



# Omya Smartfill®

Boosting the Performance of  
Biopolymers with functionalized  
Calcium Carbonate



THINKING OF TOMORROW

# Omya Smartfill improves the performance of biopolymers, eliminating detrimental hydrolysis in extrusion

Poly(lactic acid) (PLA) and Poly(hydroxyalkanoate) polymers (PHAs) will degrade in extrusion if the moisture content is too high. Mineral fillers are usually hygroscopic and carry some moisture, causing polymer chain degradation in the extrusion of hydrolysis-sensitive polymers.

To prevent this reaction, Omya has developed an innovative surface modification for Calcium Carbonate that reduces polymer degradation to an insignificant level.

Using Omya Smartfill in PLA at filler loads up to 40% significantly increases stiffness as expected, while unusually and dramatically improving toughness, elongation, and impact resistance. Omya Smartfill also reduces formulation cost and improves heat transfer for a faster cooling process.

Various bioplastics blends are common. For example, often PLA and PHA are blended with Polybutylene Adipate Terephthalate (PBAT) or thermoplastic starch. In such cases, Omya Smartfill is also the right choice when conventional Calcium Carbonate will lead to hydrolyses in production.

Omya Smartfill is supplied as a powder and needs to be pre-dispersed in a compound before being used on conventional single screw extrusion lines. Omya Smartfill fulfills the most common regulations for Ecotoxicity and can be used for compostable products with filler loads up to 40%. Natural Calcium Carbonate like Omya Smartfill is considered a renewable material because the replenishment rate of Calcium Carbonate from natural processes far exceeds the consumption, making it a renewable material according to ISO 14021.

## Benefits

10 – 40% Omya Smartfill in PLA

- *Increases stiffness*
- *Increases impact resistance*
- *Increases elongation*
- *Increases opacity*
- *Reduces formulation costs*
- *Improves heat transfer (heating / cooling)*

| Omya Smartfill                            |                   | 0%   | 10%  | 20%  | 40%  |
|-------------------------------------------|-------------------|------|------|------|------|
| <b>Tensile Modulus</b>                    | N/mm <sup>2</sup> | 3200 | 3600 | 4100 | 4900 |
| <b>Tensile Strength at Yield</b>          | N/mm <sup>2</sup> | 68   | 57   | 48   | 38   |
| <b>Elongation at Break</b>                | %                 | 5,5  | 50   | 90   | 28   |
| <b>Melt Flow Rate<br/>210 C° / 2.16kg</b> | g/10 min          | 23   | 21   | 20   | 23   |
| <b>Opacity</b>                            | %                 | 13   | 75   | 89   | 98   |

*Omya Smartfill* is a registered trademark of Omya AG in the European Union and multiple other countries.



Omya International AG, Baslerstrasse 42, CH-4665 Oftringen, email: [info.polymers@omya.com](mailto:info.polymers@omya.com)

**THIS PAPER CONTAINS  
OMYA PIGMENTS**

Omya has taken every possible care to ensure that the information herein is correct in all aspects. However, Omya cannot be held responsible for any errors or omissions which may be found herein, nor will it accept responsibility for any use which may be of the information, the same having been given in good faith, but without legal responsibility. This information does not give rise to any warranties of any kind, expressed or implied, including fitness for purpose and non-infringement of intellectual property. The technical information presented comprises typical data and should not be taken as representing a specification. Omya reserves the right to change any of the data without notice.