Compostability testing

Scion’s biodegradation facility measures the compostability of materials according to international standards.
Scion has the capability to measure the compostability of a range of different materials. Internationally, several standards have been established that outline the tests required to validate if a material is compostable or not.

One component of compostability is biodegradation. Other standard tests include chemical characterisation, disintegration and ecotoxicity.

### Compostability standards

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN13432*</td>
<td>Packaging – Requirements for packaging recoverable through composting and biodegradation</td>
</tr>
<tr>
<td>EN14995*</td>
<td>Compostable plastics used in non-packaging applications</td>
</tr>
<tr>
<td>AS47636*</td>
<td>Biodegradable plastics – Biodegradable plastics suitable for compost and other microbial treatment</td>
</tr>
<tr>
<td>AS5810</td>
<td>Biodegradable plastics – Biodegradable plastics suitable for home composting</td>
</tr>
<tr>
<td>NFTS1800*</td>
<td>Specification for plastics suitable for home composting</td>
</tr>
<tr>
<td>ASTM D6400</td>
<td>Labelling of plastics designed to be aerobically composted in municipal or industrial facilities</td>
</tr>
<tr>
<td>ASTM D6868</td>
<td>Labelling of end items that incorporate plastics and polymers as coatings or additives with paper and other substrates designed to be aerobically composted in municipal facilities</td>
</tr>
<tr>
<td>ISO 17088*</td>
<td>Specifications for compostable plastics</td>
</tr>
<tr>
<td>ISO 18606*</td>
<td>Packaging and the environment – organic recycling</td>
</tr>
<tr>
<td>BNQ 0077-988/2010</td>
<td>Compostable products – Certification protocol</td>
</tr>
</tbody>
</table>

*DIN CERTCO accredited
Biodegradation test

Ensures that the material is being broken down by naturally occurring microbes like bacteria, fungi and algae. This is achieved by measuring the cumulative CO\textsubscript{2} respired by the microbes as they consume the material.

Disintegration test

Ensures that the material reduces to a defined size within a fixed time to be considered a part of the compost.

<table>
<thead>
<tr>
<th>Standard</th>
<th>Test temperature</th>
<th>Time</th>
<th>Pass criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial composting</td>
<td>58 ± 2 °C</td>
<td>6 months</td>
<td>Sample must have degraded at least 90% of the starting carbon mass or alternatively at least 90% biodegradation relative to the cellulose control</td>
</tr>
<tr>
<td>Home composting</td>
<td>25 ± 2 °C</td>
<td>12 months</td>
<td></td>
</tr>
</tbody>
</table>

Ecotoxicity test

Ensures that the degraded material will not affect the compost quality and thus plant growth and soil ecosystem health.

All the standards use the compost from disintegration to compare seedling germination and growth to a control compost. The test compost germination rate and biomass weight has to be no less than 90% of seedlings from the control compost to pass. The Australian standards also includes a worm test where no more than 10% in morbidity or weight difference between the test compost and the control is allowed.

Chemical characterisation test

Ensures that the materials do not contain unacceptable levels of heavy metals and other toxic components.

Generally, these standards all require fluorine and heavy metal testing (e.g. zinc, copper, nickel, cadmium, lead, mercury, chromium, molybdenum, selenium, arsenic). Specific limits are included in the standard or depend on the country the material will be sold and/or composted in.

There is also a requirement for the sample to contain at least 50% volatile solids.
Biobased plastics are made from renewable resources such as trees, corn, potatoes and sugar cane etc, instead of fossil-based materials. But not all biodegradable plastics are biobased.

Examples of biobased plastics are polylactic acid (PLA) from starch and polyethylene (bioPE) from sugar cane. PLA is biodegradable and recyclable. BioPE, however, can only be recycled.

### Contact information

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### About Scion

Scion is a New Zealand Crown research institute that specialises in research, science and technology development for forestry, wood and wood-derived materials, and other bio-material sectors.

Scion’s purpose is to create economic value across the entire forestry value chain, and contribute to beneficial environmental and social outcomes for New Zealand.

**Prosperity from trees** *Mai i te ngahere oranga*