

The diversity of AP materials is equivalent to their extensive and increasing applications in multiple areas. Moreover, performing long-time experiments is essential since the more quickly eliminated groups, measured in short-time experiments, generate overestimation of the degradation rates because the C–C backbone cleavage, the most recalcitrant segment, is not quantified, providing with false expectations about how long an AP would last to be degraded. The knowledge of genes encoding AP biodegradative enzymes will be a starting point for cloning genes for producing recombinant proteins, developing metabolic engineering strategies, and doing directed evolution research that will open a vast panorama for biotechnological advances. The C–C backbone, the presence of side groups, quaternary carbons, and impurities of AP products significantly affect the biodegradability assessment, which is crucial in defining the magnitude of AP environmental impact. Nevertheless, the current information about the effect AP releases generate and the damages that can be foreseen by their accumulation in the environment, plus the toxicity of some of their components, indicates that regulations for controlling AP use and waste management should be established. An AP biodegradability assessment, which defines the biodegradation rate a polymer is degraded, will depend on the polymer's structure, the microorganisms and the environment where the process is carried out, and the techniques used to quantitate AP degradation. Using isotopic C-labeled AP materials for quantifying transformation to CO₂, biomass, or intermediate biodegradation products is the more objective approach. Significant advances in the elucidation of AP biodegradative pathways have been reached, mainly supported by analytical techniques.