

Manure Based Composite Could Build Homes of the Future

There's no avoiding the endless number of jokes that could be made about a house made using, uh, manure. But it's no laughing matter – Michigan State University (MSU) Extension educator Charles Gould is onto an idea that may help farmers handle waste, provide them with a new source of income and offer new, environmentally friendly products to the construction industry.

Gould has a vision for new lines of composite materials that use a combination of plastic and manure fibers, instead of the wood that comprises current fiberboard and other building supplies, to develop products for use in the construction of everything from playground equipment to homes.

It starts with a herd of cows. Lots of cows, actually. There are more than 40,000 dairy cattle in Allegan, Ottawa and Kent counties, where rapid housing development has limited the acres available for manure application.

Farmers looking for alternatives to land application can choose to compost manure. Composting reduces its volume, makes it a more stable fertilizer source and eliminates odor. Another option is to use an anaerobic digester, which breaks manure solids down into a sterile organic fibrous material and captures methane gas that can be used to produce electricity for the farm or sold to utility companies.

Gould read an article about how Iowa State University's biological composites lab successfully combined the fibrous material from a digester with plastic to create composite materials. He immediately saw the possibilities for western Michigan and contacted the lab director to request a visit and more information.

"They were gracious enough to show me what they were doing, and I thought, 'We can do this

at MSU,'" Gould says. "I went to Laurent Matuana, an associate professor in the MSU Department of Forestry, who happened to know the researchers at Iowa State, and we developed a project proposal together."

The two submitted the proposal to the Michigan Biomass Energy Program. They received a small community education grant to hire undergraduate student Alex Cook to develop two prototype products: a digester fiber/plastic composite product that could be used as decking and a medium-density fiberboard. The two products were tested and compared to similar products made using wood fiber. The products made with fiber from a digester passed with flying colors, meeting or exceeding industry standards for properties such as strength, stiffness and internal bond.

The digester fiber/plastic decking product performed better in tests against similar decking products made with wood/plastic. When two composite types were compared, the digester fiber/plastic decking product had properties that were superior to those of the wood product, including a darker color which potentially could be more resistant to UV rays.

During the production process, the fibers intertwine and increase the strength of resulting composites. This offers an advantage in areas such as load-bearing capacity or material strength.

"The properties of the medium-density fiberboard met or exceeded standard requirements," says Matuana. "We have shown that value-added products can be successfully manufactured from digester fibers.

"Everything being equal," Matuana concludes, "the digester fibers are giving us much better properties than wood."

There are numerous possibilities for construction materials con-



Laurent Matuana, MSU associate professor of forestry, shows a few of the prototype composite building products his lab has produced.

taining the digester fibers. Because the chemicals used in the production of pressure-treated wood have been shown to be harmful to human health, the U.S. Environmental Protection Agency has outlawed use of pressure-treated wood in playground equipment. Fiber/plastic "lumber" could take its place. Other uses might include products for siding, furniture or lakefront seawalls.

Gould has already approached managers at two western Michigan home improvement retail chains to ascertain their feelings about carrying digester fiber/plastic decking or medium-density fiberboard made with the fibrous material from a digester.

"They indicated a willingness to purchase the product even though it was made out of fiber once found in manure because they perceived the products to be green," he says. The most common question asked was about odor. Neither the fiber/plastic decking nor the medium-density fiberboard emits an odor.

So when will your contractor be showing up at your door to build a fiber/plastic backyard deck? As in most cases, the answers are tied to questions of time and money.

"We do not foresee any problems pounding holes or drilling into it at this point, but that's one thing that still needs to be tested," Gould says, "and we need to find more money to do that."

Matuana concurs. "There's still a lot to be done. Properties related to nailability, screwability and humidity have not been investigated,"

he points out.

Gould and Matuana are planning to submit another funding proposal to the Michigan Biomass Energy Program and are looking to other funding sources, both through grants and the private sector. They also need to begin work on marketing plans.

Though the field of new, environmentally friendly materials could have positive economic impacts on the construction, nursery and possibly even the forestry industries, Gould is still thinking about the pos-

sibilities for his primary audience – farms and rural communities.

"There is a limited land base for manure application. Keeping Michigan's livestock industry strong and viable means we have to find a home for the manure generated by these farms," he says. "Why not make products from manure that benefit society, add value to the farming operation and, at the same time, fit nicely into a sustainable manure management system? At the end of the day, it's really all about sustainability."

Less Shrink

Faster, Cooler Fermentation

"Our silages always cool down quick and smell good. SilagePro works!" **Dauphin Co., PA - 80 cows**

"With only one silo, we have to feed haylage immediately. By day four it is always cool and ready to feed, I've used it for years." **Washington Co., MD - 52 cows**

1,000,000 Tons of Treated Silage

"If I have to feed new silage in four or five days, this is the only product that works." **Chambersburg Co., PA - 70 cows**

"Silages ferment and cool down fast, cows always eat the forages well." **Northampton Co., PA - 110 cows**

More Rapid Fiber Digestion

"We used it for the first time last year on ryeilage. We couldn't believe how fast it fermented. Now we treat all our haylage, ryeilage and corn silage with SilagePro." **Lancaster Co., PA - 120 cows**

"Cows must be digesting the silage well. Our DMI is over 60 lbs per head per day. Milk fat is 3.6% on 94 lbs of milk." **New Jersey - 465 cows**

SilagePro Can Make It Happen

"When my forage is on the wet side at harvest, SilagePro is the only treatment I've used that always makes it smell sweet." **Martinsburg Co., PA - 70 cows**

"Silage always turns out good with SilagePro." **Snyder Co., PA - 75 cows**



Act Now and Qualify for Rebates!

Contact Arlin Koglin to learn more about SilagePro: (989) 553 3370

SilagePro is available through MMPA Member Merchandise