

BIO-ISOBUTENE PRODUCTION: WHEN THE KEY ENZYMES ARE NOWHERE TO BE FOUND

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As of today, most industrial bio production processes are based on naturally occurring metabolic pathways or biochemical reactions, preventing the access to many of the chemistry's largest market. For example, the development of bio-processes for the efficient production of light olefins such as propylene, linear butylene, butadiene and isobutene, remains a technological challenge: since these molecules are not synthesized by natural microorganisms, the design of a complete metabolic pathway for their production is hampered by the lack of identified enzymes able to perform the final biochemical step.

In order to bridge this gap, Global Bioenergies has engineered artificial biocatalysts, and combined them with natural enzymes into metabolic pathways leading to the production of isobutene. Thus, in contrast with most former approaches, the new metabolic routes leading to isobutene involve non-naturally occurring reactions. The same type of approach was also used for butadiene and other molecules.

The scale-up of this innovative bio-based production process is currently ongoing. Whereas a pilot plant with a capacity of 10 tons/year of oxidation-grade isobutene is running since 2014 in Pomacle (France) a demo plant with a capacity of 100 tons/year of polymer-grade isobutene has recently started operations on the refinery site of Leuna (Germany). It will cover the whole of isobutene's wide product tree, including rubber applications. The company prepares now the first full-scale plant through a Joint-Venture with Cristal Union, named IBN-One. In the same time, Global Bioenergies is developing a strategy of diversification, in order to propose a pipeline of processes covering all possible feedstocks, from first to third generation