Startup using U of M tech to manufacture key industrial chemicals from renewable sources

March 7 2013

Startup Ascenix BioTechnologies will perfect and commercialize production methods to synthesize chemicals from renewable feedstocks. These chemicals, which are used to manufacture everyday items, are typically made from petroleum and often use harmful add-ins like hydrogen cyanide. The startup predicts this new bio-based process, developed by University of Minnesota researchers, will be more economical and environmentally friendly.

The core technology is poised to revolutionize production of certain chemicals, as it would require little modification to existing downstream manufacturing processes to enact. Invented by Kechun Zhang, a chemical engineering professor in the U's College of Science and Engineering, the process yields chemicals comparable in performance to those created using petroleum-based materials.

"This technology is especially attractive because Dr. Zhang has done a tremendous amount of development in the lab," says Ascenix co-founder William Faulkner. "It's advanced to the point where we're already preparing for scale-up of the technology."

Although the process could be applied to the production of biofuels and myriad chemicals, the startup's initial focus is on methylmethacrylate (MMA), a chemical used to make acrylic glass, paints and coatings, automotive parts, and electronics. Global production of the chemical is

more than 6 billion pounds per year.

"We take renewable feedstock as an input, ferment it, chemically modify it, and the output is the same chemical produced through a petrochemical process," says Faulkner. "If you were at a hockey arena and looked at a piece of glass made from petroleum, and compared it to one made through our process, it would appear the same. Plus, we're able to do it much more economically than the incumbent petroleum processes."

Because the process uses renewable feedstocks—sugars derived from corn, sugarcane, cellulosic materials, etc.—manufacturing is more environmentally friendly and the industry would no longer be subjected to the more significant price fluctuations of petroleum (as compared to the relative fluctuations of sugar inputs). Additionally, the new process bypasses the need for hazardous chemicals, like hydrogen cyanide.

"There are two problems with synthesizing MMA from petroleum: Manufacturers in the U.S. need hydrogen cyanide, which is difficult to purchase and can be dangerous to handle. This new process cuts out the cyanide completely," says Zhang. "The other issue is feedstock reliability – the petroleum byproducts the incumbent processes uses as feedstock can also be more difficult to source, depending on the macro dynamics in the petroleum industry."

Provided by University of Minnesota