reverdia

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Biosuccinium™ Technology

Low pH Yeast Production Provides Significant Environmental and Quality Advantages

The need to reduce our dependency on fossil fuels, a growing world population and an increased concern for the environment are driving companies to supplement and substitute oil-based chemicals with plant-based, sustainable, high-quality chemical building blocks.

Reverdia, powered by DSM + Roquette, produces Biosuccinium™ sustainable succinic acid with proprietary green technology to enable customers to produce bio-based, high-quality performance materials with a substantially-improved environmental footprint.

The Low pH Yeast-based Technology Advantage

Reverdia, with strong expertise in fermentation, recovery and plant scale-up, is the innovation leader using low pH yeast technology rather than bacteria to produce bio-based succinic acid.

The use of a low pH yeast-based production system ensures many advantages for the customer (see figure 1).

Reverdia's proprietary low pH yeast technology is simple, direct and holds a distinct advantage over bacteria-mediated conversion technologies. The Reverdia process converts feedstock directly to succinic acid. Bacteria-based indirect processes require extra chemical processing, additional equipment and more energy to convert intermediate salts into succinic acid (see figures 2 and 3).

Reverdia's low pH yeast process is also much less vulnerable to infection in comparison to bacteria-based processes. As a result production equipment requires less cleaning and handling which improves both the consistency and quality of the bio-based succinic acid product.

Yeast Versus Bacteria Process Comparison

		Yeast	Bacteria
Fermentation	Production at pH 3	●	●
	Robustness / phage infection	●	●
Recovery	Product purity	●	●
	No waste salts	●	●
	Simple purification	●	●
Carbon footprint	Compared to petrochemical	●	●

Figure 1. Reverdia's yeast-based fermentation process has significant advantages over bacteria-based processes enabling sustainable performance delivering a unique and consistent product quality.

Equations for the Production of Succinic Acid

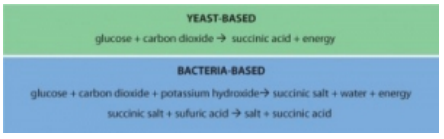

Figure 2. With Reverdia's proprietary low pH (<3) yeast-based fermentation process the succinic acid is present as H2SA. In the case of bacteria-based fermentation, as base is added to control the pH so the succinic is present as K2SA. The salt has to be transferred into acid, for example, through the addition of H2SO4. Alternatively electrodialysis, which requires significant amounts of energy, can be used to convert the succinic salt to succinic acid.

Bio-based Succinic Acid Process Comparison

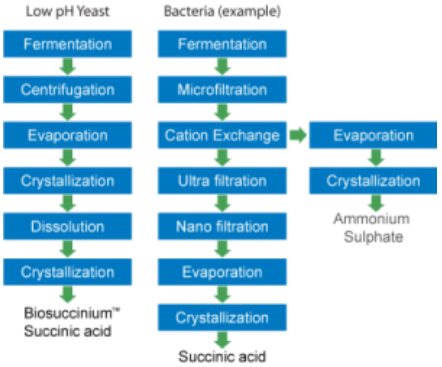

Figure 3. Reverdia's yeast-based fermentation process has significant advantages over bacteria-based processes enabling sustainable performance delivering a unique and consistent product quality.

Environmentally Friendly

Biosuccinium™ is not only renewable but also provides an environmentally sound way to produce succinic acid. This feature is becoming increasingly important to environmentally conscious downstream customers. They desire more environmentally friendly products both to be good stewards of the earth, as well as to advance an eco-friendly brand image to meet consumer's growing demand for green products.

Excellent Product Quality and Purity

Providing a chemical intermediate that is of the highest quality and purity is essential for applications where color and other criteria are important. Reverdia produces succinic acid of excellent quality and purity largely due to the proprietary low pH yeast-based production process which greatly reduces impurities and undesired by-products.

Succinic acid made with bacteria technology suffers from several production challenges which negatively affect purity and quality. These processes can also produce mono-acids which may cause unwanted polymerisation. In addition, formation of nitrogen containing compounds have been observed which causes unwanted and difficult to remove discoloration.

Proven Approach

The low pH process technology is based on proven technology for other compounds such as citric acid, itaconic acid and lactic acid.

Unique Proprietary Technology

Biosuccinium™ is protected by a robust patent portfolio surrounding its low pH fermentation process.

License Biosuccinium™ Technology-Reverdia's Sustainable Bio-succinic acid with Best-in-class Carbon Footprint

Licensing Biosuccinium™ offers a clear advantage for companies to integrate bio-succinic acid production into their business, enabling competitive bio-based materials. Reverdia's proprietary yeast technology has fewer unit operations, is energy-efficient and generates less waste and impurities than bacteria-based alternatives. It's easy to order a sample of Biosuccinium™ now. Please contact us if you have any questions or would like to discuss opportunities for collaboration.

ABOUT REVERDIA

Reverdia is the joint venture between Royal DSM, the global Life Sciences and Materials Sciences company, and Roquette Frères, the global starch and starch-derivatives company. Reverdia takes a leadership position on quality, sustainability and reliability, focusing on market and application development.

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