

TRIAL USING VEGWARE FOOD WASTE AND PACKAGING TO TRACK  
BIODEGRADATION THROUGHOUT THE COMPOSTING PROCESS

Involved Parties:

Eilidh Brunton – Vegware  
Andrew Ryan – Biogen  
Andy Sibley – Biogen  
Charlie Trousdell – Consultant  
Jeremy Jacobs – ORG

Purpose of trial:

There has been a renewed interest in the use of compostable materials with the push back on single use plastics following the BBC Blue Planet II Series.

One of the solutions to reducing the volume of plastic material that is littered both in the urban and marine environment is to use materials that degrade in both commercial and domestic composting systems. This trial is designed to track some fully certified materials through an APHA approved commercial in-vessel composting process that treats food and garden waste to see how effectively it degrades under normal commercial conditions. There has been some scepticism in the efficacy of these materials, so this trial will provide robust evidence to demonstrate that under normal commercial conditions certified material does degrade successfully.

Method: (also see photos below text)

Food waste mixed with compostable plates, cutlery and packaging was delivered to the Biogen Tempsford in-vessel composting site in Bedfordshire on the 18<sup>th</sup> July. This material had been collected from a range of clients including the Glasgow Science Centre, Vegware offices and various cafes and food establishments from Glasgow and Edinburgh including a street food market in Glasgow which exclusively used EN13432 certified compostable materials. The EWC code this was transported under was 20-01-08.

The 1.36 tonnes of material was weighed on arrival, then tipped within the reception hall of the composting facility and mixed with 11 tonnes of comingled garden and food waste which is the normal material composted on this site. The aim was to have a mix ratio of 10% food and packaging waste mix.

The two fractions were mixed initially using a loading shovel and then this material was placed into a Willibald high speed shredder. The gate on this machine was reduced in order that the shred size on the compostable cutlery and plates was optimal. A squeeze test (a recognised means of determining the percentage moisture of compost) was carried out on the blended material and it was decided that at approximately 60% moisture, this was adequate to compost effectively.

The shredded material was then filled using a loading shovel into a 400 tonne capacity composting tunnels to undergo its sanitisation step of the composting process. This site composts to the EU standard of 70 degrees C for one hour (minimum) at 12 mm particle size.

Event	Process days	Date	Outcome/comment
Delivery of co-mingled food and packaging waste to Tempsford	0	18 <sup>th</sup> July 2018	Food waste and packaging all in compostable bags

Blending with co-mingled food and green waste		18 <sup>th</sup> July 2018	
Shredding of blended material		18 <sup>th</sup> July 2018	
Filled into ABP approved IVC		18 <sup>th</sup> July 2018	
Temperature monitoring commenced		18 <sup>th</sup> July 2018	Temperature maintained at between 71.3(minimum) and 75.9 (maximum) over the duration.
Tunnel emptied	22	9 <sup>th</sup> August	Inspected for compostable cutlery and packaging (see photos) 22 days in tunnel.
Transported to Lackford (Permitted OAW composting site)		9 <sup>th</sup> August	Loaded into walking floor trailer and transported by road to alternative site for maturation.
Compost placed into windrows		9 <sup>th</sup> August	3.5 m high by 3m wide windrows
Turned	36	23 <sup>rd</sup> August	Turned once prior to screening
Screened	49	5 <sup>th</sup> September	Screened to 10 mm for use in agriculture (see picture # 14)
Despatched	62	18 <sup>th</sup> September	To local farm for spreading on stubbles
Total time from start to finish of process		62 days	

Delivery on weighbridge:



Image 1

Tipping material in the reception hall:



Image 2

Food waste and packaging including compostable bags tipped in reception hall:



Image 3

Close up of Vegware compostable plates and bags:



Image 4

Material spread on reception-hall floor prior to blending with garden and food waste:



Image 5

Blending comingled garden and food waste with packaging:



Image 6

Blended material prior to shredding:



Image 7

Willibald high-speed shredder loading with blended materials.



Image 8

Shredded blended material prior to tunnel filling:



Image 9

Tunnel filling using a loading shovel:



Image 10

### Method continued

On the 9<sup>th</sup> of August, the tunnel was emptied using a loading shovel and the material was loaded into vehicles for onward transport to Lackford another Biogen site where it was to be composted in open air windrows. Locating the food waste and associated packaging was not straightforward, due in the main to the fact that there was a significant quantity of non-compostable packaging and plastic within the feedstock. Once the Vegware materials were located, the following comments were made by J Jacobs who inspected the materials as the tunnel was emptied on the 9<sup>th</sup> August.

- The paper plates and cups showed significant disintegration and were quite difficult to find.
- The Vegware bags used to hold the compostable cutlery, plates and cups had all but disintegrated other than the knots which were obviously thicker than the normal bag thickness.
- The cutlery however was still clearly discernible but was distorted as a result of the heat from the composting process.

The pictures below show the materials on exiting the tunnel after 22 days in the tunnel. The temperatures within the tunnel are monitored 24/7 and managed through an integrated control system that controls air volumes and input of ambient air.

Images of Vegware packaging after 22 days in the composting tunnel.(images11-14)



Image 11



Image 12



Image 13



Image 14

10mm screened compost on day 49



Image 15

### **Summary**

Although this was only a small scale trial of compostable packaging, it was carried out under normal commercial in-vessel composting conditions, followed by a period in open-air windrows, with no exception made for the inclusion of the compostable packaging. The composting duration was no longer than the normal length of time used for this material. At the end of the process there was no discernible compostable packaging found in the screened output. It is possible that some fragments were taken out with the trommel screen, however this material returns to the front end of the windrow composting process so would have further degradation time if required.

This trial has demonstrated that compostable packaging certified to EN13432 can be composted successfully through a commercial composting facility. As with all commercial composting operations, the balance of feedstocks at the start of the process is important to ensure that the correct C:N balance is achieved. When adding compostable packaging to conventional green waste feedstock, it is advisable to start with circa 10% packaging by weight and then adjust this according to the C:N ratio of the incoming green waste material. In winter when the N content falls, it may be necessary to reduce the volume of compostable packaging and conversely increase it in the summer as the C:N decreases.

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