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**NEW REPORT OFFERS TRANSPARENCY AROUND ALTERNATIVE MATERIALS
TO REPLACE SINGLE-USE PLASTICS**

Study Shows Environment, Thickness, and Polymer Type Impact Fragmentation of Biomaterials

SANTA MONICA, CALIFORNIA (November 14, 2023) – A new report, published today by The 5 Gyres Institute, provides a first-of-its-kind look at how bioplastic products and packaging break down in various natural environments. Better Alternatives 3.0 offers greater transparency around these novel materials, their real-world behavior in the environment, and considerations that should be made before the widespread adoption of bioplastics in all sectors of society.

The field study took place in six environments across Florida, California, and Maine, representing different ecological conditions, including the ocean, a desert, the everglades, and a temperate forest. The study tested 22 items, including straws, thin film, utensils, bottles, bottle caps, pens, bags, tampon applicators, and baby wipes, over 64 weeks. Different polymers and blends were tested, including traditional plastics (e.g., polyethylene (PE) and polystyrene (PS)), bioplastics, (e.g., polyhydroxyalkanoates (PHA) and polyhydroxybutyrate (PHB)), and natural alternatives (e.g., paper and bamboo).

The study revealed that there was a wide range in degradation rates for bioplastics, but traditional fossil fuel plastics were persistent in all environments. Environment, product thickness, and polymer type were important factors in environmental persistence for bioplastics. Items persisted much longer in terrestrial than marine environments, likely due to lack of moisture and microbial activity. Thickness and design also affected degradation rates, with thinner items fragmenting at a faster rate. Polymers like PHA degraded more quickly than PLA, and degraded in similar timeframes to paper and bamboo.

“Our research shows that real-world factors greatly impact what happens to a product if it ends up in the environment,” said Dr. Marcus Eriksen, Co-founder and Researcher at The 5 Gyres Institute. “An item may be advertised as biodegradable or compostable, but under what conditions? We need greater transparency and truth in advertising about the things we buy. Better Alternatives 3.0 can support both stakeholders and consumers in making better decisions for the health of people and the planet.”

The report also offers insight into the specific sectors in which biomaterials may play a role in the shift away from fossil fuel-based plastics. For example, the use of plastic mulch in agriculture often leaves behind microplastic fragments in the soil. Also, plastic fishing gear is a major contributor to ocean plastic pollution. For items like meats and cheeses, shrink-wrapped film offers superior protection against pathogens and leaks compared to other available materials. While bioplastics are not functional replacements for the majority of single-use plastic products and packaging, they offer potential to mitigate harm in specific cases.

“There is no silver bullet solution for the plastics crisis,” said Dr. Lisa Erdle, Director of Science & Innovation at The 5 Gyres Institute. “Instead, we need targeted solutions that address each sector of plastic use in society, from textiles and tires to agriculture and electronics. There are opportunities for upstream innovations across all sectors, and for some sectors, bioplastics offer an alternative to traditional plastics.”

To harness the potential of new biomaterials, stakeholders must prioritize truth in advertising, strengthen waste management practices, and foster responsible practices through fair legislation. Further research is needed to comprehensively understand their environmental impacts, such as the impact of additives on degradation and toxicity.

Better Alternatives 3.0 follows previous reports in the series, Better Alternatives Now (BAN) List 2.0 (2018) and BAN List (2016). For more information, visit 5gyres.org/BetterAlternatives.

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About The 5 Gyres Institute

The 5 Gyres Institute (5 Gyres) is a leader in the global movement against plastic pollution with more than 10 years of expertise in scientific research, engagement, and education. With the original goal of answering a few key scientific questions about ocean plastics, co-founders Marcus Eriksen and Anna Cummins led 19 research expeditions in all five subtropical gyres, as well as many of the world’s lakes and rivers. 5 Gyres continues to lead with scientific research to drive upstream solutions through education, advocacy, and community building. Learn more at 5gyres.org and [@5gyres](https://twitter.com/5gyres).