Enzymatic Synthesis of Linear and Thermally Stable Biobased Long-Chain Polyesters

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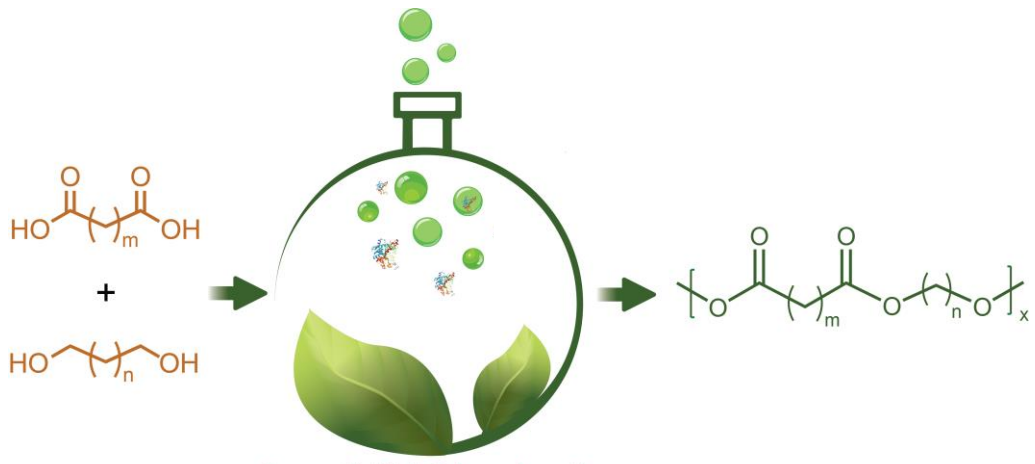
Motivation- Research Strategy

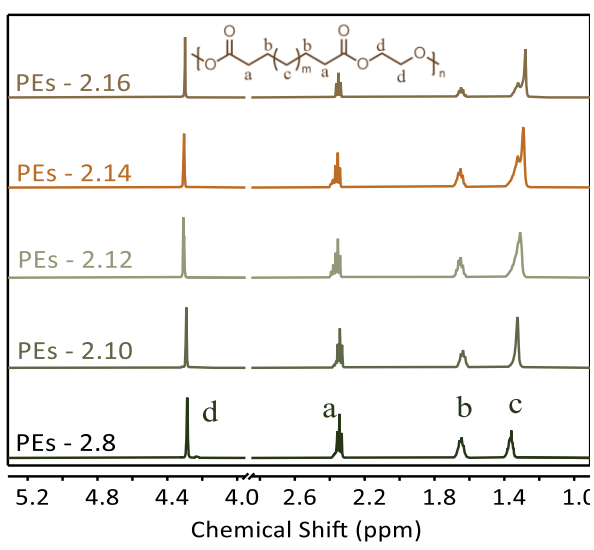
The exponential growth in plastic production coupled with inadequate disposal practices, severely impacts natural ecosystems.

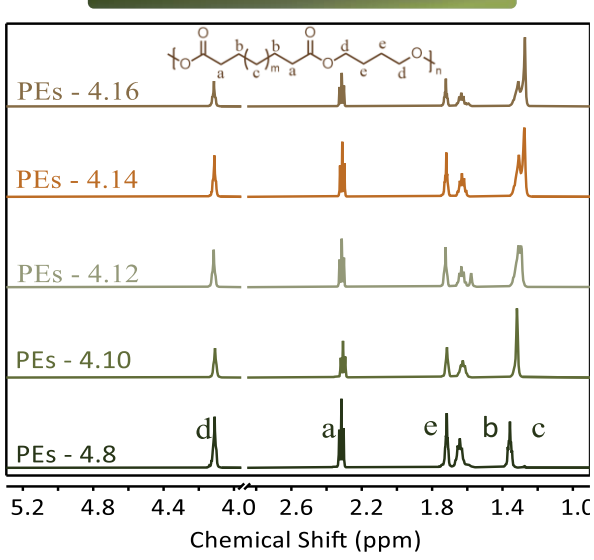
Polyethylene serves as a valuable feedstock for chemical transformation via depolymerization and upcycling strategies.

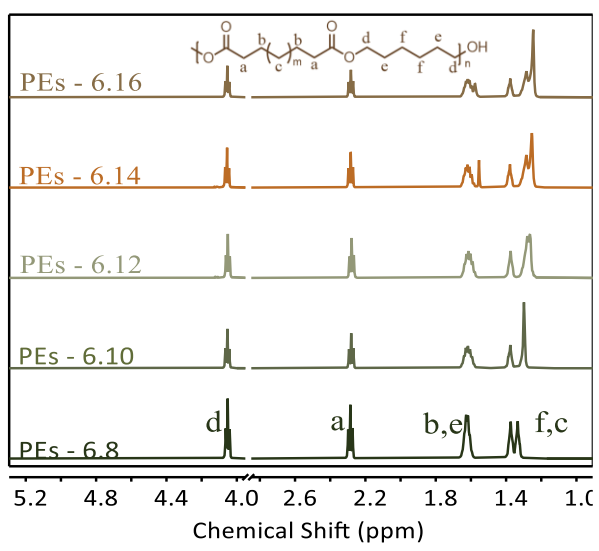
The development of enzymatic polymerization strategies aims to create a sustainable upcycling route that supports the transition to a circular plastic economy.

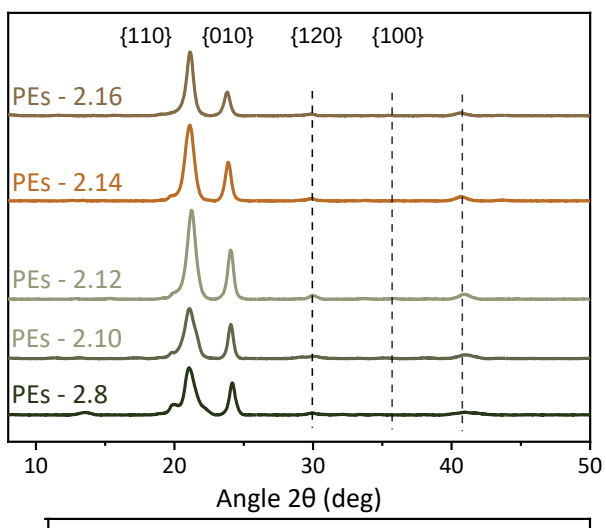


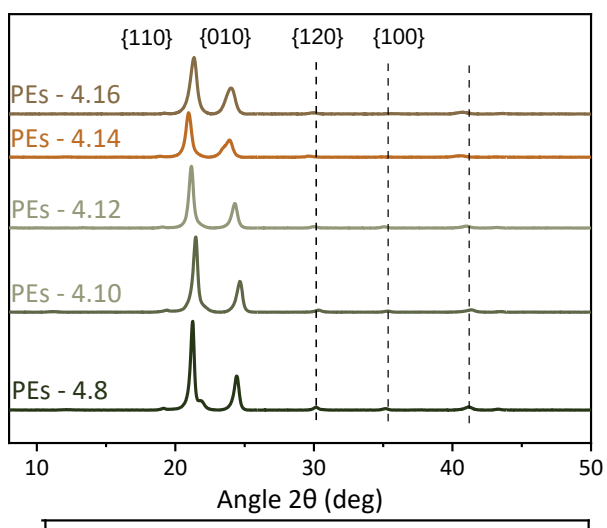
Results & Discussion

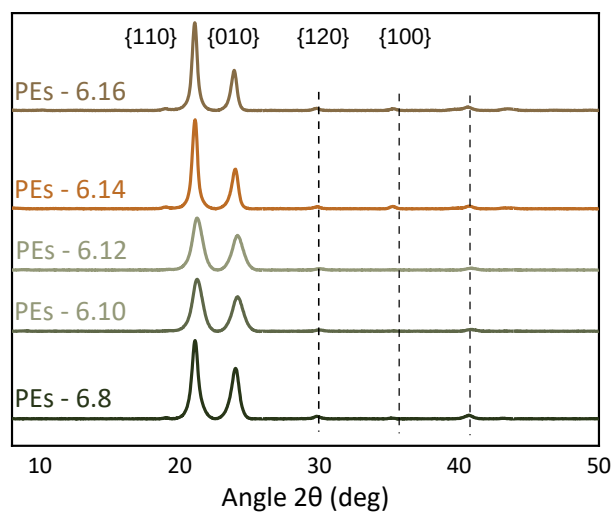


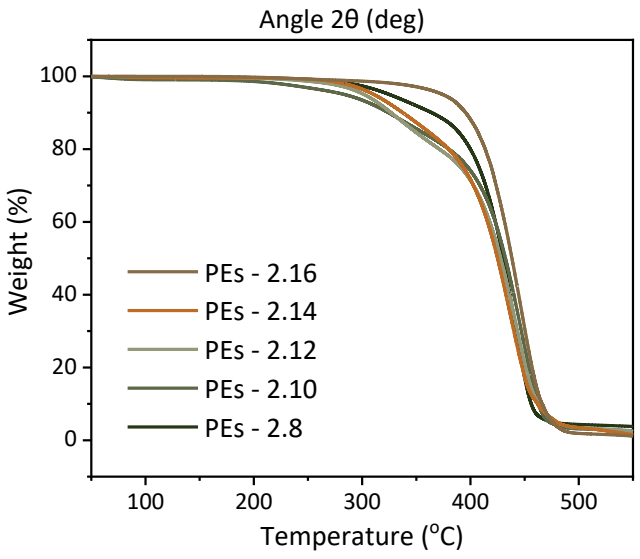


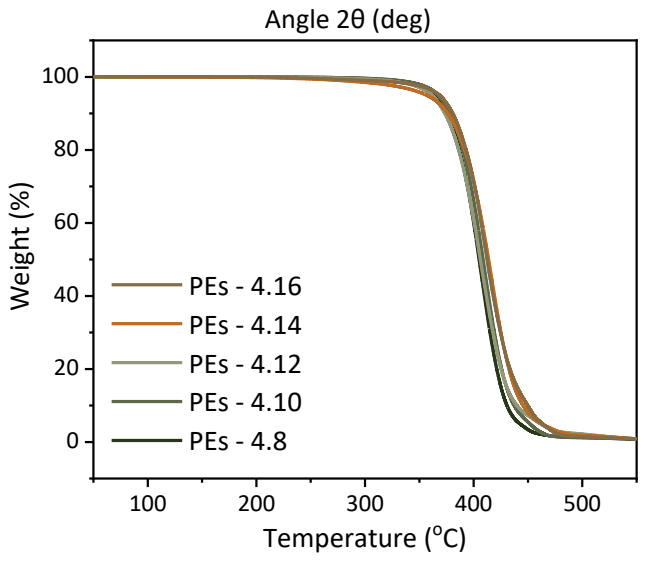


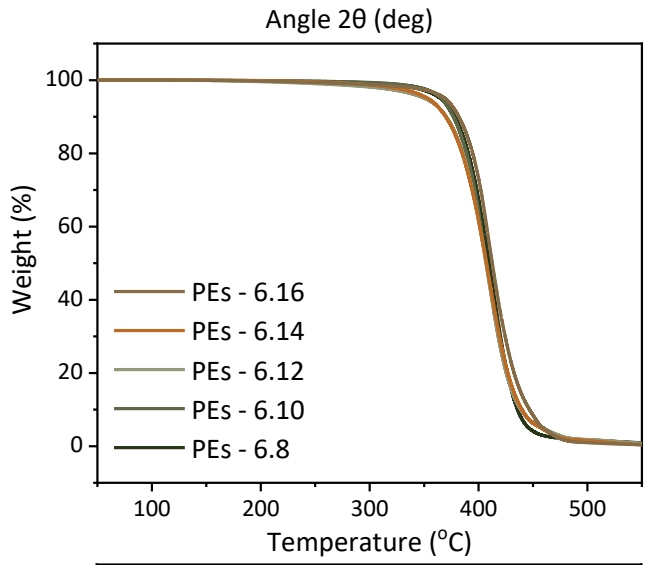


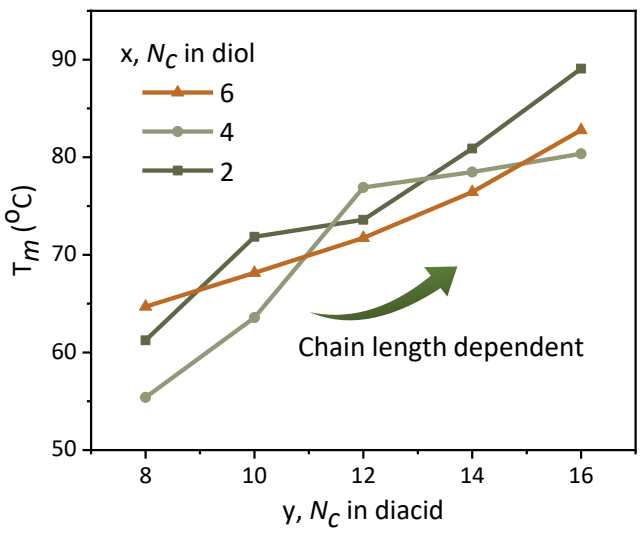


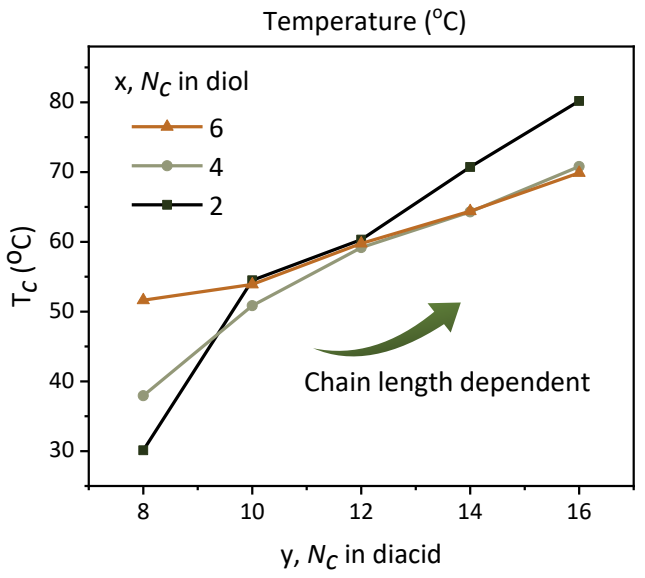


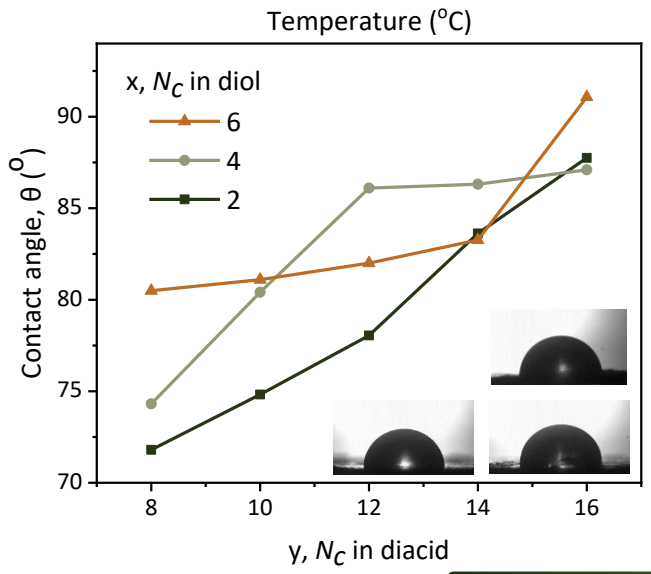












Outline

- Enzymatic polymerization, coupled with solvent-free process, successfully produced long-chain biobased polyesters, thereby enhancing the sustainability of enzymatic polymerization.
- The polyesters demonstrated good thermal stability, showing no weight loss at temperatures ≤250 °C.
- The resulting polyesters showed a polyethylene-like crystalline structure and rapid crystallization, with melting temperatures and hydrophobicity increasing proportionally with diacid chain length.

References

- Sahu P., Sharma L., Dawsey T., Gupta R.K., J Appl Polym Sci. **2024**; 141(8):e54972.
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