COMBINATORIAL ENGINEERING OF PET AND PLA DEGRADING ENZYMES

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The issue of plastic waste has become one of the most prevalent subjects in the global discussion of ecology and the environment. The use of bioplastics is one emerging method to address this issue. Another is the implementation of plastic degrading enzymes. PETase from *Ideonella sakaiensis* 201-F6 is an esterase capable of degrading the conventional plastic polyethylene terephthalate (PET). Lip1 is an intracellular lipase from *Pseudomonas chlororaphis* PA23 capable of degrading several types of bioplastics, including polyhydroxyalkanoates (PHA), polycaprolactone (PCL), polylactic acid (PLA), and polyethylene succinate (PES). A combination of artificial intelligence, ancestral sequence reconstruction, and rational protein engineering has been used to increase the thermostability and activity of these enzymes. Here we describe the crystal structure of the improved enzymes and highlight the importance of the engineered mutations for the development of a circular economy.

References:


