GO!PHA
Global Organization for PHA

UN GLOBAL PLASTICS TREATY (INC-4)

GO!PHA POSITION STATEMENT

About Us

Foundation **GO!**PHA is a member-driven, non-profit initiative promoting the use of renewable carbon-based and sustainable materials to help transition to a circular economy.

Renewable, biodegradable, and compostable materials provide a unique opportunity to reduce greenhouse gases and environmental plastic pollution while establishing circularity in materials used by offering sustainable, functional, and natural materials that are renewable and offer diverse end-of-life options. **GO!**PHA provides a platform for creating and sharing experiences and knowledge and facilitates joint development initiatives using these natural, unique, and innovative materials.

We commend the Intergovernmental Negotiating Committee (on Plastic Pollution) on publishing the revised Zero Draft on the United Nations Global Plastics Treaty. The text provides a strong foundation towards enacting the treaty. An effective treaty must consider a wide range of large-scale solutions and holistic initiatives to close the tap on fossil fuels-based and harmful materials. **GO!**PHA believes that more needs to be done to promote the transition towards circular and sustainable materials as substitutes and alternatives that can replace fossil and persistent plastics while providing the same benefits that plastics provide without the downsides.

Our recommendations

1. Rigorous and fair assessment criteria for all major proposed solutions
2. A level playing field for assessing materials and technologies capable of safe material substitution
3. A robust and inclusive science-policy interface that fosters innovation
4. Stricter measures to address the dangers of microplastics
5. Strong measures throughout material and product life cycles to maximise the use of suitable substitutes

To achieve the goal of reducing and ultimately eliminating the production and use of harmful plastics and additives worldwide, it is essential to adopt renewable, biodegradable, and compostable materials to achieve true circularity and sustainability. Considerable advancements in the last 40 years have shown suitable substitutes that are functional and are renewable, biodegradable, and compostable can reduce our dependence on fossil-based plastics. Therefore, we believe that the treaty should mandate concrete and actionable steps to promote the rapid development and use of materials and chemicals that are renewable, recyclable, compostable, and free from persistent microplastics. We recommend focussing on the following;

Origin

Materials that can be derived from **renewable carbon sources** and can be commercially extracted, processed, or synthesised using **natural processes** such as fermentation to develop bio-benign and biocompatible materials similar to cellulose, proteins, starch, and PHAs.

Functionality

Materials that exhibit **functionality** to substitute fossil polymers where relevant. They should also fit the present waste management hierarchy, and can be **effectively reused, recycled, and composted** in home and industrial settings.

Impact

Materials that exhibit **lower environmental impact** due to their **renewable sourcing**, recyclability and biodegradability; making them a **sustainable choice** throughout their lifecycle.

Safety

Materials that are **benign to all forms of life and natural environments** and in the event of unforeseen circumstances, degrade naturally without causing harmful impacts to the environment.

Natural and Renewable
No fossil carbon

Recycling through re-design, improved Waste Collection, and carbon recycling Infrastructure composting and anaerobic digestion.

Promote Compostable Materials to Improve Organic (Waste) Carbon Recycling

Use Marine Biodegradable Materials to Eliminate Microplastic Pollution

Following the above four defining principles, GO!PHA urges the UNEP to enact our suggestions on alternatives and substitutes in the next version of the treaty document.

1 Rigorous and fair assessment criteria for all major proposed solutions

We recommend prioritising transitioning away from fossil-based plastics and promoting standardised product formulations to facilitate reuse and recycling of safe materials and products within a circular economy. While strategies for improving the circularity of plastic products are important, the focus should broaden to include the development and adoption of non-plastic substitutes and alternative materials that are inherently sustainable and safe. Drawing from the suggestions of intergovernmental organisations like UNCTAD and WTO, the treaty should support the development and widespread use of non-plastic substitutes and plastic alternatives, considering their origin, properties, impact, and safety, to effectively mitigate the diverse challenges associated with plastic pollution and advance towards more sustainable practices and materials.

2 A level playing field for assessing materials and technologies capable of safe material substitution

Terms like "environmentally sound," "environmental viability," and "sustainable"are consistently used in reference to suitability of alternative plastics and non-plastic substitutes. These must be clearly explained and defined through the science policy interface to develop scientifically backed criteria and prevent greenwashing practices. Assessment criteria for alternative plastics and non-plastic substitutes should prioritise properties such as renewability, safe compostability, and natural biodegradability without persistent microplastic release in case of unintended leakage. These criteria must also ensure unbiased representation of information, undergo rigorous peer review, and be regularly updated to reflect the latest scientific knowledge.

Moreover, it is critical to address and rectify any text linking the effectiveness to manage (ban, reduce, phase-out or regulate) fossil plastics and associated chemicals directly with the availability of sustainable alternative plastics, as this could lead to complacency and hinder the pursuit of innovative solutions in the sector.

Plastic alternatives and non-plastic substitutes require comprehensive support beyond affordability, including research, development, innovation, market incentives, and policy frameworks that actively promote their adoption and integration into various industries. As much research and best practices across the globe already exist and indicate many natural materials like wood, cellulose, proteins, starch, and natural PHA, can serve as substitutes for traditional fossil-based materials.

3 A robust and inclusive science-policy interface that fosters innovation

It is imperative to establish a robust and inclusive science-policy interface that fosters innovation while navigating the complexities of adapting concepts, sources, and definitions to suit specific rulemaking purposes and scopes. For this, the roles and responsibilities of the interface, facilitated by subsidiary bodies outlined in the revised Zero Draft, need to be clearly articulated. Given the vast range of topics in this instrument, the composition of engaged experts must be diverse. It will be critical to consistently engage the diverse stakeholders throughout the process, and communicate openly about decision-making criteria, methodologies, and outcomes. Additionally, the interface's should bridge the gap between scientific innovation and the evaluation of scientific measures for policy frameworks, promoting effective decision-making and policy implementation.

4 Stricter measures to address the dangers of microplastics

IWhile the current focus is primarily on intentionally added microplastics, it's essential to address the issue of microplastics released unintentionally from plastic products. Additionally, it's important to note that recycling processes frequently overlook microplastics. The treaty text focuses primarily on waste management, neglecting two significant aspects: 1) the continued presence and release of microplastics in recycled plastics, and 2) the eventual release of microplastics as recycled plastic items degrade at the end of their lifespan. The dangers that come with plastics do not vanish, even in the best-case scenario when they are properly discarded or treated as per waste management rules. The consequences of plastic ingestion by living organisms, as it degrades into micro and nanoparticles, have been largely overlooked and underestimated.

5 Strong measures throughout material and product life cycles to maximise the use of suitable substitutes

In maximising the use of suitable substitutes, the guiding principle should be to diversify the materials landscape and reduce reliance on traditional plastics. By prioritising non-plastic substitutes during the production phase, the zero draft takes a strong position to address the plastic problem. The focus must be on selecting sustainable materials from the outset, thereby addressing plastic pollution issues at their source. Although treatment of alternative plastics and non-plastic substitutes differs, it must be noted that both are significantly better and preferable over fossil fuel-based plastics. Furthermore, sustainable alternatives and non-plastic substitutes can be designed to promote reusability, seamlessly integrating into existing waste management hierarchies. Additionally, initiatives encouraging composting and anaerobic digestion must be supported in the transition to a circular economy. by minimising waste and maximising the utility of organic materials, these processes can yield valuable resources like compost and biogas, which contribute to soil enrichment and renewable energy generation. This approach also aligns with the circular bioeconomy objectives of various nations, including in the European Union, the United States, India, and many countries in Africa.

How can suitable substitutes and alternatives to plastics contribute to the goals of the Global Treaty?

The significance of suitable substitute polymers is that they originate from natural processes within plants, animals, fungi, or bacteria during their production, which does not depend on fossil fuels. Moreover, at the end of their lifecycle, they are biodegradable, and hence can be composted without generating persistent microparticles during biodegradation. Researchers and innovators around the world have discovered, and successfully reproduced, their natural processes and features, such as biodegradability, compostability, and renewability for commercial applications.

When manufactured responsibly, adhering to safety and environmental guidelines, and when reused and recycled in appropriate infrastructures, these materials can serve as environmentally sound and safe alternatives including packaging among other applications that are made from fossil plastics.

RENEWABLE & BIO-BASED

BIODEGRADABLE

BIOCOMPATIBLE

CIRCULARITY & END-OF-LIFE

WHAT SUITABLE SUBSTITUTES ARE	WHAT SUITABLE SUBSTITUTES ARE NOT
Natural and Renewable No fossil carbon	A license to litter
Compatible with circularity design - reusable, recyclable and compostable	A substitute for proper waste management
Biodegradable - in cases when recycling or reuse is not an option	A means to circumvent safe product development standards and regulations
Non-persistent in the environment Microplastics-free	An alternative to reducing superfluous products

About PHA [2-6]

Polyhydroxyalkanoate (PHA) biopolymers are a class of natural materials that have existed for over 2 billion years. Like other natural materials such as wood, cellulose, proteins, and starch, PHA is produced in nature and this natural process (fermentation) is being used to produce them commercially. Being a natural material, PHA is benign to living beings and is marine, freshwater, and soil biodegradable.

PHA is thermoplastic in nature having the attributes of 7 of the top-selling fossil plastics in the world. PHA is being used in many applications to successfully replace fossil plastics [5]. PHA can be recycled for reuse, they are home and industrially compostable, and if they were to leak, they biodegrade in the marine environment, freshwater, and soil. Therefore, PHA does not create microplastics and in some countries, they are even being used as animal feed.

[1] Ellen MacArthur Foundation UNEP Report
[2] Koller, Martin & Mukherjee, Anindya. (2020). Polyhydroxyalkanoates – Linking Properties, Applications and End-of-life Options. Chemical & biochemical engineering quarterly. https://doi.org/10.15255/CABEQ.2020.1819
[3] Mukherjee, Anindya & Koller, Martin. (2022). Polyhydroxyalkanoate (PHA) Biopolyesters - Emerging and Major Products of Industrial Biotechnology. The EuroBiotech Journal. https://doi.org/10.2478/ebtj-2022-0007
[4] Koller, Martin & Mukherjee, Anindya. (2023). Polyhydroxyalkanoate (PHA) Bio-polyesters – Circular Materials for Sustainable Development and Growth. Chemical and Biochemical Engineering Quarterly. https://doi.org/10.15255/CABEQ.2022.2124
[5] Koller, M., Mukherjee, A., Obruca, S., Zinn, M. (2022). Polyhydroxyalkanoates (PHA): Microbial Synthesis of Natural Polyesters. In: Rehm, B.H.A., Wibowo, D. (eds) Microbial Production of High-Value Products. Microbiology Monographs, vol 37. Springer, Cham. https://doi.org/10.1007/978-3-031-06600-9_8
[6] Koller, Martin & Mukherjee, Anindya. (2022). A New Wave of Industrialization of PHA Biopolyesters. Bioengineering. https://doi.org/10.3390/bioengineering9020074