

## Global Bioenergies' renewable isobutene compatible with chemical oxidation

**Evry (France), 13 June 2016 - Global Bioenergies today announced the completion of a series of tests on the oxidation of bio-sourced isobutene. The reaction produces methacrylic acid, one of the main components of acrylic paint, in a market valued more than €500 million, and up to €5 billion, if all methacrylate by-products (organic glass and specialty products) are included. Methacrylic acid is currently produced in a process reliant exclusively on fossil resources. During a selective oxidation test, Arkema, our partner in the BIOMA+ project, made a key observation: the behaviour of Global Bioenergies' bio-sourced isobutene and isobutene from petrochemical based sources was identical.**

One of the objectives of the BIOMA+ project was to confirm the compatibility of bio-sourced isobutene with chemical oxidation. The three-year project started in October 2013 and received €5.2 million in support from the French government's Investissements d'Avenir programme (through the Environment and Energy Management Agency, ADEME).

Global Bioenergies produced isobutene by fermentation at its pilot plant in Pomacle-Bazancourt (near Reims in France) and delivered it to Arkema's Rhône-Alpes Research Centre (CRRRA, in Pierre-Bénite), where it was used as the charge in a selective oxidation test. A large series of tests demonstrated that fermentative isobutene delivered the same performance as the reference isobutene from petrochemical sources, in terms of both selectivity and yield. The test did not show any difference in the lifetime of the catalyst.

Methacrylic acid can be used as a building block for the production of methyl methacrylate, a monomer of poly-methyl methacrylate (or PMMA), the organic glass polymer commonly known under the trade names Altuglas® or Plexiglas®. 3 million tonnes of PMMA are produced every year in a market worth €5 billion.

Jean-Luc Dubois, Scientific Director for Catalysis and Procedures at Arkema comments: "Arkema has long been committed to using renewable resources in order to reduce our environmental impact. Our collaboration with Global Bioenergies since 2010 on bio-sourced isobutene is testimony to this engagement. While the technical aspects of fermentative isobutene have been confirmed, the next step is to define the economic conditions for its application to major intermediates of the petrochemical industry."

Marc Delcourt, co-founder and CEO at Global Bioenergies, adds: "Oxidation is the second reaction to be confirmed for fermentative isobutene, after dimerization to produce isooctane, in our partnership with Audi. Isobutene's product tree has many other branches - in polymers, fine chemistry, cosmetics and others. Recent production of the first high-purity isobutene opens new ways forward for these branches, with the potential for new industrial agreements in the coming months."

### About GLOBAL BIOENERGIES

Global Bioenergies is one of the few companies worldwide, and the only one in Europe, that is developing a process to convert renewable resources into hydrocarbons through fermentation. The Company initially focused its efforts on the production of isobutene, one of the most important petrochemical building blocks that can be converted into fuels, plastics, organic glass and elastomers. Global Bioenergies continues to improve the performances of its process, operates its industrial pilot, builds its demo plant in Germany, and prepares the first full-scale plant through a Joint-Venture with Cristal Union, named IBN-One. The company also replicated its achievement to propylene and butadiene, two members of the gaseous olefins family, key molecules at the heart of petrochemical industry. Global Bioenergies is listed on Alternext, Euronext Paris (FR0011052257 – ALGBE).

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