

NORTH AMERICA

JOSEPH CHANG & WILL BEACHAM NEW YORK

New biochem model a game-changer

Petrochemical producers will be able to source feedstocks with ease using the Genomatica/Cargill collaboration

Bio-based technology licensing firm Genomatica's collaboration with agribusiness giant Cargill is a new business model that can change the game in bio-based chemicals, the CEO of Genomatica said on 28 October.

"If a chemical company wants to build with Genomatica technology, Cargill can provide the feedstock to that plant almost anywhere in the world," said Christophe Schilling, CEO of Genomatica, in an interview with ICIS.

US-based Genomatica focuses on technologies to produce bio-butanediol (BDO), butadiene (BD), and nylon intermediates caprolactam, adipic acid and hexamethylene diamine (HMDA). Genomatica has licensed its BDO technology to Italy's Novamont and Germany's BASF.

In July 2015, the companies announced their agreement to give chemical producers and consumers access to carbohydrate feedstocks, support services and production partnerships.

Through its deal with Genomatica, Cargill can not only supply feedstocks, but also build and operate bio-based chemical plants for chemical producers or consumers, he pointed out.

"A lot of chemical companies are interested in fermentation technologies, but may never have run the process," said Schilling.

"Cargill has expertise in carbohydrate feedstocks, and also operating fermentation plants. So you get a global footprint for feedstocks, operating excellence, and Genomatica technology in one package," he added.

The Genomatica/Cargill model allows "risks to be aligned to strengths" across the value chain, Schilling said.

While large capacities can be built using Genomatica's BDO technology, it also lends itself to smaller scale plants, he noted.

"Using our technology, when you go to smaller scale, you see much greater capital efficiencies



Schilling: venture will boost innovation to the chemicals sector

versus traditional technologies," said Schilling.

"If a consumer of BDO uses around 25,000-45,000 tonnes/year, it may not make economic sense to build a traditional capital intensive BDO plant. But a smaller scale BDO plant would take substantially less capital," he added.

Bio-based production of BDO is "very competitive, even in the current low oil price environment," said Schilling.

The largest use of BDO – around 40% – is in polytetramethylene ether glycol (PTMEG), which goes into spandex fibres, he noted. BDO is made into tetrahydrofuran (THF), which is then made into PTMEG.

C1 FOR NEXT-GENERATION

The next generation of technology for bio-chemicals production will use carbon (C1) feedstocks, according to Schilling.

Using C1 feedstocks such as methane, syngas, methanol and carbon dioxide (CO₂) may develop into an important new route for chemicals production, he said.

"We want to unlock C1 as a feedstock as today this is used for low-value products. This could be disruptive technology. We can deliver more innovation to the chemicals sector and diversify its

"We want to unlock C1 as a feedstock as today this is used for low-value products"

CHRISTOPHE SCHILLING
CEO, Genomatica

feedstock base," he said.

Genomatica is developing this technology, which is currently at a laboratory stage of development, several years away from commercialisation.

According to Schilling, a broad range of chemicals could be produced from the C1 route, including but not limited to butanediol (BDO), butadiene (BD), and nylon intermediates such as caprolactam, adipic acid and hexamethylene diamine (HMDA).

"From a risk management perspective we want to diversify the technologies we offer – this is part of our strategy."

C1 technology would broaden the feedstock slate for biotechnology-based chemicals production to include methane from municipal waste and syngas from the gasification of coal, he added.

Schilling insisted that certain biotech-based chemicals are cost-competitive even with the low oil

price. He pointed out that the cost of bio-based feedstocks such as corn and sugar have fallen in tandem with oil.

FERMENTATION PROGRESS

Meanwhile, Genomatica is moving closer to commercialising chemicals production using fermentation.

In 2016, biochemical producer Novamont is on course to start up an €85m, 30,000 tonne/year bio-BDO plant in Adria, Italy, using Genomatica's technology.

In October, Genomatica and BASF expanded their licence agreement for the production of 1,4-butanediol using bio-BDO as the feedstock. The licence allows Genomatica's technology with the capacity to produce 75,000 tonnes/year of BDO. It also added southeast Asia as a potential location for the plant, in addition to North America.

In July, Genomatica signed a collaboration agreement with agribusiness group Cargill which will allow chemical producers to gain easier access to feedstocks for the production of biochemicals.

Italy's Versalis will decide at the end of this year what to do with the bio-butadiene (BD) technology it has developed with Genomatica, the group's CEO, Daniele Ferrari said earlier in October.

The two companies launched the joint venture in April 2013.

A decision will be made to either license the technology or to start up their own production plant. Ferrari confirmed the bio-based BD project with Genomatica was progressing as planned.

"We are coming to a conclusion," Ferrari said. He added that to date, the company has obtained the first bio-based BD in lab, and the results were "promising". He also said the price of bio-based BD would be at least competitive with traditional BD.

Franco Capaldo contributed to this article ■