Written evidence submitted by UCL Plastic Waste Innovation Hub (PW0036)

About the Plastic Waste Innovation Hub

The Plastic Waste Innovation Hub is a multidisciplinary team of researchers based at UCL, including scientists, engineers, designers and social scientists. We take a design-led approach to the issue of plastic waste.

The Hub is led by Professor Mark Miodownik, Professor of Materials and Society in UCL's Department of Mechanical Engineering, radio and television presenter (including most recently, the BBC Radio 4 series Dare to Repair and Plastic Fantastic), and author of the award-winning Stuff Matters.

Our current focus is compostable and biodegradable plastics and how barriers to a sustainable system for their use might be overcome. Compostable plastics: unlocking existing barriers to systems change is a 3-year project funded by UK Research and Innovation and the Natural Environment Research Council.

Key points

- Compostable plastics could be an environmentally-friendly alternative to conventional plastics in the area of food waste contaminated packaging such as tea bags, coffee pods, fruit stickers, caddy liners and freezer and other bags.
- Compostable plastics are not suitable alternatives for applications where they might contaminate recyclable plastic waste streams, end up as litter or displace reusable or recyclable alternatives.
- There is currently no system in place for the collection and processing of compostable plastics.
- Food waste collection might provide a route for collecting and processing some compostable plastics, but a number of barriers would need to be overcome to make the system sustainable:
    - A means of sorting compostable plastics from conventional plastics would need to be developed.
    - The EPR would need to be reformed to ensure that compostable packaging was economically viable.
    - Standards and labelling will be needed to ensure citizens are able to correctly sort compostable plastics as part of their household waste collection.

How should alternatives to plastic consumption be identified and supported, without resorting to more environmentally damaging options?

Compostable plastics are often presented as a sustainable solution to the plastic waste problem but these claims are largely unsubstantiated and have led to widespread confusion among members of the public about how such products should be disposed of.

At the moment, there is no England-wide system for the collection and processing of compostable plastics. If they are mistakenly put in to plastic recycling streams, they will contaminate them and reduce the quality of the recycled plastic. Nor can they be composted: as it is not possible to easily

distinguish between compostable and regular plastic, industrial composting facilities used for food waste currently screen out all plastic items. In any case, many of these facilities (such as Anaerobic Digestion plants) do not provide suitable conditions for compostable plastics to break down. There is very little data about how well compostable plastics break down under home composting conditions (our BIG COMPOST EXPREIMENT – a citizen science project involving 9590 volunteers – aims to fill this gap. See www.bigcompostexperiement.org.uk for more information.)

Therefore, at this point in time, the best waste stream for compostable plastics is currently the general waste, through which they will be sent to landfill or burnt.

Life cycle assessment shows that the current system, with no dedicated UK-wide collection and processing facilities for compostable plastics, is not environmentally favourable.

This situation is likely to change, however. Compostable plastics are likely to play an important but small role in the future of sustainable packaging, especially in the areas of food waste contaminated packaging such as tea bags, coffee pods, fruit stickers, caddy liners and freezer and other bags. In 2023, when food waste collection is unified across England, compostable plastics for these products should be part of this new system. Directing citizens to put them in the food waste collection to capture as much food waste as possible may be the best option (our current research programme aims to clarify the best processing route). Thus, to capture for instance, the 100 million tea bags used each day in the UK, most of which now contain 'biodegradable' plastics, it may be important to develop a 'Recycle with Food Waste' label for compostable plastics and an associated policy framework that might include standards, producer obligations and fiscal measures.

The corollary of this is that there are many applications for which compostable plastics are not suitable alternatives to conventional plastics. A simple rule of thumb would be to exclude any product that might reasonably be collected with household plastic recycling (typically rigid packaging such as bottles, trays and containers). Other plastic-containing products, such as nappies and wipes, could potentially be made from compostable plastics, but unless a new system is put in place to collect and compost such items, there would not be any overall environmental benefit from doing so. In fact, they may have a detrimental impact if they end up as litter or displace reusable or recyclable alternatives.

Will the UK Government be able to achieve its shorter-term ambition of working towards all plastic packaging placed on the market being recyclable, reusable or compostable by 2025?

As described above, there is no overall environmental benefit to making plastic packaging compostable if there is no system in place by which to compost it at the end of its lifetime. Separate food waste collections will become mandatory in England from 2023 and this presents an ideal opportunity to provide a route by which food-waste contaminated compostable plastics could be collected and composted.

In order for such a system to work, a number of barriers would need to be overcome, including:

- A reliable system for sorting and separating compostable and non-compostable plastics (so that compostable plastics do not get screened out of food waste along with other plastics). We are currently researching technologies (such as hyperspectral imaging) that could be used for this purpose.

- The economics need to stack up for packaging producers. At the moment Defra does not consider bio-degradable, bio-based and compostable packaging to be recyclable under packaging Extended Producer Responsibility (because there is no collection or infrastructure in place) and so it will therefore attract higher fee rates than other recyclable packaging.
- Behaviour change – people will need to be able to correctly identify which items are suitable for composting with food waste and which should be disposed of elsewhere, for example in plastic recycling or general waste. Labelling and standards are likely to play an important role in this.

What measures should the UK Government take to reduce the production and disposal of single-use plastics in England? Are the measures announced so far, including a ban on certain single-use plastics and a plastic packaging tax, sufficient?

There are some categories of single-use plastics that are not currently affected by either the ban or packaging tax. These include: disposable nappies, wipes, feminine hygiene products and incontinence products. These items are already a big part of the waste stream going to landfill and incineration. Recycling is not a viable option for these products but composting could represent a more environmentally-friendly solution. Tests and pilot studies need to be carried out urgently to better understand whether this is possible in practice.

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