BioAdimide™ are additive solutions specially suited to improve the hydrolysis resistance of bio-based polyester (specifically PLA) and to expand their range of applications. The BioAdimide™ product line enables the production of renewable, biobased polymers for durable applications with a lower environmental impact.

BioAdimide™ also allows for a greater range of process variables in terms of

- Providing melt stability during processing
- Using higher levels of re-grind material
- Enabling blending with higher melting plastics by stabilizing the bio-based polyester component.

BioAdimide™ 100 is the additive of choice for superior hydrolysis stabilization of bio-based polyesters. PLA (polylactic acid) is prone to hydrolysis, but...

- Depending on the choice of BioAdimide™ - Service life can be increased up to 7 times compared to the unstabilized polymer (depending on test conditions).
- This extended performance makes PLA a suitable candidate for durable application markets previously out of reach.

™ 500 XT improves the melt stability of bio-based polyesters
- PLA does not degrade during processing and …
- … enables compounders to have consistent and easier processing.
BioAdimide™ Anti-hydrolysis Resistance

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Chemical</th>
<th>Physical form</th>
<th>Color</th>
<th>Density (20°C), g/cm³</th>
<th>Melting range, °C</th>
<th>Viscosity (50°C), mPa.s</th>
<th>Carboximid content, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>BioAdimide™100</td>
<td>Monomeric Carbodiimide</td>
<td>Crystallized melt</td>
<td>Pale yellow</td>
<td>0.97</td>
<td>43-50</td>
<td>20±4</td>
<td>9.8</td>
</tr>
<tr>
<td>BioAdimide™100 powder</td>
<td>Monomeric Carbodiimide</td>
<td>Solid powder</td>
<td>White</td>
<td>0.97</td>
<td>48-52</td>
<td>20±4</td>
<td>10.5</td>
</tr>
<tr>
<td>BioAdimide™500 XT</td>
<td>Polymeric Carbodiimide</td>
<td>-Free flowing powder (4% aerosol to prevent lumping) -Pastilles</td>
<td>Pale yellow</td>
<td>1.05</td>
<td>70-80</td>
<td>N/A</td>
<td>13.0</td>
</tr>
</tbody>
</table>

The combination of BioAdimide™100 and BioAdimide™500 XT allows you to meet the demand for both hydrolysis stabilization and improved processing.

What is hydrolysis?

BioAdimide 100 offers superior hydrolytic stability to enable entry into durable and technical applications.

Good hydrolytic stability with BioAdimide™ 500 XT combined with improved melt stability.
Bioplastics

Now a day bioplastics play an important role in plastics industry and plastic products. The key drive is to reduce the effect of global warming. People give more attraction to use eco-products. This process helps to reduce the emission of greenhouse gases by using the carbon label and carbon footprint. Developing countries use the Non-Tariff Barriers: NTBs to motivate people to use the eco-plastics. People in developed countries start to use this factor for their consideration.

The definitions of bioplastics are divided in two categories:

1. **Compostable plastics** are the plastics that degrade into the carbon dioxide, water, inorganic compound, biomass and do not emit the toxic substances according to the ISO 17088 or EN 13432 or ASTM D-6400. These are made from renewable or bio-based sources. This type of plastics is renewable plastic.

2. **Non-Compostable plastics** are bioplastics from renewable biomass source which may produced from cassava, sugar cane, and corn cob. The non-compostable plastics have the same properties with the conventional plastics from petro-based, but do not compose by bacteria. This type of plastics is renewable plastic.
Plastics and Polymer Business

“Properties enhancement for plastics”

Optimal Tech’s News

Knowledge Corner

2) Biodegradable plastics can degrade easily by biological means (Non-Compostable Plastics) are plastics that degrade when thrown away. However, they cannot be broken down into harmless substances (Conventional Plastics) by bacteria. Biodegradable plastics can be used as a replacement for conventional plastics in many applications:

- Biodegradable plastics are made from renewable sources such as corn, sugar cane, and tapioca, among others.
- They have similar properties to conventional plastics (Conventional Plastics) that are made from petroleum, but they degrade easily.
- Biodegradable plastics are sustainable because they are made from renewable resources, whereas conventional plastics may take hundreds of years to decompose.

Nowadays, the most used bioplastics is polylactic acid (PLA). However, the thermal resistance and strength of PLA is low and easy to form hydrolyze therefore, PLA compound require to add the functional additive to improve the mechanical properties.

Improvement of hydrolysis of PLA

The hydrolysis of PLA can improved by adding BioAdimide from Rhein Chemie Co., Ltd to increase the stability of PLA during molding and reduce the PLA decomposition. BioAdimide can change the carboxylic end group of PLA to form ester.

Improvement of brittle of PLA

The brittle of PLA can be improved by adding impact modifier substance to increase the flexibility of PLA such as Biostrength (impact modifier) of Arkema Company.

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Improvement of thermo resistance of PLA

The thermo resistance of PLA can be improved by adding nucleating agent into PLA to form crystallize structure or create stereocomplex structure which is the blend of PLLA and PDLA.

Reference: “Bioplastic Focus: พลาสติกชีวภาพ...นวัตกรรมเพื่อโลกสีเขียว” จัดทำโดย สานักงานนวัตกรรมแห่งชาติ (องค์การมหาชน) ร่วมกับ สมาคมอุตสาหกรรมพลาสติกชีวภาพ