enabling sustainable resins and coatings

biosuccinium®
sustainable succinic acid

Biosuccinium, a 100% bio-based succinic acid, enables resin, coating, adhesive and sealant products with lower environmental footprints

A UNIQUE RENEWABLE RAW MATERIAL

A 100% biobased alternative to traditional chemicals

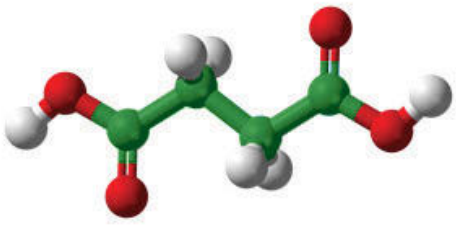
Biosuccinium sustainable succinic acid is produced by Reverdia from renewable, plant-based resourc es to enable manufacturers to produce sustainable resins, coatings, adhesives, and sealants.

Using a novel and proprietary biotechnology process at Reverdia's world class commercial plant in Cassano, Italy, biobased feedstock is converted to Biosuccinium succinic acid. The yeast based fermentation process is unique for the consistent high product quality produced with a best-in-class environmental footprint and economics.

Biosuccinium provides a sustainable alternative to fossil-based succinic acid, adipic acid or terephthalic, conventional raw materials used for resins, coatings, adhesives, and sealants. With Biosuccinium Reverdia presents the coatings, adhesives and sealants industry the opportunity to create unique, high quality and sustainable products (see figure 1).

Biosuccinium is now commercially available.

Figure 1: Bio-Based Biosuccinium is an Alternative to Fossil-based Chemicals



succinic acid, $C_4H_6O_4$
118,09 g/mol

BIOSUCCINIUM™ IN RESINS AND COATINGS

A "green" di-acid

By using Biosuccinium as a "green" di-acid to produce resins, coatings, adhesives or sealants you will be able to manufacture products with a reduced carbon footprint (see figure 2) thus enabling a reduction in greenhouse gas emissions. Additionally, products containing Biosuccinium are at a minimum partially bio-based, requiring less from the earth's limited fossil resources (see figure 3). The process to manufacture Biosuccinium is also environmentally sensitive. It uses non-fossil raw materials, sequesters carbon dioxide (CO2), is energy efficient, and does not produce unnecessary by-products.

Reverdia has successfully identified opportunities for using Biosuccinium as raw material for alkyd, polyester, polyurethane and composite resins (figure 4). In addition, chemical derivatives of succcinic acid, which are in part biobased, provide alternative sustainable solutions to the chemicals industry. These are in various stages of development:

- Dimethyl succinate (DMS), branded Provichem® 2511 Eco provided by Proviron[4]
- Biosuccinium based polyester polyols[5]
- Plasticizers based on Biosuccinium[6]
- Quinacridone and DPP pigments[6]

Thus, Biosuccinium presents a wide range of new market opportunities for more sustainable architectural coatings, product finishes, special purpose coatings, biobased adhesives and sealants.

Reverdia welcomes a more specific technical evaluation of Biosuccinium for your particular application.

Figure 2: Reduction of the Carbon Footprint Using Biosuccinium vs. Petrochemical Adipic Acid[1]

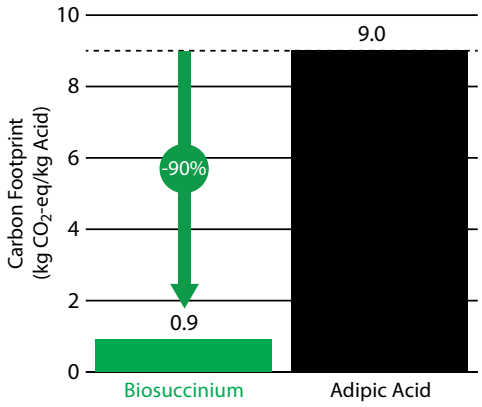


Figure 3: Improving the Environmental Footprint of Resins and Coatings by Replacing Fossil-based Adipic Acid with Biosuccinium Succinic Acid

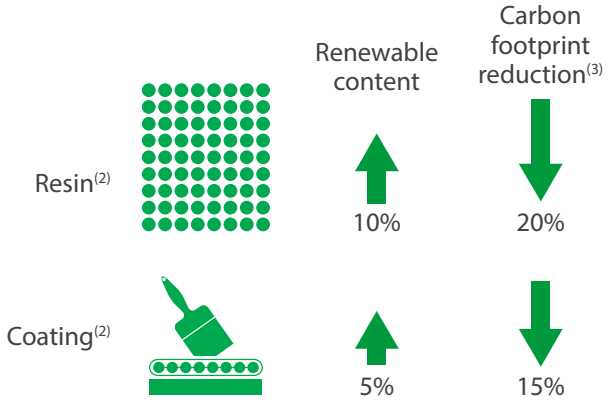


Figure 4: Biosuccinium Finds Potential Uses in a Broad Range of Markets

HOW TO ORDER BIOSUCCINIUM

Please contact Reverdia at info@reverdia.com or via www.reverdia.com.

Footnotes:

(1) Executed by the Copernicus Institute at Utrecht University, the Netherlands. Data is published as an early view (August 2013). The adipic acid data is reflects a best in class plant with 98% N_2O abatement.
(2) The case assumes a typical formulation, i.e. adipic acid content 10 w% and 5 w% in the resin and finished coating product respectively
(3) The carbon footprints of the resin and coating are assumed at values of 4 and 3 kg CO_2 eq./kg product respectively
(4) For more information contact Proviron on www.proviron.com or www.proviron.com/product/provichem-2511-eco-dms
(5) Refer to the Biosuccinium™ Polyester Polyols and Thermoplastic Polyurethanes Data Sheet
(6) Request more information from your supplier or contact Reverdia directly

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