

# Bio Methacrylic Acid Development Update

## SPECIAL REPORT: Bio Methacrylic Acid

France-based Global Bioenergies has reached the first milestone in its development of bio-based methacrylic acid (trademarked under BioMA+) using renewable isobutene feedstock. Methacrylic acid

is a key intermediate in the production of methyl methacrylate (MMA). This milestone resulted in the

company unlocking a €1.7 million payment from the French Investissements d'Avenir State program. The

French State had granted a €5.2 million financing to a consortium that included Global Bioenergies,

Arkema and CNRS. The objective was to develop and demonstrate at pilot scale a complete process of

producing isobutene from a renewable resources and converting isobutene into methacrylic acid.

Global Bioenergies started up an industrial pilot plant in November 2014 on the agro-industrial site of

Pomacle-Bazancourt where BioAmber used to have its bio-succinic acid tolling facility. ARD, a subsidiary

of the sugar refiner, Cristal Union, is in charge of the pilot's operation, and now carries out on a weekly

basis, fermentation trials mimicking the exploitation of bio-isobutene to MA at full-scale.

Global Bioenergies has been able to produce more isobutene in the last three months than over the past

five years. The company said the oil price meltdown does not affect its fundamentals in the short or medium

term because of the expectation that the oil market's equilibrium will be back before its commercialisation

of bio-isobutene process, which is projected to begin in the 2017-18 time frame. The isobutene process is

said to be competitive with crude oil at \$50/bbl in specific markets.

There are other companies currently developing either bio-based MA or its ester derivative, methyl

a. methacrylate. Petro-based MA is currently produced via three routes: either by the acetone cyanohydrin

route; using the isobutylene feedstock route; or via a isobutyric acid route, which can be dehydrogenated

to MA. Methacrolein can also be obtained from formaldehyde and ethylene.

Mitsubishi Rayon (MRC), through its subsidiary Lucite International, has been developing several bio-based

MMA routes either by using biomass for feedstock in the existing production processes, or using a novel

one-step fermentation route to produce bio-MMA. According to Lucite, all of its major raw materials can

be potentially sourced from bio-feedstocks such as acetone from the ABE fermentation process; bioethanol

can be converted into bio-ethylene; or bio-methanol can be made from biogas or from the gasification of

domestic waste.

Lucite is currently working with a number of companies to investigate the feasibility of bio-acetone production

as well as to evaluate the introduction of bio-methanol and bio-ethylene into its MMA manufacturing

- operations. Its Alpha Technology enables the company to use ethylene, methanol and carbon monoxide

for MMA feedstock. Lucite has been running its Alpha Technology at a commercial scale since 2008 with

a 100 ktpa petro-MMA plant in Singapore.

Lucite said its bio-based MMA project is ongoing as the company addresses many technological challenges

in designing complex new biochemical routes. The fermentation process must be able to deliver high

concentrations of the product at acceptable output rates and at an economical level. The company noted

that customers' attitudes towards lowering their environmental footprint, especially in the coatings industry

is a positive note towards further development of plant-based MMA.

Specialty chemicals company, Evonik, through its Creavis business unit, is also working on bio-based

MMA using a fermentation process that can convert syngas to pure 2-hydroxyisobutyric acid (2-HIBA).

Evonik has partnered with LanzaTech for its gas fermentation expertise. Evonik is already offering in the

market its VISIOMER® Terra methacrylate monomers partially based on bio-renewable raw materials.

The VISIOMER® Terra IBOMA uses a main raw material, camphene, produced from pine tree resin. The

product enables formulation of paint resins with a lower VOC content, and reduces resin viscosity.

Evonik's VISIOMER® Terra C13-MA and VISIOMER® Terra C17.4 MA are based on natural oils and

are typically used to increase the hydrophobicity of resins. The products improve water repellency and

resistance to polar solvents.

Source: [Tecnon Bio-Materials and Intermediates Issue 118 February 27 2015](#)