10.2.24

SYMPHONY ENVIRONMENTAL TECHNOLOGIES PLC

EU Compensation Claim

Analysis of the Court Judgment T-745/20

The problem with plastic is that a lot of it gets into the open environment, where it can lie or float around for decades. Symphony's d2w oxo-BIOdegradable plastic is designed to reduce this problem by causing the plastic to biodegrade much more quickly at the end of its useful life, leaving no harmful residues. See https://www.symphonyenvironmental.com/why-biodegradable/ It is not intended to replace waste-management structure, which should continue to be improved.

This case in the General Court of the EU was a claim for compensation for loss suffered by Symphony due to confusion in the market caused by the wording of Article 5 of the Single-use Plastic Directive 2019/904, which led many people to think that d2w product were banned in the EU.

EXECUTIVE SUMMARY

The case shows that:

- EU politicians can legislate without an environmental impact assessment
- they can circumvent all the safeguards against arbitrary banning of products, provided by the REACH Regulation
- they can disregard industry standards, written by experts in the field to replicate conditions likely to be experienced by a plastic product in the real world See https://www.biodeg.org/wp-content/uploads/2021/02/Swift-evidence-to-BEIS.pdf.
- expert evidence paid for by the Claimant has "little or no probative value" in their courts, no matter how eminent the expert. This fatally undermines the credibility of the whole judgement.
- they can even disregard their own scientific experts – (The EU Chemicals Agency had said after ten months study that they were not convinced that microplastics are formed by oxo-BIOdegradable plastic). ECHA are independent scientists, and have disclosed that they had been under intense political scrutiny.
    - The court cited the difference between oxo-degradable and oxo-BIOdegradable defined by CEN, and did not rule that they were the same. Symphony has legal advice that oxobiodegradable products are not within the prohibition of oxo-degradable products.

The court has not found that the Institutions made a correct assessment of oxo-biodegradable technology - simply that they had not "manifestly and gravely disregarded the limits of their discretion."

The court has not taken account of the important evidence which has become available since 5th June 2019.

If the court had accorded due weight to all the evidence, (including their own scientific experts ECHA, and including evidence which post-dated the Directive), we are confident that they would have found that Symphony's d2w oxo-BIOdegradable plastic:

- Does properly biodegrade and does not leave microplastics behind

- Does biodegrade in compost
- Can be recycled without separation
- Does deliver an environmental benefit.

THE JUDGMENT

Neither the Institutions nor the court appear to understand the purpose of oxo-biodegradable technology. It is intended to upgrade ordinary plastic so that in the event that it gets into the open environment as litter it will not lie or float around for decades. It is necessary therefore to compare it with ordinary plastic in the same place at the same time. This has not been done.

Everything fragments as it degrades, but the court does not deny that oxo-biodegradable plastic will biodegrade much more quickly than ordinary plastic. It is true that the exact timescale cannot be ascertained, because conditions in the open environment are variable, but those conditions will almost always include oxygen and bacteria, which are the only essential requirements. Light and heat will accelerate the process and will usually be available to litter on the surface of land or water, but they are not essential.

The court does not define what it means by a reasonable time. The Loughborough study relied on by the court suggests “in the conditions of the United Kingdom, between two and five years, but even if took ten years to biodegrade, that is a lot better than the 100 years that ordinary plastic is said to persist in the environment.

Neither the Institutions nor the court give any reasons why, once degradation has commenced, it should stop before biodegradation is complete, but even if only 50% biodegraded that would be a lot better than ordinary plastic, which will have fragmented rapidly into microplastics but does not biodegrade at all except over a very long time.

With regard to microplastics, nobody denies that most of the microplastics are coming from the fragmentation of ordinary plastic when exposed to sunlight, and this is why oxo-biodegradable technology was invented.

Insofar as composting is relevant at all, it is not in doubt that oxo-biodegradable plastic will biodegrade in compost (though not necessarily in the short timescale required by the industrial composters) but ordinary plastic will not biodegrade at all in compost except over a long period of time.

The institutions and the court place considerable weight on the proposition that tests performed in laboratories cannot predict what is likely to happen in the real world, but they have dismissed the best expert evidence on this very point. This is the evidence of Dr. Graham Swift, Vice-chairman of the technical committee at ASTM and one of the authors of ASTM D6954, who said www.biodeg.org/wp-content/uploads/2021/02/Swift-evidence-to-BEIS.pdf:

“ASTM D6954 contains a standard caveat, recognising that laboratory environments are isolated, unlike the dynamic natural environment - in which degradation and therefore biodegradation is likely to proceed **more quickly.** However, ASTM D6954 has been devised by myself and other specialists working in the field over many years to provide practical guidance as to how the product is likely to perform in commercial use.

It has been my experience that results from laboratory testing are very likely to be reproduced in the real world. I can see no cause for concern that they would not, and have seen no evidence that they have not. In particular I do not consider that persistent plastic fragments and smaller, microplastics would be left behind which could have any harmful effect on the open environment, and in particular marine life.”

This very important evidence by Dr. Swift is dismissed by the court (183) because it post-dates the adoption of Directive 2019/904. Also, because “it is not a scientific study presenting test results, but a simple six-page statement drafted in response to a call for evidence by the United Kingdom Government.” That is not a sufficient ground to ignore the evidence of a very experienced polymer scientist who was actually one of the authors of the Standard concerned. At the same time the court places reliance on the Eunomia and Ellen MacArthur reports, which are just literature-reviews by non-scientists.

Evaluation of biodegradation has to be done in laboratory conditions – it cannot be done in a field or an ocean or a compost heap. These tests are very expensive and are not done for the amusement of scientists. They are designed to replicate conditions in the real world.

There is no reason to think that in the open environment the micro-organisms will stop before they have consumed all of the available material, and it is for those who think so to prove it. They have not done so.

At 196 the court says "the only environment the conditions of which can be satisfactorily reproduced in a laboratory is composting, because it is an industrial process which occurs in a controlled environment. Consequently, for other environments, the results of laboratory tests cannot necessarily be reproduced in a real-world situation." This is not correct, as explained by Dr. Swift, who says:

"Of course, conditions in the open environment are variable but there is no need for a standard for each of these conditions. Provided that oxygen is present, a plastic complying with ASTM D6954 will become biodegradable much more quickly than ordinary plastic, and that is its purpose. Oxygen is ubiquitous, and most of the plastic litter is found lying or floating around with abundant access to oxygen, but it is possible to imagine a piece of plastic in anaerobic conditions where abiotic degradation cannot proceed. However, if this is in a landfill it does not matter, because the plastic has already been properly disposed of."

"It is also possible for a piece of oxo-biodegradable plastic to find itself in anaerobic conditions outside a landfill, but this would be very unusual and does not invalidate the general proposition. It is for example possible for plastic to be deprived of oxygen by being heavily bio-fouled in the ocean or buried in sediment, but this is unlikely to happen quickly enough to prevent sufficient exposure to oxygen for abiotic degradation. If it did, then that small proportion of the global burden of plastic litter would perform in the same way as ordinary plastic – no better and no worse."

It is well known that oxidation and subsequent biodegradation will proceed more quickly in warm conditions than in cold conditions but timescale is not critical except in industrial composting, for which oxo-biodegradable plastic is not intended.

At 169 the court dismisses the innovative work by the scientists at Queen Mary University on the basis that it is a new method which has not (yet) been standardised.

LEGAL BASIS

The Court said (115) that "Review by the EU Courts has to be limited to verifying whether the exercise of powers has been vitiated by a manifest error of assessment or a misuse of powers, or whether the EU legislature has manifestly exceeded the limits of its discretion." The essence of this judgment is that whether they had come to a correct conclusion or not, they had not "manifestly and gravely disregarded the limits of their discretion."

The most disturbing feature of this case is that evidence paid for by the Defendants (such as the Eunomia Report, on which the court placed much reliance - as to which see https://www.biodeg.org/wp-content/uploads/2022/10/BPA-Comment-on-the-Eunomia-Report-2016-1.pdf) is acceptable to the court, but evidence paid for by the Applicants "has little probative value." (This point is made nine times in the judgment). However, as professional witnesses and laboratories have to be paid, how is a claimant against the EU to adduce any expert evidence before their courts which has any "probative value?" This places the Applicant at an unacceptable disadvantage before the EU court.

The court therefore attached little or no weight to the evidence of very reputable witnesses such as Intertek, TCKT Recycling experts, Roediger Laboratories, Queen Mary University, Eurofins, Peter Susman KC, and even the evidence of Symphony's chief scientist who, after 38 years' experience in the theory and practice of oxo-biodegradable plastic, must be one of the world's leading experts.

There was no enquiry into the scientific qualifications or professional reputation of any of these distinguished witnesses – for the court it was enough that the work had been paid for by Symphony. **This crucial point was never put to Symphony's counsel at the oral hearing.**

In addition to Eunomia, why did the court attach weight to the Commission Report of January 2018 (paid for by the Defendants) the de Wilde Report (paid for by Plastics Europe), and the Ellen MacArthur Foundation, whose own website showed funding from companies who have been lobbying against oxo-

biodegradable plastic for more than ten years. EMF has twice refused to disclose the amount of such funding. Why did the court place reliance on their so-called "oxo-statement, "whose author, Rob Opsomer, was not qualified in polymer science, or even in chemistry.

At 134 the court says "The amendments made [by EMF] in 2019 clarify the content of that statement, but do not change its meaning." There was in fact a fundamental difference. The 2017 report said that oxo-bio plastic simply fragmented, but they admitted in their May 2019 report that "oxo-degradable plastics are manufactured so that they can degrade faster than conventional plastics and that **they do become biodegradable,** although it is not yet possible accurately to predict the duration of the biodegradation for such plastics.

Not one of the authors of the Eunomia Report, the Commission Report, or the MacArthur statement are polymer scientists. De Wilde is a polymer scientist, but he derives most of his income from the companies who market plastic as "compostable," who are in competition with oxo-biodegradable plastic.

While accepting the opinion of the unqualified Mr. Opsomer, the court dismisses at 165 the opinion adduced by Symphony from a very distinguished lawyer.

At 26 the court says "The choice of expression used to designate the type of plastic in question is not neutral, since it may imply that a view has been taken on the biodegradability of that type of plastic. It is therefore appropriate to use, in the present judgment, the most neutral term possible … the expression 'plastic containing a pro-oxidant additive' [PAC] will be used."

This approach to terminology has been the cause of much confusion. As explained below ordinary plastic may well contain a pro-oxidant additive. Also, it may or may not be possible accurately to predict the *duration* of the biodegradation but there is no doubt that oxo-biodegradable plastic *is biodegradable*. If the subject under discussion is oxo-biodegradation, as defined by CEN, the plastic should be referred to by its correct description ie "oxo-biodegradable" and the expressions "oxo-degradable" "oxo-fragmentable" and "PAC plastics" should no longer be used to describe it.

In paras 124-201 the court systematically selects from the evidence the passages which favour the Defendants, and omits or dismisses the evidence which favours the Claimant. For example, while much reliance is placed on the Eunomia Report, the following passages from that report are omitted:

At 129 and 291 the court says "plastic containing a pro-oxidant additive is marginally worse than conventional plastic because, unlike conventional plastic, it can lead to emissions of greenhouse gas" However, the Eunomia report says "The limited evidence that is available suggests that deeper in landfill under anaerobic conditions there will be little or no biodegradation taking place. In this case, the carbon is effectively sequestered, **avoiding the direct release of GHGs to the atmosphere**."

One of the key findings of Eunomia is that "without exception, the scientific evidence suggests that the conditions present during the abiotic stage (which in most studies is simulated by some form of accelerated pre-treatment) of degradation **will have a significant impact on the materials' ability to subsequently biodegrade."**

The Eunomia Report refers to the work at Queen Mary University London which shows that "small levels of biodegradation were observed which if left to continue at the same rate would lead to full **biodegradation in around 2 years**." The Report continues "It is, however, unclear how these results can be translated to behaviour in the real world. One strain of bacteria is used in the test whereas in the open environment there may be many more, as well as fungi which may also attack and break down the plastic—and **therefore it may biodegrade quicker**."

"From the information studied, the authors of this report can believe that it is possible for a PAC plastic to fully mineralise in an open environment, with the prodegradant additives encouraging this action, and **thus the polymers and entrained substances can be assimilated into the natural environment**."

It is often claimed (though not by the court) that biodegradable plastics are likely to encourage littering, but this is never seen as an objection to the type of plastic marketed as compostable. The Eunomia Report says, "**rather than speculation, objective behavioural research is required to move this topic forward in a constructive manner."**

Eunomia says that "during pre-ageing under water, PAC plastic is **much more susceptible to UV degradation** than conventional plastic (as demonstrated by the large difference in molecular weight). The **biodegradation tests also indicate that bacteria can feed off plastic measured with a higher molecular weight than the 5,000 limit often used to characterise this**."

"it is perfectly possible to conclude that degradation which is much more rapid than for conventional plastic, and biodegradation which proceeds at the same rate as conventional plastics after they have become biodegradable, **would decrease absolute quantities**."

"Working under the assumption that PAC plastic in marine environments will be more fragmented, **the effect may be to reduce the impacts on wildlife in some respects (such as entanglement)."** but to increase the impacts in others (such as physical ingestion of microplastics)." However, thousands of tonnes of microplastics formed from conventional plastics are already being ingested. If these are causing harm as they pass through the digestive system (which has not been proved), the response must be to ban plastics of all kinds – but this is clearly impracticable and disproportionate.

Eunomia says "it does appear that the PAC plastics industry can create products that have minimal toxic impact on flora and fauna. … and it is at least encouraging that **almost all existing test standards for PAC plastic specify some form of toxicity test using established methods (such as germination and earthworm survival tests)."**

The court also placed reliance on the Loughborough Report but omits to mention its finding "that oxo-degradables do degrade when exposed to either sunlight or heat (~60ºC) **is not in any doubt**. The additives serve to catalyse and accelerate break-down of the polyethylene by a process known as oxidative degradation. The mechanisms of these reactions have been studied over a period of several decades and are widely reported and well established in the scientific literature.

Also, that Oxo-biodegradable plastics: • ARE NOT TOXIC • CONTAIN NO HEAVY METALS • ARE SAFE FOR FOOD CONTACT • DO NOT EMIT METHANE, EVEN DEEP IN LANDFILL • DO DEGRADE ABIOTICALLY IN A NORMAL ENVIRONMENT • DO DEGRADE ABIOTICALLY UNDER ELEVATED TEMPERATURES IN LANDFILL.

Also that: • THERE IS NO EVIDENCE THAT DEGRADABLE PLASTICS ENCOURAGE LITTERING • THERE IS NO EVIDENCE OF BIO-ACCUMULATION NOR ANY HARMFUL EFFECT ON THE ENVIRONMENT • THERE IS NO EVIDENCE OF ACCUMULATION OF POLLUTANTS • PRO-DEGRADANT ADDITIVES ARE NOT HARMFUL AND HAVE NO NEGATIVE ENVIRONMENTAL IMPACT IN THE PRODUCTION AND USE PHASE.

Important evidence of original scientific work adduced by the Applicants is dismissed at 163 on a procedural technicality that "it is not for the Court to seek and identify in the annexes the pleas and arguments on which it may consider the action to be based, since the annexes have a purely evidential and instrumental function."

If the court had accorded due weight to all the evidence, (including their own scientific experts ECHA, and including evidence which post-dated the Directive), we are confident that they would have found that Symphony's d2w oxo-BIOdegradable plastic:

1. **Does properly biodegrade** and does not leave microplastics behind.(Even Eunomia said "the debate around the biodegradability of [PAC] plastic is not finalised, but should move forward from the assertion that PAC plastics merely fragment, towards confirming whether the timeframes observed for total biodegradation are acceptable from an environmental point of view and whether this is likely to take place in natural environments," and **Eunomia did not recommend a ban on oxo-biodegradable plastic)**. As to natural environments see the Oxomar and Queen Mary University reports. https://www.biodeg.org/subjects-of-interest/agriculture-and-horticulture/the-marine-environment/

- **Does biodegrade in compost** (although we do not believe that plastic of any kind has any role in composting – See https://www.biodeg.org/subjects-of-interest/composting/)

- **Can be recycled without separation** - See https://www.biodeg.org/subjects-of-interest/recycling-2/

- **Does deliver an environmental benefit.**

For more detail see Annex, below

THE BEST EVIDENCE

It cannot be said that the Institutions had no evidence at all on which to base their legislation, but the court confirmed (118) that "if it is not to adopt arbitrary measures, which cannot be rendered legitimate by the precautionary principle, the competent public authority must ensure that any measures that it takes, even preventive measures, are based on **as thorough a scientific risk assessment as possible."**

And (119) the "scientific assessment should be based on the **best scientific data available** and should be undertaken in an independent, objective and transparent manner."

The court overlooked these failures by saying (121) that "it is sufficient that the three institutions concerned had at their disposal, during the legislative procedure, sufficiently reliable and cogent information to allow them to understand the ramifications of the scientific question raised and to decide upon their policy in full knowledge of the facts, irrespective of the origin and form of such information."

By so doing **the court held the Institutions to a lower standard than the law required**. They had not carried out "as thorough a scientific risk assessment as possible" and their scientific assessment was not based on "the best scientific data available." They cannot be heard to say that the best scientific evidence was not available because they had themselves terminated the ECHA enquiry, and had failed to make an impact assessment. Nor can they justify disregarding the doubts expressed by ECHA in October 2018 as to the formation of microplastics, and making their assertion about microplastics in Recital 15 of the Directive.

The Court conceded that the Commission had carried out an impact assessment in relation to its proposal for a Directive, but the adoption of the Parliament's amendment to Article 5 **was not accompanied by an impact assessment covering that type of plastic.** The court simply dismissed this failure by saying that an impact assessment was not required by law.

The court observed that "impact assessments are a tool to help the three institutions reach well-informed decisions and not a substitute for political decisions within the democratic decision-making process." Nevertheless the court did accept that they were obliged to act on "the best scientific data available." They failed to do this because an impact assessment, as well as a report from ECHA, would have provided better scientific data than was then available to them. The court said (90) that an impact assessment is not binding on the Institutions, but they would have had to take it into account. In this case there was no impact assessment for them to take into account.

ECHA have never provided a dossier to support any ban on oxo-biodegradable plastic by the EU, and no evidence has been produced that microplastics from oxo-biodegradable plastic have ever been found in the environment.

Whether or not the Institutions are bound by the REACH Regulation and also to carry out an impact assessment, the court accepted (99) that they were legally bound by the general principle of proportionality, enshrined in Article 5(4) TEU and Article 191 TFEU, as well as being legally bound not to make manifest errors of assessment. **It was precisely to avoid disproportionate conduct, and to avoid manifest errors of assessment, that the procedures in Arts 69-73 of REACH, and the requirement to carry out Impact Assessments were devised.**

The papers on which the Institutions relied were literature reviews, not original scientific work. There is no space here to comment on each work cited in these literature reviews, but almost every month our attention is drawn to an academic paper which is being used against oxo-biodegradable technology, but when we study them we find them misleading. For example, one claimed that an oxo-

biodegradable mulch film showed very slow degradation, but the material used for the tests had been heavily over-stabilised. Another failed to ascertain that the test material was oxo-biodegradable at all. In a third paper the test material might have been correctly made with a suitable masterbatch or it might not. This deficiency was enough to invalidate the whole paper, but they then proceeded to expose the sample to abiotic degradation for a period which was much too short. The fourth actually proved that abiotic oxidation helps to reduce the molecular weight of oxo-biodegradable polyethylene and form easily biodegradable fractions.

At 144 "it is apparent from the [Loughborough] study that the fragmentation of that type of plastic into very small parts depends on environmental conditions." Neither the Institutions nor the court have understood that biodegradability depends **not on the size of the particles, but their molecular weight.**

DISCRETION

The court said that the exercise of the legislator's discretion "implies the need to anticipate and evaluate ecological, scientific, and technical matters of a complex and uncertain nature" but the Institutions were not scientifically qualified to do that. The only EU body qualified to do so is the European Chemicals Agency (ECHA).

If the Institutions thought that oxo-biodegradable plastic might constitute a threat to human health or the environment they would be justified in taking action according to the precautionary principle, but (117) they "may not take a purely hypothetical approach to risk and may not base their decisions on a level of 'zero risk.' The appropriate action, which they actually took in this case, was to refer the matter to ECHA for their expert opinion.

The court acknowledged that the Commission had asked ECHA to carry out a scientific investigation, but the court did not criticise the Commission for stopping the investigation before it was complete, and thereby depriving the Institutions of the best scientific data available.

Moreover the court acknowledged that in October 2018 an e-mail from ECHA indicated that it is "not yet convinced that microplastics are formed." There was no evidence before the court superior to that of ECHA that microplastics were formed, so how could the Institutions be thought to be justified in stating that they were? The court simply dismissed this finding by ECHA on the inadequate basis that it was only an interim view.

The statement from ECHA did however show that after ten months study, including study of the Eunomia Report and the other reports on which the court placed reliance, and after an open Call for Evidence, they were **not convinced** that microplastics were formed. Neither the Institutions nor the Court have ever given a reason why, being aware of the doubts of their scientific experts, the Institutions should not have waited for ECHA to conclude their study before legislating. **It is highly likely that they did not wait because they had become aware that ECHA, being independent scientists, were not going to give them the answer they wished to hear.**

The court observed that the Institutions could not be expected to be aware of evidence which was not available to them when they made the Directive. Correct, but this means that **the evidential basis for the Directive is now out of date**. See eg the four-year study sponsored by the French government, known as Oxomar, and published in 2020, and the Queen Mary University Reports published in 2019 and 2020. https://www.biodeg.org/subjects-of-interest/agriculture-and-horticulture/the-marine-environment/ and the AIMPLAS recycling study, done in 2023, and the evidence of Dr. Swift.

The court accepted that the CEN definition in TR15351 distinguishes oxo-degradation, defined as 'degradation resulting from oxidative cleavage of macromolecules', from oxo-biodegradation, defined as 'degradation resulting from oxidative and cell-mediated phenomena either simultaneously or successively," and **has not ruled that there is no difference between the two**.

At 238 the court dismisses the point that the Environment Committee inserted the prohibition without giving any justification. They say that the decision was made in plenary, but do not say that any justification was given in plenary either. Also, at 239 "It counts for little that a committee, such as the Committee on Fisheries, has an opinion which differs from that adopted in plenary session."

At 246 the court dismisses 100 pages and more than 30 letters sent in response to the Call for Evidence by ECHA. These were in the public domain and should have been taken into account by the Defendants.,
At 247 the court dismisses the study by Jin, H., Gonzalez-Gutierrez, J., Oblak, P., Zupančič, B., and Emri, I., entitled 'The effect of extensive mechanical recycling on the properties of low-density polyethylene' dated November 2012

At 263 the court says (notwithstanding the clear definitions in TR15351) that the institutions were justified in making no distinction between oxo-degradable and oxo-biodegradable. They say this just because in their view the Institutions did not make a manifest error of assessment in finding that plastic containing a pro-oxidant additive does not biodegrade properly within a reasonable time.

At 264 the court dismisses ASTM D6954 on the basis that there is no unified standard at EU level. (This is because the "compostable" plastics industry controls the relevant CEN Committee).

At 254 the court confirms that "when there is a choice between several appropriate measures, recourse must be had to the least onerous, and the disadvantages caused must not be disproportionate" However, at 268 and 269 the court dismisses alternative measures less onerous than a ban.

At 322 the Court says that "no economic operator can claim a right to property in a market share." Symphony were not claiming entitlement to a market share, but were maintaining that their ability to conduct a business had been damaged by the wording of the Directive which had led customers to believe that their d2w product was banned in the EU. It is no answer to say (320 and 325) that "Symphony may continue to manufacture d2w products in order to place them on the market in third countries," and "They may also continue to manufacture their d2w masterbatch and sell it to customers who will use it in the manufacture of products which they intend to place on the market in third countries." These minor exceptions are of little or no economic value to Symphony.

Symphony do not deny that restrictions may be placed on businesses, including the exercise of intellectual property rights (324), for the protection of human health or the environment, but they do deny that the restriction in Article 5 was necessary for that purpose.

RECYCLING

See https://www.biodeg.org/subjects-of-interest/recycling-2/

The court accepted (221) that "while the use of stabilising compounds makes it possible, in certain cases, to avoid deterioration in the quality of recycled plastic, it is nevertheless difficult to determine the quantity of stabilisers needed, which depends on the concentration and type of pro-oxidant additive used."

This was not the view of TCKT or Roediger, who were the only recycling experts whose evidence was before the court, who had both advised that oxo-biodegradable plastic could be safely recycled in a post-consumer waste-stream without separation.

Most recently, polyethylene products made with d2w oxo-biodegradable masterbatch were tested in November 2023 by AIMPLAS in accordance with the Protocol published by the Association of Plastics Recyclers (APR) of the United States, and found to be recyclable without separation from a post-consumer waste stream, with no detriment to the process nor to the new product made with the recyclate.However, to this court (227) none of this expert evidence would be of any value, because the work was commissioned by Symphony.

The Eunomia Report says "Evidence suggests that the impacts of prodegradant additives on recyclates can under certain circumstances be avoided with the inclusion of stabilisers. The appropriate quantity and chemistry of stabiliser would depend on the concentration and nature of the prodegradants in the feedstock." However, the report misunderstands the role of stabilisers. It is clear from the scientific reports that it is not necessary to add stabilisers unless the recyclate is being used to make long-life products exposed to sunlight, in which case the manufacturer would be adding stabilisers anyway. These stabilisers are in a quantity and with a chemistry which he would normally use, and no special arrangements are necessary for recyclate containing OBP.

Eunomia says "Recyclate made from mixtures containing unknown PAC plastic should not be used for long-life products, due to the lack of evidence surrounding the long-term impact in secondary products." There is no lack of evidence. The TCKT report dated 27th July 2016 considered this very issue, and

concluded that "provided a UV-stabiliser has been included (which as demonstrated should always be the case with plastic products intended for outdoor use) there will be no negative effects from the inclusion of oxo-biodegradable recyclate. These studies also demonstrate that even without UV stabiliser the presence of oxo-biodegradable recyclates has no effect within the body of the plastic, where oxygen is not available." (The authors of the Eunomia Report had read the 17th March 2016 TCKT report, but had not cited the 27th July 2016 report).

The court (265) says "as regards the applicants' suggestion of requiring plastic containing a pro-oxidant additive to also contain a **marker** which makes it visible to an automatic sorting machine so that it is separated from conventional plastics and is not recycled with them it is apparent from the Eunomia study that the current technology does not allow automatic sorting of plastic containing a pro-oxidant additive, and from the report of 16 January 2018 that 'currently available technology can … not ensure identification and separate sorting of oxo-degradable plastic by re-processors."

In fact, Eunomia is discussing plastic which does **NOT contain a marker.**

At 223 the court says "it is impossible to control the level of ageing experienced by plastic containing a pro-oxidant additive before it is recycled" but this is a problem for recylers whether there is oxo-biodegradable plastic in the feedstock or not. This is because all plastics can become embrittled and unsuitable for recycling.

At 297 "Dr R. Rose states that she is 'surprised that the European Union [are] proposing to ban a product that is certainly no worse than the unmodified [low-density polyethylene, namely, conventional plastic] that is not subject to the same action' and that 'legislating against a single form of plastic is not the way to resolve the accumulation of many forms of poly hydrocarbon'. The evidence of this distinguished scientist is dismissed simply because new scientific methods have been used, while they are content to rely on the evidence of the non-scientist authors of the Eunumia and Ellen MacArthur reports.

COMPOSTING

The court accepted that producers of plastic containing a pro-oxidant additive do not market that plastic as being compostable in accordance with the EN 13432 standard, but rather indicate that it is not suitable for composting. In that case why should lack of compostability according to that standard be a reason for prohibition? The court gives no answer to this question but simply refers at 217 to other factors which might justify prohibition. Nor does it give any answer (211) to the question why composting of plastics should be thought desirable at all.

The court accepted (214) that testing in a laboratory according to EN13432 was acceptable for showing biodegradation in an industrial compost facility of the type of plastic marketed as "compostable" but not for showing biodegradation *in a composting facility* of the type of plastic marketed as oxo-biodegradable.

The court said that "industrial composting is, of all environments, the most aggressive, that is to say, the most favourable to biodegradation. Consequently, it is unlikely that a sample of plastic containing a pro-oxidant additive which does not biodegrade properly in industrial composting conditions and does not comply with the EN 13432 standard will biodegrade properly in other environments."

The court said, "therefore, it must be held that, in coming to the conclusion, on the basis of studies carried out pursuant to the EN 13432 standard, that plastic containing a pro-oxidant additive did not biodegrade properly, the three institutions concerned did not exceed the limits of the broad discretion which, in accordance with case-law, they enjoy in environmental matters."

There was no evidence that oxo-biodegradable plastic would not biodegrade properly in industrial composting conditions, and indeed the evidence of Intertek and Eurofins had shown that it would. The essential difference was the 180-day time limit in EN13432 required by industrial composters, which is not relevant to biodegradation in the open environment, where plastic without a pro-degradant masterbatch could persist for perhaps 100 years.

The court did not define what is meant by "properly" nor why a plastic which takes more than 180 days to fully biodegrade in the open environment can be said not to "properly" biodegrade? A leaf or a twig,

and even the type of plastic marketed as “compostable” would take much longer than 180 days in the open environment.

Recital 15 does not say that compostability shall be determined in accordance with EN 13432.

The type of plastic marketed as “compostable” does not properly biodegrade if it gets into the open environment, and it will created microplastics. It will also contaminate a recycling stream. However, at 306 the court says that it is not discriminatory to ban oxo-biodegradable plastic but notproducts made from plastic marketed as ‘compostable’, just because “those two categories of products are not in a comparable situation.”

APPENDIX:

REASONS WHY ART.5 DOES NOT APPLY TO D2W OXO-BIODEGRADABLE PLASTIC

“Oxo-degradation” is defined by CEN (the European Standards authority) in TR15351 as “degradation identified as resulting from oxidative cleavage of macromolecules.” This describes ordinary plastic, (which does not contain an intentionally-added prodegradant catalyst). It will abiotically degrade by oxidation when exposed to sunlight in the open environment and create microplastics, but it does not become biodegradable except over a very long period of time.

By contrast, **“oxo-biodegradation** is defined by CEN as “degradation resulting from oxidative and cell-mediated phenomena, either simultaneously or successively”. This means that the plastic (which contains a specially-formulated prodegradant masterbatch) degrades rapidly and converts into hydrophilic oligomers which are not plastic. They are then recycled back into nature by bacteria and fungi.

The reason for the EU ban is set out in Recital 15 of the Directive as follows:

“that type of plastic:

(a) does not properly biodegrade
(b) and thus contributes to microplastic pollution in the environment,
(c) is not compostable,
(d) negatively affects the recycling of conventional plastic and
(e) fails to deliver a proven environmental benefit.

(a) BIODEGRADATION

Has it been shown that oxo-BIOdegradable plastic will properly biodegrade? Yes, tests have been done by Eurofins showing biodegradation of 88.9% and by Intertek showing biodegradation of 92.74% (The percentage required by EN13432 for “compostable” plastic is 90%). Carbon-evolution tests will never find 100% because some of the material converts into water and biomass.

Once the material has become biodegradable it really does not matter how long it takes to biodegrade completely, provided it has been proved to be non-toxic. This would matter only in the unlikely situation that there were large quantities of plastic residues in the same place, and the Eunomia Report acknowledges that this is not likely.

The four-year research programme sponsored by the French Government, known as Oxomar, concluded that plastic made with Symphony’s d2w technology will biodegrade even in the marine environment significantly more efficiently than conventional plastic. https://www.biodeg.org/subjects-of-interest/agriculture-and-horticulture/the-marine-environment/

The Eunomia Report acknowledges that abiotic degradation of OBP occurs in the natural environment, but speculates that that if marine biodegradation does not occur rapidly enough, this will result in an increase in fragments of plastic in a given area. Their comparison with soil environment is very speculative. It is true that bacterial biomass and diversity are lower in seawater compared to soil, but it does not follow that biodegradation will be less efficient in marine waters.

According to Dr. Jean-François GHIGLIONE, one of the Oxomar Scientists, “OBP will float and be at almost all times subjected to UV light, which accelerates the abiotic phase of degradation. This is not always the case in soil, where plastic pieces are often covered by soil, leaves etc and are less exposed

to UV light. There are specific bacteria living in the “seasurface microlayer” (the top millimetre of the ocean surface), where bacteria are different from further below the surface. The bacteria in the seasurface microlayer are particularly adapted to a hydrophobic environment (eg where oil materials are floating) and these bacteria are known to present a high capability for hydrocarbon degradation. These bacteria are therefore potential OBP-degraders, and such an environment does not exist at the surface of soil. These bacteria are probably less abundant and less diverse than in soil, but probably more effective to degrade OBP.”

Queen Mary University in London also reported that:

- Oxo-Biodegradable plastic demonstrated up to 90 times more biodegradation than conventional plastic, when aged for the same period of time.
- The degraded material was biodegraded by bacteria found in soil and marine environments.
- Molecular-weight reduction is a critical factor in the rate and extent of biodegradation, showing that biodegradability increases as molecular-weight reduces.
- The use of a prodegradant catalyst such as that in a d2w masterbatch, caused a rapid reduction of molecular-weight.
- The plastic samples tested for biodegradation were abiotically degraded under both real life and laboratory conditions.

As to whether the micro-organisms will bioassimilate the whole of the low molecular-weight material, biodegradation of 91% has been proved in the laboratory at the Technical Research Institute of Sweden and the Swedish University of Agricultural Sciences, and 88.9% in the Eurofins laboratory in Spain. This is complete biodegradation for all practical purposes (the limit specified for HDP in EN13432 is 90% of the maximum degradation of a suitable reference material, which could be less than 90% of the actual material.

Even if oxo-biodegradable plastic did not fully biodegrade, it would **still be better than ordinary plastic**, which would have created persistent microplastics but would not have biodegraded at all to any significant extent.

(b) MICROPLASTICS

Some of the microplastics found in the environment are coming from tyres and man-made fibres, and recycling is also a source of microplastics, **but most of the microplastics found in the environment are created by the fragmentation of ordinary (ie oxo-degradable) plastic when exposed to sunlight**. These fragments are very persistent because their molecular weight is too high for microbes to consume them, and can remain so for decades.

That is why oxo-BIO-degradable plastic was invented. This type of plastic falls apart because the molecular chains have been dismantled and it has been converted into hydrophilic oligomers, not into microplastics. It will then be consumed by naturally-occurring bacteria and fungi. (When the Ellen MacArthur Foundation asked Professor Jakubowicz for his advice, he made this point, but they omitted it from their “oxo-statement”). The court simply dismissed this statement (175) from one of the world’s leading experts on this subject.

The European Chemicals Agency (ECHA) were asked to study oxo-biodegradable plastic in 2017. They made a Call for Evidence, and said after 10 months study that they had not been convinced that it creates microplastics.

Eunomia says “The PAC plastic is more likely to fragment quicker so the impacts associated with microplastics are concentrated within a shorter period of time.”.. “this could ultimately be worse than spreading out the impacts over a longer period of time due to an increase in the proportion of individuals, species and habitats affected, as well as the burden of impacts for an individual of a species.” In fact the opposite would be the case. Fragments of conventional plastic will be a problem for decades, but once OBP has reached the fragmentation stage it is no longer a plastic and has become a food source for micro-organisms. See Judgment at 295.

Oxo-biodegradable plastic has been used for bread wrappers for 15 years by the largest bread producer in the world and has been compulsory in the Middle East for nearly 15 years. There have been no problems with microplastics or recycling.

(c) COMPOSTABLE

Tests have been done by Intertek and Eurofins according to ISO 14855 which show that oxo-biodegradable plastic will properly biodegrade in an industrial composting facility (not necessarily in the short timescale required by EN13432), but the fact that a plastic is not compostable would not be a ground for banning it. Industrial composters do not want plastics of any kind in their facility, and even the plastic marketed as "compostable" does not actually convert into compost. See https://www.biodeg.org/subjects-of-interest/composting/

(d) RECYCLING

It is sometimes said that oxo-biodegradable plastic will contaminate a recycling stream and is incompatible with a circular economy. That is not correct – see https://www.biodeg.org/subjects-of-interest/recycling-2/ but it is correct for the type of plastic marketed as "compostable."

It is also said that recycling is preferable to biodegradation. Yes, but it is not possible to recycle plastic which has escaped into the open environment from which it cannot realistically be collected.

(e) ENVIRONMENTAL BENEFIT

The ONLY way to prevent plastic which has escaped into the open environment from accumulating there for decades is oxo-biodegradation. Even if this were not the case, failure to deliver an environmental benefit might be a reason for not using it, but would not justify a ban.

ARTICLE 3(3)

"oxo-degradable plastic' means plastic materials that include additives which, through oxidation, lead to the fragmentation of the plastic material into micro-fragments or to chemical decomposition."

This applies to ordinary (oxo-degradable) plastics. A Report in March 2020 by the Institute of Environmental Engineering, Zurich, found that: "Conventional plastics may contain pro-oxidant additives that were added to produce different intended functionalities. For example, Moura et al. (1997) showed that colorants in general can act as pro-oxidants. If they partake in the creation of radicals or reactive oxygen species, such as singlet oxygen (1Δg), they can trigger photo-degradation of the polymer matrix." "Conventional plastic products were found to regularly contain Fe, Ba, Ti, Zn, Cu and V. Some individual conventional plastic bag samples also contained Cr and Pb"

It cannot therefore be assumed that any plastic is free from additives with a pro-oxidant effect.

Art. 3(3) does not apply to oxo-biodegradable plastic, because the plastic material does not fragment into micro-fragments. The plastic material converts into hydrophilic oligomers, which are then consumed by micro-organisms; and conversion into oligomers is not chemical decomposition.

CONCLUSION

The court has failed to resolve the confusion which exists in the market.

Nobody would wish to prohibit plastic which does properly biodegrade, which reduces microplastic pollution in the environment, which does not negatively affect the recycling of conventional plastic, and which does deliver a proven environmental benefit. On the contrary, the use of such plastic should be encouraged.