

DSM approves BDO made using Genomatica's process for use in Arnitel

DSM has tested and approved bio-based BDO (1,4-butanediol) made with Genomatica's process, for use in Arnitel thermoplastic copolyesters. The company said that this is a next step in the development of a bio-based high performance portfolio and fully in line with DSM's front running position in a bio-based economy.

DSM plans to use BDO made with Genomatica's bio-based process technology in its Arnitel products. Used as a raw material, BDO made from Genomatica's process is able to increase Arnitel's bio-based content up to 73 %. The bio-based BDO is used to produce polybutylene terephthalate, one of the building blocks of Arnitel TPC.

DSM said that tests confirmed that the Genomatica BDO was of higher purity than typical fossil-based BDO. Additionally, when used to form polymers, this bio-based BDO delivers equivalent in-spec behaviour and properties of the polymers compared to using petroleum-based BDO, and required no changes in DSM's processes. As a result, DSM considers BDO made with Genomatica's process to be a suitable raw material for commercial production of Arnitel.

DSM plans to start transitioning its Arnitel portfolio to this new BDO, as soon as supplies are readily available from one of the producers that Genomatica licenses to use its BDO process. The first two key products to benefit from the new BDO are **Arnitel Eco** and **Arnitel VT**:

- **Arnitel Eco** already has a bio-based content of 22-53% depending on the hardness. The introduction of BDO made with Genomatica's process will increase the bio-based content up to 73%. Arnitel Eco is being used for food packaging films and for a number of soft touch applications in consumer electronics.
- **Arnitel VT** is a very flexible material that, when made into membranes just a few microns thick, is 100% waterproof but also highly breathable and comfortable. The primary application is in outdoor apparel and shoes. Currently, Arnitel VT products are not bio-based. The planned use of BDO made with Genomatica's process will result in an Arnitel VT that is up to 22% bio-based.

Rein Borggreve, Global Research and Technology Director at DSM said: "As a global science based company, DSM understands the need to make the transition from a fossil-based economy to a bio-based economy. So we are focusing on developing alternative, renewable, non-fossil-based solutions. To speed up this development process, we frequently partner with leading innovators such as Genomatica." Borggreve added: "Both DSM and Genomatica are leaders in the production and invention of bio-based solutions. Together we can shape part of the bio-based economy that will emerge after the fossil-based economy."

Christophe Schilling, Ph.D., CEO of Genomatica, said: "DSM's tests show how quickly bio-based products can be adopted if you're delivering the exact same performance for an existing, high-volume chemical. Our partnership combines DSM's in-depth understanding of materials and applications with our technology, and together this will deliver new, more sustainable materials. We applaud DSM's initiative in being an early mover in this field, and are excited about this additional proof of the commercial-readiness of our BDO process."

About Genomatica

Genomatica's first process for BDO is now commercial. The process was used to make 5 million pounds of BDO in late 2012, and has been licensed by BASF and by Novamont. Multiple companies, including Lanxess, DSM, Toray and Far Eastern New Century, have confirmed that BDO produced using Genomatica's process can be used the exact same way for downstream products as chemicals made from fossil fuel feedstocks. Genomatica is developing processes for additional major chemicals; the next is for butadiene, with Versalis as partner.

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