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*b*FI

Establishing PHAs: Ensuring Process Reliability for Sustainable Plastics

PHAs as "Hidden Champions"

Polyhydroxyalkanoates (PHAs) are a sustainable alternative to conventional plastics. Derived from renewable sources, they are biodegradable and therefore contribute to reducing environmental pollution. Despite these advantages, processors often encounter challenges related to the high brittleness and low thermal stability of PHAs. These hurdles can, however, be overcome through innovative material combinations that incorporate novel polymeric additives. By leveraging advanced material science, new processing possibilities emerge, making the production of bio-based and biodegradable products feasible for a broader range of applications and industries.

Process Optimization for Practical Applications

The processing aid *b*FI A 3745 from Polytives significantly enhances the processability of PHAs, making them more versatile for industrial use. During processing, it reduces melt viscosity and increases the melt flow rate (MFR) by up to 30 %, thereby improving overall efficiency. Enhanced flow behavior facilitates injection molding and extrusion, leading to smoother manufacturing operations. Additionally, lower processing temperatures allow for a gentler treatment of the material, reducing degradation risks and enhancing thermal stability. This results in a more efficient and sustainable manufacturing process, opening up new design possibilities for bio-based and biodegradable polymers. Ultimately, these improvements help to bridge the gap between sustainability and practical usability in industrial settings.

Expanding Application Possibilities for Innovative PHA Compounds

The improved processing conditions made possible by Polytives' innovative additives enable a wide range of applications for PHA-based materials. Demand for such sustainable solutions is growing rapidly in key sectors such as medical technology, the consumer goods industry, 3D printing, and the automotive sector. Everyday products, including sustainable packaging, benefit from these enhanced processing capabilities, offering both environmental advantages and superior performance, without the biodegradability being negatively influenced. The More technically demanding applications, such as the production of high-quality films and fibers or coatings for paper and other surfaces, are now feasible. With the innovative polymeric additives from Polytives, companies gain access to powerful tools that enhance the processability of sustainable plastics. This, in turn, enables them to develop high-performance, eco-friendly materials that serve as viable alternatives to conventional naphtha-based polymers, thus contributing to a more sustainable future for the plastics industry.

Are you interested? Let's talk!

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Figure 1: Influence on the Melt Flow Index (MFI) of different PHAs when using the polymeric additive *b*FI A 3745.

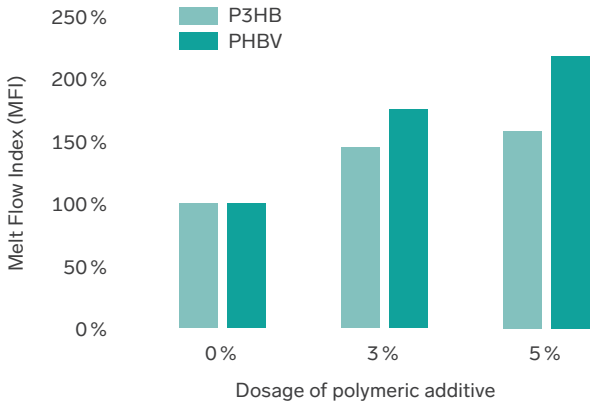

Figure 2: Influence on thermal and mechanical properties of PHAs, exemplarily shown for P3HB, when using the polymeric additive *b*FI A 3745.

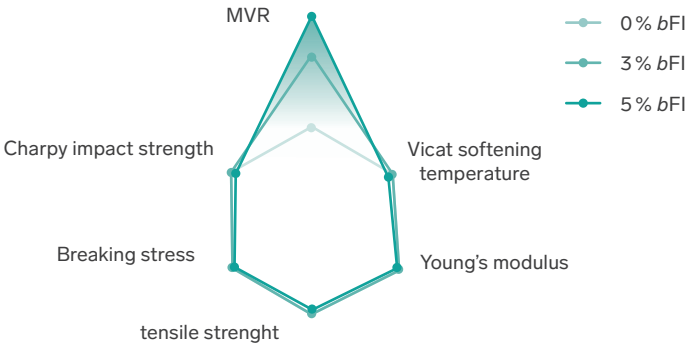

Figure 3: Grade of specimen-filling of PHAs — exemplarily PHBV — at the same injection moulding parameters (160 °C, 800/700 bar injection/holding pressure) without (at the top) and with 7 % of the polymeric additive *b*FI A 3745 (at the bottom).