Renewable Bio-Methanol From Sugar Beet Pulp

Sugar beet pulp, currently of low value to sugar beet growers and processors, could become a significant source of renewable methanol. Up to 500,000 methanol fuel cell vehicles could be powered by the pulp produced by US sugar beet refineries.

Atlantic Biomass Conversions, in conjunction with scientists at the US Agriculture Research Service, is developing a genetically enhanced bacterial process to directly convert sugar beet pulp wastes to methanol. This process would be integrated into existing sugar beet processing plants and does not require a gaseous conversion step. Furthermore, the entire bacterial conversion would be safely contained in existing bioreactor technology so the release of genetically modified organisms would be of minimal concern.

Not only would sugar beet methanol powered fuel cells provide immediate Climate Change benefits by reducing the use of non-renewable oil, but would also benefit the farm industry of North Dakota.

North Dakota annually produces 5 million tons of sugar beets on 230,000 acres. This is about 25 percent of the US output. There are three co-op processing plants in the state as well. All could be equipped to produce methanol, assuring that a large portion of the methanol income would stay local which would help stabilize the rural economy of the upper Mid-West.

The initial efforts of Atlantic Biomass and ARS researchers, funded in part by the Maryland Technology Development Corporation, are to match the methanol production genetics of Atlantic Biomass developed bacteria to the structures of sugar beet waste pulp. This will involve cutting-edge genomic techniques made possible by the dramatic technological breakthroughs of the Human Genome Project. The result will be maximized conversion efficiencies and quick production times. Later stages of development will be directed at maximizing both sugar and methanol producing content of sugar beets so that per acre yields of methanol could be raised without decreasing sugar production. Sugar beets would become true Abi-product@ crops.

The most exciting prospect of this research is that sugar beets are only a first step. The ultimate goal of the project is to adapt the methanol producing bacterial genetics to a wide range of agriculture and forest product waste streams. For instance, the international wood and pulp industry produces over 700 million tons of waste lignin per year. Converting this biomass has the potential to power up to 20 million methanol fuel cell vehicles.

When can this be ready? This is not a project for our children to undertake. This is for now. With adequate funding, prototype installations at North Dakota and other sugar beet refineries could be a reality in 3 years. America can begin the conversion to a renewable methanol/hydrogen economy right now and not wait for the Apromise@ of compressed hydrogen sometime in the next twenty years.

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