

Black: listed or blacklisted?

The colour black in food and other types of consumer packaging has become a hotly-contested topic, given the challenges with carbon black in identifying the base polymer for recycling. **Paul Gander** looks at some of the alternative strategies

While the majority of plastics packaging might be said to have a ‘visibility’ problem, which counts against it in the eyes of many consumers and much of the media, with black plastics this is more of an ‘invisibility’ problem.

Whether the packaging is black or a dark containing the same colourant, the challenge is that carbon black can render the item undetectable by near-infrared (NIR) identification systems, typically used in materials recovery facilities (MRFs) around the world. As a result, this stream has frequently been inaccurately described as ‘unrecyclable’.

In the UK especially, this is one plastics-related issue that predates the BBC Blue Planet 2 marine wildlife series, as business development manager at Faerch Plast UK Ruth Price explains. “Even before then, there was a lot of media attention given to the way black plastics were not being recycled,” she says. “That in turn was putting pressure on the use of black trays, even though they are recyclable.”

The polymer itself will often be crystalline polyethylene terephthalate (CPET), for chilled ready meals, for example, or other mono-material polymers such as, for bottles, polypropylene (PP). Any of these, once identified, can be readily recycled.

Carbon black has the advantage that, as a colourant, it is low-cost. Many thermoformers would be reluctant to move away from black CPET because the material is such a “great sink”, as Price puts it, for different colours of skeletal and other process waste.

With protein in particular, a black tray may help to disguise the unattractive accumulation of fluids. But more generally, black is often considered to show product at its best. Consultant Keith Freegard goes further: “Black

is associated with premium quality; that’s the hidden marketing message.”

Research into the viability of detectable blacks dates back at least a decade. The UK Waste & Resources Action Programme (WRAP) spearheaded significant amounts of work on these alternatives between 2009 and 2011, when its final report on the Development of NIR Detectable Black Plastic Packaging was published.

Recycling consultancy Nextek co-ordinated much of WRAP’s research and compiled the report, verifying the detectability of different colourants not only in a variety of polymers but against a range of NIR systems. “We wanted an approach that any MRF could adopt without putting new equipment in, needing at most a software change,” says Nextek’s managing director Ed Kosior.

As many see it, the problem with detectable black is that it is still black. This is partly to do with consumer expectations and perceptions, and in part to do with how any type of black is liable to be handled in waste and recycling streams. Many UK converters producing NIR-detectable black plastics trays appear resigned to the fact that they will still end up in landfill or an incineration plant.

Some in the supply chain may well have shot themselves in the foot here. Kosior talks about the “vilification” of this particular material stream, singling out as an example a comment from the chief executive of the Iceland retail chain about “toxic” black plastics.

But it is not only retailers that are pursuing their own strategies in relation to black and its alternatives. Some major multinational brand-owners are pushing positive innovation in this area, with Unilever announcing before the summer that it would be moving all its TRE-



Semmé and Lynx bottles into detectable black high density polyethylene (HDPE) bottles.

Then again, PET recycling streams in general, and CPET in particular, are known to operate rather differently to those for polyolefins.

Faerch has looked at different options for CPET. As recently as the summer of 2018, the converter was publicising work with major UK retailers and waste processor Viridor to collect and recycle trays made from CPET containing carbon black. “But by then, the market had moved on,” says Price.

The converter has also introduced detectable black options, but in the summer of 2019, it launched its Evolve range of CPET trays. These contain an average of 80 per cent post-consumer recyclate (PCR) and, critically, tap into the jazz stream of mixed colours. “Historically, this stream has in general been down-cycled into applications such as strapping,” says Price. “By putting this material into our trays, we are at least recycling it into packaging.”

The other positive side to this picture is that those using this stream are “not in the queue for bottle flake,” she points out.



Are brands going back to black, or backing off?

As the converter explains, the hope is that the variable shades of these trays will themselves act as an indication to consumers of recycled content.

Then again, given the pains taken by brand-owners and retailers over the years to achieve colour consistency across all areas of their packaging, Faerch is evidently taking a risk here. Some chains have embraced this new recycling vocabulary, with Waitrose's packaging manager Karen Graley, for example, referring in a statement to "a rainbow of recycled content".

Sainsbury's led the way in July with its move to Evolve, and Asda has similarly announced that those products in its chilled ready meal range still in black would move to Faerch's new packaging by November.

But, at least up to the beginning of October, both Marks & Spencer and Tesco had continued to weigh up their options in relation to ready meal trays.

These variations in retailer response parallel the contrasting attitudes towards black plastics across the wider UK supply chain. Membership organisation RECOUP offers expertise and guidance on recycling, and earlier this year published a report on behalf of its Black Plastic Packaging Forum on options for improving performance in this area.

All because the client loves black trays...

When UK chocolate manufacturer Whitakers was asked by an anonymous retailer to supply black recycled polyethylene terephthalate (rPET) assortment trays which were detectable by near infra-red (NIR) identification, it turned to local thermoformed packaging converter Macpac for a solution.

Macpac sales manager Simon Firth explains: "The retailer wanted to move away from non-detectable black. They wanted something that would not be discarded to landfill or incinerated." In this case, clear rPET would have been an option, but the retailer preferred black for presentational reasons.

Macpac's rPET thermoforming sheet is sourced from extruder and AMB group company Thermodynamix (TDX), which in turn sources its detectable black colourant from Ampacet.

Business development manager at TDX Will Turner says it doses the additive in proportions of 3 to 4 per cent. "It does its job, although the shade is currently not as dark as [carbon] black," he says. This will change over time, he adds, as more detectable black waste goes back into the mix.



As packaging sustainability manager Paul East explains, recycling guidelines have, over the past few years, advised against the use of black, given that until very recently 'black' equated with 'carbon black'. "Our members are split," he says. "Some have been quite decided about coming out of black, while others are saying it's too much of a 'knee-jerk' reaction."

Other options mentioned in the RECOUP report include artificial intelligence (AI) equipment to sit over the sorting line, from the likes of Tomra, Pellenc, Machinex and BHS Systems. In these cases, the idea is that this technology does not have the same limitations as NIR in sorting carbon black or any other kind of plastic.

The report does not recommend any one strategy in relation to black plastics and, under the circumstances, that is hardly surprising. "We will publish new guidelines at the end of this year, and they will reflect the new realities," says East.

Are black plastics just a UK problem? At The Shepherd Color Company in the US, marketing manager Mark Ryan says it is now on its fifth generation of IR blacks, developed over some 40 years. But applications to date have principally been in vinyl for outdoor use requiring solar reflectivity. Those same properties make the additives ideal for IR reflectivity.

Following Europe's lead, the issue of black plastics packaging and recycling is starting to come to the fore in the US, says Ryan. He highlights the boom in food delivery services in the US where, he says, providers will often use black plastics for their meals.

More broadly, he says: "Recycling rates in the US are so much lower, generally, than in Europe. Any initiative that helps has to be good."

Cost-per-pack is always a thorny topic in relation to any type of packaging, but is especially the case with carbon black CPET and the alternatives. Carbon black requires only a low dosage to generate solid black, but the detectable alternatives will need to be dosed in higher proportions,

while additionally being more costly weight-for-weight to begin with.

Nonetheless, Kosior at Nextek is scathing in his assessment of market responses. "You're talking about, say, 0.3p more than carbon black per tray, and people said they weren't going to do it," he recalls.

Using the mixed jazz PCR stream also comes at a premium compared with non-detectable black but, given the preparedness of UK retail to dip its toe into this stream, this is evidently within the limits of commercial acceptability.

Where the market, in the UK and beyond, goes from here is not at all clear. In a statement to accompany Unilever's launch of its detectable black HDPE bottles, WRAP made a more general plea about black plastics: "We now call for wide-scale adoption of detectable black pigments by brands and retailers, and the sorting and reprocessing of that packaging by the recycling sector."

A statement from RECOUP on the same occasion was more circumspect, calling on manufacturers, brands and retailers to "ensure that plastics packaging placed on the market can be recycled".

Nextek suspects the plastics supply chain is hedging its bets for now in the hope that an AI-based detection system specifically for black will emerge. "But what gets knocked off the belt could be any polymer," Kosior points out. "Then what do you do? Are they hoping for a no-cost solution?"

Meanwhile, Freegard muses: "I wonder what percentage of today's rigid container stream is black. I'd guess it's less than 5 per cent. It's reduced a lot in recent years." He argues that, even if a black-specific detector were viable, it is debatable whether this type of investment would generate much value for a MRF. Viewed from this perspective, the black plastics conundrum may already be well on the way to resolving itself.

But in this particular debate, nothing appears to be quite so black-and-white. **P**