

## Windmill-Driven ATAD Autothermal, Thermophilic Aerobic Digester for increased pathogen removal (Southern Illinois University, USA)

Posted by blackburn - 04 Feb 2013 21:25

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Dear all,

And now is a a good time to &quot;officially&quot; provide you with more information about my grant and the results:

**Title of grant:** Decentralized Next Generation Sanitation for Diarrheal Pathogens

**Subtitle (more descriptive title):** Windmill-Driven ATAD (Autothermal, Thermophilic Aerobic Digester) for increased pathogen removal

**Name of lead organization:** Southern Illinois University

**Primary contact at lead organization:** James (Jim) Blackburn

**Grantee location:** Carbondale, Illinois, USA

**A developing country where the research can be tested:** Initially a second run in Carbondale as soon as we can build some new equipment , then choose and understand the individuals, eventually apply to the BMGF target populations globally.

**Start and end date:** 5-2010 to 12-2012.

**Short description of the project:** The goal of this project is to test an air-pumping windmill sanitation system using normal, existing flush toilets in actual variable weather conditions for its ability to raise and maintain temperatures in an insulated container for the removal of pathogens in human waste.

**Goal(s):**

- Develop a community sanitation system where pathogens are completely removed and having no outside power, water, chemicals, very low maintenance, flushing with pathogen free recycled reactor product, also ideal for irrigation, environ-compliance and only useful products generated.
- Establish that reactor temperatures are stable for at least 5 days when the wind is calm.
- Demonstrate that deep pathogen removal occurs at a high percentage of time at correct temperatures and time.
- Determine weather profiles.

**Funding for this research currently ongoing:** no

**Research or implementation partners:** We tried ineffectively to work with two excellent scientists in Argentina to begin the process of using infective organisms specific to Some on Gate's list. We could not work out the &quot;business&quot; arrangements between institutions.

**Contacts, links, further readings:**

Final report:

[susana.org/lang-en/library/library?view=...p;type=2&id=1708](http://susana.org/lang-en/library/library?view=...p;type=2&id=1708)

Am happy to field any questions you may have and will enjoy hearing about comments and advice.

Regards,

Jim

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**Re: Windmill-driven ATADS**

Posted by arno - 19 Dec 2012 13:13

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*(note: an earlier long discussion on this project took place here on the forum: [forum.susana.org/forum/categories/105-hi...indmill-driven-atads](http://forum.susana.org/forum/categories/105-hi...indmill-driven-atads)*

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Just to make sure people understand what &quot;autothermal thermophilic aerobic digestion&quot;

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is- there is another maybe more common term for this - and that is &quot;

**wet composting**

&quot;. The whole trick in composting in wet systems is addition of air. This is because water contains very little oxygen and the rule of thumb is that air contains 10000 times the concentration of oxygen than what water can hold. So to keep the wet systems from going anaerobic, air needs to be added. The great thing about the wind-mill driven system is that it doesn't need to depend on fossil fuels or grid electricity sources. So it can be a stand alone system that can reduce and eliminate pathogen and provide fertiliser. These systems can be used to treat manure from farm animals as well as humanure. Wet composting means that waterborne sewage systems can be used (ideally however low-water systems like vacuum toilets) and that the resulting product is ready for use as a very safe fertiliser.

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**Re: Windmill-driven ATADS**

Posted by blackburn - 01 Feb 2013 16:38

Thank you Christof.

I am also wary of the equivalent COD we calculated. Data were used from several international sources, but I could find none on the target population. This might be a very site-specific value as well. We will proceed, but hopefully we may be able to adjust the results up or down when we find more reliable information.

On the second thought. There must be a separator to make pathogen-free water and solids. We have assigned that as an issue after we make some progress on the reactor. We will be largely reducing COD (Solids) in the system, so checking for the ability to process this stream to higher grades, even maybe potable, seems like a &quot;natural&quot;. Regards, Jim

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**Re: Windmill-driven ATADS**

Posted by blackburn - 05 Feb 2013 15:31

By the way, a colleague has a catalyst for ammonia and virtually all the organics that might be there. It would increase the expense, but it exists and is useful when the source is a point source. Regards, Jim

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