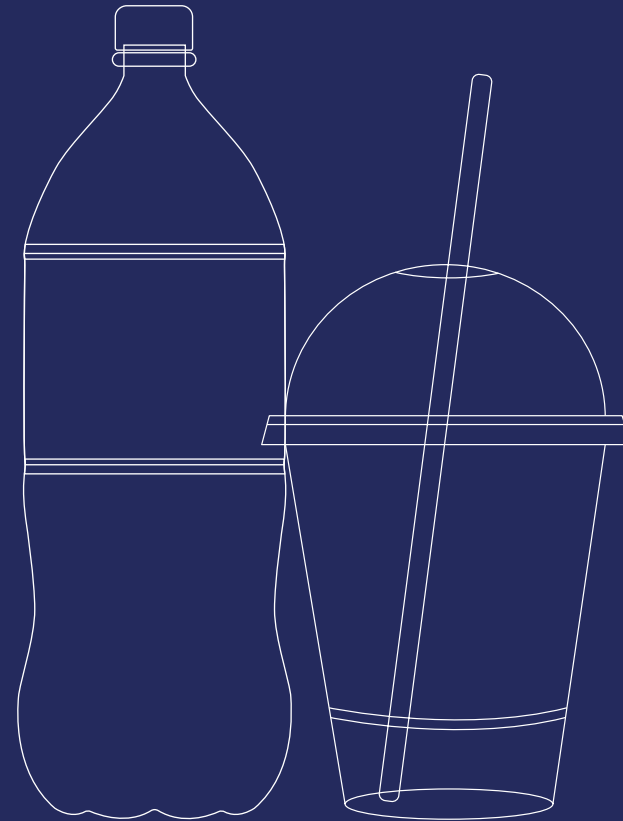


Petco position paper

on biodegradable and compostable packaging.



Introduction

This paper outlines Petco's position on the impact of biodegradable and compostable packaging on the PET recycling value chain.

Petco is a Producer Responsibility Organisation (PRO), incorporated in 2004, that administers Extended Producer Responsibility (EPR) schemes on behalf of its members for various identified products in the packaging sector. Petco serves as a national organisation responsible for driving recycling activities, unlocking the collection and recycling value chain, guiding product design, stimulating end-use markets for recycled material, carrying out education and awareness initiatives and building the required local recycling infrastructure and capacity.

Petco's strategic approach involves empowering its members to assume EPR and take accountability for their products throughout their products' entire life cycle, as mandated by Section 18 of the National Environmental Management: Waste Act (NEMA). Petco is committed to driving change towards a circular economy in South Africa's packaging industry in partnership with its members.

One of the identified products for which Petco administers an EPR scheme is PET packaging. In line with the EPR Regulations, Petco not only facilitates the collection of PET packaging, but also facilitates and supports the recycling of the collected material together with its recycling partners. Since Petco's establishment, Petco has supported the growth of the recycling industry, by means of infrastructure investment in PET recycling. Thousands of entrepreneurs have been trained and hundreds of SMMEs are supported with personal protective equipment, scales, cages, trailers and baling machines. In the South African context, job creation and small business support is a critical deliverable.

Despite the work done by Petco and other such organisations, plastic waste is escaping into the environment from which it cannot realistically be collected for recycling, or any other form of beneficiation. This is causing obvious public concern. For this reason, plastic has become something of a pariah, and a frenzy of "plastiphobia" is preventing us from having pragmatic and evidence-based discussion about the place of this material in our lives. **Plastic is in fact a useful and versatile material, when used in a fit-for-purpose manner.**

Plastic has enabled us to lead safer, healthier and more connected lives. The increased awareness around plastic pollution in the environment has led to the development of alternative packaging materials – namely bioplastics, and biodegradable and compostable materials. These alternatives are seen as the silver bullet to end plastic pollution and the "Plastic Crisis".

However, the introduction of these new packaging materials has not come without its own complications. One of the challenges is the lack of awareness and irresponsible marketing claims that created the impression, for some, that biodegradable and compostable packaging decompose quickly in the environment and solve the plastic pollution problem. WRAP, a climate action NGO working around the globe to tackle the causes of the climate crisis and give the planet a sustainable future, warns against this notion and states that, *"the nature of the material used to make a plastic or the term used to describe it does not necessarily dictate the way it will behave at the end of its life e.g. a bio-based plastic or bioplastic does not automatically mean it will biodegrade"*¹.

The following section provides a useful guide on the key concepts and facts on conventional, biodegradable, and compostable plastics.

¹ <https://www.wrap.ngo/sites/default/files/2020-09/WRAP-Understanding-plastic-packaging-FINAL.pdf>

Key concepts and facts

Plastic

Plastics are polymers. A polymer is made of many repeating units of monomers². Plastics can be made from non-renewable fossil-fuel-based materials (e.g. petrochemicals), often referred to as conventional plastics, or renewable bio-based materials (e.g. cornstarch, sugarcane etc.).

While fossil-fuel-based plastics are not naturally compostable or biodegradable, bio-based plastics /bioplastics can be designed to be compostable or biodegradable.

Biodegradable plastic

Plastic degraded by microorganisms into water, carbon dioxide (or methane) and biomass **under specified conditions**³. The speed, method and nature of biodegradation differs between materials.

Compostable plastic

A type of biodegradable plastic which breaks down into biomass, organic and inorganic compounds, carbon dioxide, and water in **specific composting conditions**. Composting can be done at home or in an industrial facility⁴.

Compostable plastic must meet a particular international standard for the material to decompose and biodegrade adequately in industrial composting conditions. It can have similar strength, plasticity and elasticity properties to non-biodegradable plastics and can be made into products using the same technologies (e.g. film processing or moulding).

Oxo-degradable plastic

Conventional plastic that has been supplemented with additives that mimic biodegradation. When the additives are exposed to heat and/or light they initiate and accelerate break-down of the plastic by a process known as “oxidative degradation”. Exposure to heat and/or light causes the molecules to break apart so that the plastic weakens in strength, becomes brittle and fragments into small pieces. The time taken for oxo-degradable plastic, like some carrier bags, to start to degrade will depend on the amount of additive in the plastic and the type of environmental conditions to which it is exposed. Therefore, it is not possible to accurately predict when the plastic will start to degrade. Too quickly and it could create

product quality and integrity issues; too long and it could compound the potential for microplastics to leak into our environment.



² <https://www.sciencehistory.org/education/classroom-activities/role-playing-games/case-of-plastics/science-of-plastics/>
#:~:text=Plastics%20are%20a%20group%20of,made%20of%20many%20repeating%20units.

³ <https://plasticseurope.org/plastics-explained/a-large-family/biodegradable-plastics/>

⁴ <https://www.rsc.org/globalassets/22-new-perspectives/sustainability/progressive-plastics/explainers/rsc-explainer-2-compostable-and-biodegradable-plastics.pdf>

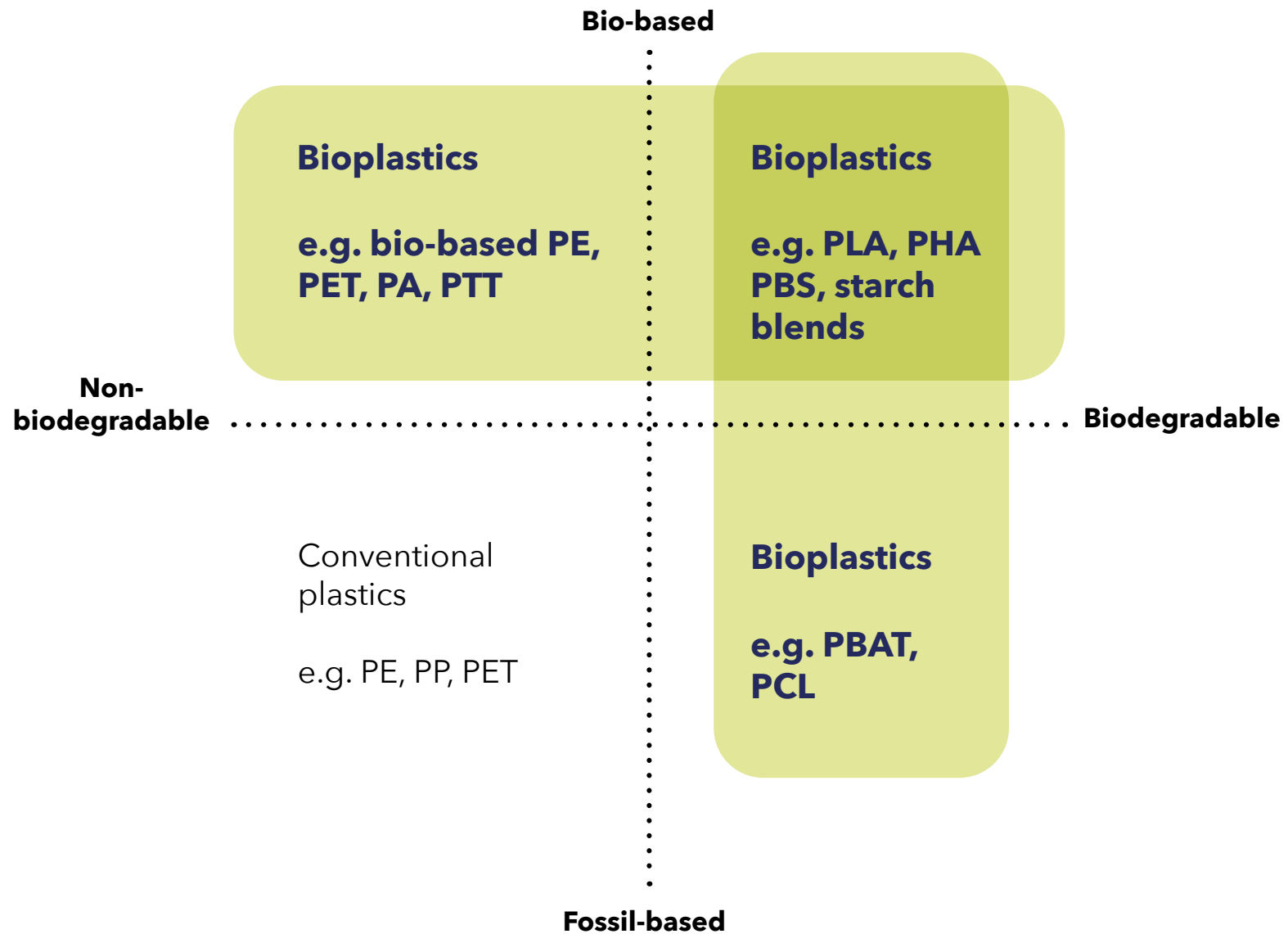


Figure 1: Classification of bio-plastics by material origin and biodegradability
<https://www.european-bioplastics.org/bioplastics/>

Challenges of biodegradable and compostable plastics⁵

Most South African consumers have limited awareness and understanding of what biodegradability and compostability mean and therefore what is required for responsible post-consumer management. The absence of effective education and awareness can create the misconception that biodegradable materials decompose rapidly in the environment, potentially exacerbating the littering culture.

Brand owners, retailers and consumers are typically unaware of the range of material types, their properties and the fact that different materials may only be certified to degrade or compost under specific, controlled conditions. Without the infrastructure and awareness to effectively sort and collect biodegradable and compostable plastics, it is unlikely that these materials will end up at appropriate processing facilities. The performance outside of the stipulated conditions is often poorly understood, but evidence suggests degradation rates are likely to be significantly slower.

The lack of certainty around how these materials perform outside of the conditions for which they are certified makes them problematic.



⁵ https://www.plasticsinfo.co.za/wp-content/uploads/2020/03/As-Is-Biodegradable-Packaging-Context-Paper_final_20March2020.pdf

Impacts on the PET recycling process

The introduction and proliferation of compostable and biodegradable plastics has posed specific challenges for PET recycling. These are mostly to do with Poly Lactic Acid (PLA) packaging, a compostable bioplastic made from the lactic acids found in corn starch. Transparent PLA packaging has gained popularity in the foodservices and hospitality sectors in the form of beverage bottles and cups.

It is understood that the transition from conventional plastic packaging to compostable alternatives is driven by consumer demands and increasing pressure on the foodservices and hospitality sector to reduce its ecological footprint. However, it is important to draw attention to the undesirable impacts of PLA on the PET recycling process.

The impacts of PLA on the PET recycling process are as follows:

1. PET and PLA are identical in appearance

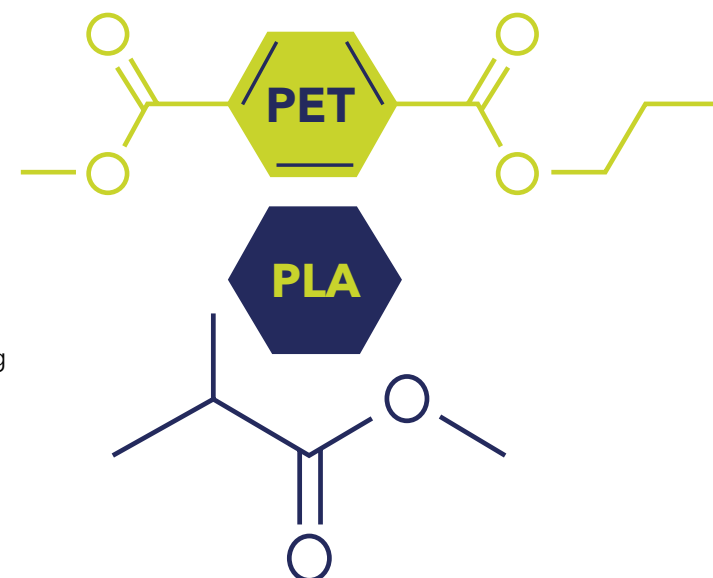
As with PET, PLA bottles, containers, packaging and foils are transparent. This makes visual distinction based on appearance between

a bottle made from PET and from PLA impossible. Consumers and manual sorters find it difficult to separate, unless clearly marked. This leads to non-recyclable PLA ending up in the recycling bins and ultimately at PET recycling plants leading to contamination.

2. PLA is NOT recyclable

When PLA ends up at PET recycling plants, it causes technical issues in the PET recycling process as it is not recyclable. The Recyclclass Design for Recycling Guidelines specifically list PLA as having low compatibility with the PET recycling process. Recyclclass define low compatibility as *"detrimental and disqualifying features that should be avoided when designing packaging, as these strongly impact the recycling process and/or the quality of the recycle"*⁶. PLA can only be composted when it meets the appropriate composting conditions (i.e. in an industrial composting facility designed to keep the material at 60°C for 10 consecutive days). This makes PLA incompatible with home composting or environmental degradation at ambient temperature. It is therefore important for biodegradable packaging to be clearly labelled

as biodegradable and non-recyclable and thereby making it easy for citizens to identify, separate and correctly dispose of. The majority of South Africans do not compost at home and South Africa does not have a widespread separate collection for organic waste, and there are few industrial composting operations. The likelihood that PLA material will get to an industrial composter is low.



⁶ <https://recyclclass.eu/recyclability/design-for-recycling-guidelines/>

Impacts on the PET recycling process

3. PET recycling rates and circularity

South Africa has a well-established mechanical recycling industry that provides a livelihood for many people in the collection, transport, and processing of recyclable plastics. Collection and recycling rates for certain material types, such as HDPE dairy packaging and PET beverage bottles, are among the highest in the world. The market for recycled polymers is dependent on confidence in the technical integrity of the recycled material. Material sorting is primarily by hand or density separation. Therefore, products made from incompatible materials that are difficult to distinguish from traditional polymers risk contaminating the recycling stream and reducing PET recycling rates and the circularity of bottle-to-bottle recycling.

4. Added costs for PET recycler

The presence of PLA bottles in PET bales, necessitates that recyclers remove these bottles, destroy them, and dispose of them to landfill. This results in PET recyclers incurring additional purchasing, labour, processing, destruction, and disposal costs.



Petco position

Without clear and easily identifiable labelling, and a well-established collection and processing value chain for compostable plastic, Petco opposes the use of biodegradable and compostable plastic, as it contaminates the PET recycling process. PLA bottle manufacturers must take responsibility for making sure that their products are not just clearly identifiable as not PET, but also include explicit instruction that the bottles must not be mixed with PET as it is not recyclable.

Furthermore, due to lack of education and awareness, there is public perception that biodegradable and compostable packaging will effortlessly decompose in the environment. This encourages poor consumer behaviour in the form of littering. Any plastic or other material that evades appropriate collection and treatment and then escapes into the environment has the potential to have a long-lasting impact on the environment. Therefore, Petco wishes to emphasise that biodegradable or compostable packaging is not a solution to littering. Biodegradable and compostable packaging must be collected and

processed under appropriate conditions that facilitate their breakdown. In addition, Petco opposes the use of pro-degradant additives to PET packaging. Degradation leads to fragmentation, making it harder to collect the material and contributing to environmental leakage. Even if the plastics do not degrade until they end up in landfill, they should not degrade once there. Degradation can release methane and carbon dioxide emissions, which require further treatment on landfills⁷. Promoting degradation of any kind moves us away from the circular economy and back towards a “make, take, dispose” form of consumption.

Petco is not against the use of bio-based, non-biodegradable polymers, such as bio-PET as these materials are essentially identical to the petrochemical-based materials. Therefore, they are compatible with the current collection and recycling landscape in South Africa.

It is crucial that any environmental claims are backed by sound science and standards. All environmental claims such as biodegradability, compostability

or bio-based content must be in compliance with appropriate standards such as SANS 1728 that requires that all biodegradable, compostable, and oxo-biodegradable plastics comply with the following international standards:

- Biodegradable: DIN 38412:30 or ISO 14855-1
- Compostable: ISO 17088, EN 13432, or ASTM D6400
- Oxo-biodegradable: ASTM D6954-04

Petco encourages and supports any packaging innovations that are fit for purpose and that can be disposed of responsibly or reused at the end of their useful life. The standards that define biodegradability are specific about the conditions required for specific packaging to be biodegradable and compostable. Therefore, if a product is certified it will have been tested under those specific conditions.

It is crucial to recognise that the plastics industry is an important part of the South African economy that creates income opportunities through the collection and recycling chain.

⁷ Is Biodegradability a Desirable Attribute for Discarded Solid Waste? Perspectives from a National Landfill Greenhouse Gas Inventory Model (2011) James W. Levis and Morton A. Barlaz. Environ. Sci. Technol. 2011, 45, 13, 5470-5476 <https://doi.org/10.1021/es200721s>

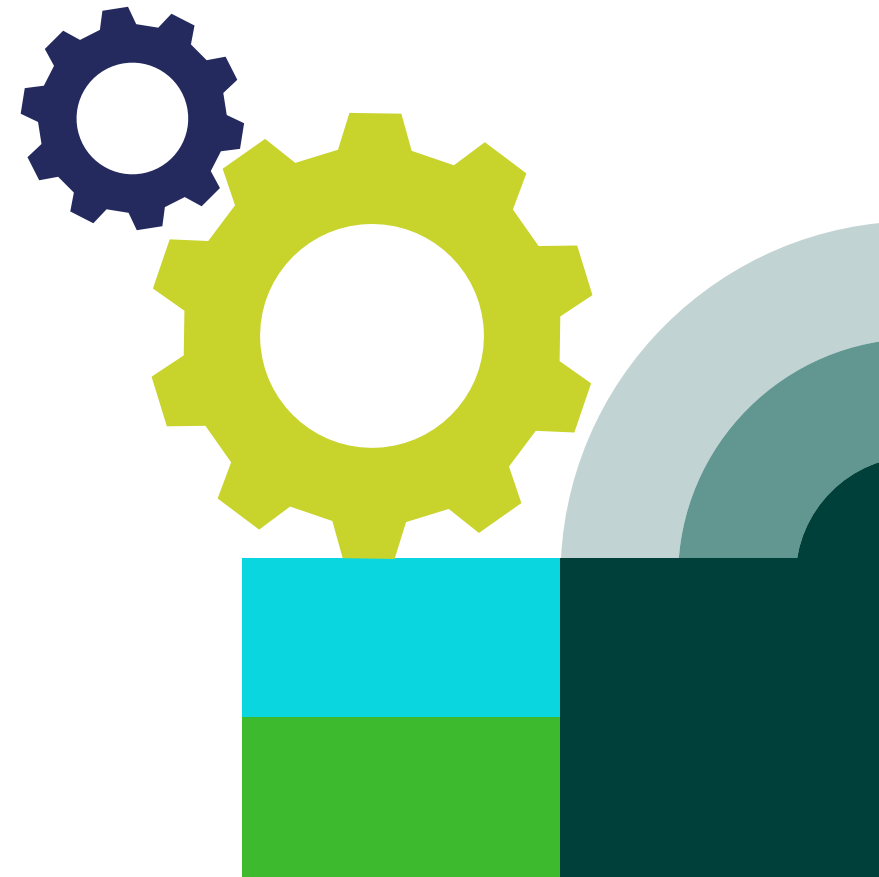
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