitted a project proposal to The United States

> >Environmental Protection Agency for funding the work of standardisation

and

> >dissemination of this biogas system in India. I have just received the

long

> >awaited communication from USEPA that the contract papers of the grant

have

> >been sent to us for our signature. Incidentally, the USEPA are providing

us

> >with more money than the amount that we were expecting from Rolex Award.

> >Yours

> >Dr.A.D.Karve, President,

> >Appropriate Rural Technology Institute,

> >Pune, India.

>

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> Stoves mailing list

> [Stoves at listserv.repp.org](mailto:Stoves@listserv.repp.org)
> <http://listserv.repp.org/mailman/listinfo/stoves>
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