



Genomatica Breakthrough Replaces Petroleum with Sugar in Major Chemical Process

Sustainable fermentation proven to produce a key industrial chemical used for making plastic, rubber and fiber products

SAN DIEGO, Sept. 16, 2008 – San Diego-based Genomatica Inc., a sustainable chemical company, has proven a novel bio-manufacturing process capable of producing thousands of tons of a commodity chemical in a single facility. The foundational chemical, 1,4-butanediol (BDO), is a key raw material in the manufacturing of hundreds of plastic, rubber and fiber products. BDO has a worldwide annual production value estimated at more than \$4 billion across the automotive, textile and consumer goods industries.

Genomatica achieved this breakthrough by engineering a microorganism that has the potential to produce BDO in a global-scale manufacturing plant in less than one year. Prior to this effort, no one had published evidence of microorganisms capable of producing BDO. The Genomatica process is expected to offer substantial cost savings to chemical producers compared with petrochemical-based processes, as well as provide a 100-percent renewable pathway by using sugar instead of petroleum as the main input.

Genomatica first produced BDO in February 2008, and subsequently improved the productivity of the process 1,000-fold in the following few months. Concurrently, the company created strains of the bacteria that were tolerant of the concentrations needed to produce large volumes of BDO at reduced cost.

“This demonstration of sustainable chemical bio-manufacturing is a huge leap and illustrates the power of Genomatica’s unique technology and process,” said Christopher Gann, chief executive officer of Genomatica. “By using advanced computational modeling and evolution-based methods to rapidly engineer living organisms, Genomatica can produce valuable chemicals from renewable feedstocks at low cost.”

BDO and the Rising Cost of Chemical Feedstocks

BDO is one of the world’s most important commodity chemicals, with approximately 3 billion pounds produced annually. BDO is a key precursor to specialty plastics, solvents, fine chemicals, pharmaceuticals, exterior and under-the-hood automotive components, electrical and electronics components, as well as apparel fibers. Currently, the chemical is manufactured only from non-renewable petrochemical feedstocks – based on oil and natural gas – through energy-intensive petrochemical processes. With the Genomatica process, this segment of the chemical industry can move toward sustainable production.



The rising cost of oil and natural gas has caused dramatic increases in the price of chemicals worldwide, straining chemical manufacturers, impacting customers downstream in the value chain and even increasing prices for the consumer.

“Genomatica’s breakthrough technology has the potential to move the chemical manufacturing industry from current petrochemical processes to modernized bio-manufacturing for a number of very important and widely used industrial chemicals,” said Harvey Blanch, professor of biochemical engineering at the University of California at Berkeley. “Chemical manufacturers that take advantage of Genomatica’s process can reduce cost with a sustainable process using 100-percent renewable inputs.”

Because of rising oil and natural gas prices, the search for new processes to produce existing high-volume chemicals from alternative feedstocks in a cost-competitive manner has intensified. Genomatica is leading the way to a solution with biotechnology to meet demand for greater feedstock flexibility and sustainability. BDO is the first product the company has disclosed in its rapidly maturing pipeline, which targets several other commodity chemicals to be produced using microorganism-based fermentation.

The Genomatica Technology Platform

Genomatica’s breakthrough was made possible by the power and pace afforded by the company’s integrated technology platform. Genomatica scientists use the platform to rapidly create new forms of microorganisms through traditional genetic modification, which is guided by detailed designs created with proprietary computational modeling techniques. With these models, the company exhaustively explored all ways to make the targeted chemical and then zeroed in on the optimal designs, providing the precise “blueprints” for further development.

In a complementary fashion, Genomatica uses its deep understanding of biological adaptation to create organisms that thrive under adverse conditions while further increasing their production of the desired chemical product. Normally microorganisms experience inhibition of growth and productivity when they produce a nonnative material; here, exactly the opposite is true. By engineering organisms in this manner, Genomatica can open the door to new bio-manufacturing processes, gaining substantial economic benefits relative to traditional hydrocarbon-based petrochemical processes, while helping the chemical industry advance its sustainable development initiatives.

Genomatica is currently working on improving the yield and productivity of its BDO process while scaling manufacturing output to meet the demands of large bioreactors.



The company estimates that within a year its BDO process will cost less than non-renewable hydrocarbon-based processes, even if oil prices drop to \$50 per barrel.

About Genomatica

Genomatica is focused on producing sustainable chemicals. Genomatica is revolutionizing the chemical industry with groundbreaking technologies that sustainably transform chemical production processes through bio-manufacturing. Founded in 2000 by research scientists from the University of California at San Diego, Genomatica develops a broad range of biologically produced industrial chemicals from a variety of renewable feedstocks at a fraction of the cost.

A privately held company, Genomatica is backed by top Silicon Valley venture capital firms Mohr Davidow Ventures, Alloy Ventures and Draper Fisher Jurvetson. Genomatica is based in San Diego.

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