ROUTINE FINISHED PRODUCT TESTING

1. Oxo-biodegradable prodegradant catalyst

X-Ray Fluorescence Spectroscopy (XRF) – Confirm that the prodegradant additive is present in the plastic product

- Instant QC test – 1 Minute
- Benchtop ED-XRF systems for high throughput sample testing
- Handheld ED-XRF for mobile inspection and QC

2. Degradation

Accelerated Degradation Test– Confirm that the prodegradant additive is effective in promoting degradation

- Accelerated Fluorescent UV ageing (ASTM D5208) and Accelerated Thermal Ageing (ASTM D5510)
- Monitor Degradation by FT-IR Spectroscopy (ISO 10640)
- Demonstrates the principles of abiotic degradation outlined in ASTM 6954 tier 1.
- For technologies which have been tested according to ASTM 6954, it follows that abiotically degraded material will become biodegradable

3. Stability

Accelerated Stability Test– Confirm that the product is stable during storage conditions

- Accelerated Thermal Ageing (ASTM D5510) – without UV exposure
- Monitor Degradation by FT-IR Spectroscopy (ISO 10640)
- Initial period of stability consistent with shelf-life stability

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Testing of Oxo-Biodegradable Plastics – Recommended Equipment

Prodegradant Content

Test	Technique/Apparatus	Relevant Standard	Model (Suitable Example)	Estimated Cost
Elemental Content	X-Ray Fluorescence (ED-XRF) Spectrometer	n/a – calibrated for determination of transition metals associated with prodegradant catalyst	Bruker S2 Ranger (laboratory/benchtop) 	100,000 USD
			Symphony/Bruker d_2Detector (handheld/portable) 	40,000 USD

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Testing of Oxo-Biodegradable Plastics – Recommended Equipment

Accelerated Degradation & Stability

Test	Technique/Apparatus	Relevant Standard	Model (Suitable Example)	Estimated Cost
Determination of Polymer Oxidation	Fourier Transform Infrared (FT-IR) Spectrometer	ISO 10640: Plastics – Methodology for assessing polymer photoageing by FTIR and UV/visible spectroscopy	Nicolet iS10 *(with ATR accessory)* 	30,000 USD
Accelerated UV Weathering	Fluorescent Ultraviolet (UV) Exposure. UVA 340 Lamps	ASTM D5208 - 14 Standard Practice for Fluorescent Ultraviolet (UV) Exposure of Photodegradable Plastics	Q-Lab QUV/se 	10,000 USD
Accelerated Thermal Ageing	Forced Convection Laboratory Oven	ASTM D5510-94(2001) Standard Practice for Heat Aging of Oxidatively Degradable Plastics	Memmert UFE 600 	3,000 USD

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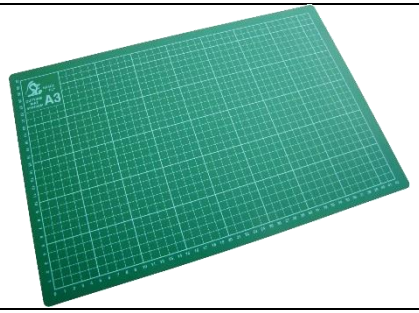
Testing of Oxo-Biodegradable Plastics – Recommended Equipment

General / Sample Preparation

Test	Technique/Apparatus	Relevant Standard	Model (Suitable Example)	Estimated Cost
Film Thinness Measurement	Digital Micrometer / Thickness Gauge	ISO 4593:1993 Plastics -Part 6: Dimensional properties - Method 630A: Determination of thickness by mechanical scanning of flexible sheet.		**200 USD**
Scalpel / Cutting Blade				-
Cutting Mat				-

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Testing of Oxo-Biodegradable Plastics – Recommended Equipment

General / Sample Preparation

Test	Technique/Apparatus	Relevant Standard	Model (Suitable Example)	Estimated Cost
Sample Holder	Support samples during UV & Thermal Ageing. 4x Windows Permit measurement by FT-IR Spectroscopy.	n/a	Custom made. Aluminium Sheet. 35 x 90 x 0.8mm 	-
Sample Disc Cutter	Cutting samples (multiple layers) for analysis by XRF spectroscopy. Compatible with ⌀4cm XRF Rings	n/a	James Heal 230/10 ($10cm^3$) 	700 USD

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