

Table S1 Organisms capable of degrading PE

Type	Organism	Source	Reference
fungi	<i>Penicillium citrinum</i>	Landfill soil	(Khan et al., 2022)
	<i>Streptomyces Albogriseolus LBX-2</i>	Soil sample	(Shao et al., 2019a)
	<i>Zalerion maritimum</i>	Ocean	(Paço et al., 2017)
	<i>Aspergillus flavus</i>	Galleria mellonella gut	(Zhang et al., 2020a)
	<i>Trichoderma asperellum</i>	Soil	(Zhu et al., 2024)
	<i>Rhizopus arrhizus</i> SLNEA1	Landfill	(Harrat et al., 2024)
	<i>Bacillus</i> sp. YP1	Waxworm gut	(Yang et al., 2015)
	<i>Alcanivorax</i> sp. 24	Marine plastic debris	(Zadjelovic et al., 2022)
	<i>Enterobacter asburiae</i> YT1	Waxworm gut	(Yang et al., 2014)
	<i>Bacillus</i> sp. YP1	Waxworm gut	(Yang et al., 2014)
<i>Jacksonvillea</i> sp. ISTCYN1	Farmland	(Mishra et al., 2021)	
<i>Brevibaccillus borstelensis</i>	Soil	(Hadad et al., 2005)	

<i>Acinetobacter baumannii</i> Rd-H2	Rhizopertha dominica	(Zhang et al., 2022c)
<i>Kocuria palustris</i> M16, <i>Bacillus pumilus</i> M27 and <i>Bacillus subtilis</i> H1584 b	Ocean	(Harshvardhan et al., 2013)
<i>Bacillus velezensis</i> MT9	Ocean	(Bajo et al., 2024)
<i>Nocardia asteroides</i> No.11	Farmland soil	(Bai et al., 2024)
<i>Rhodococcus hoagii</i> No.17		
<i>Cupriavidus necator</i> H16	ATCC	
<i>Pseudomonas putida</i> LS46	Hog barn wastewater	(Nguyen et al., 2024)
<i>Pseudomonas chlororaphis</i> PA2361	ATCC(American Type Culture Collection)	
<i>Bacillus velezensis</i> C5	Untreated commercial polyethylene wrap	(Tang et al., 2024)
<i>Tenebrio molitor</i>		(Brandon et al., 2018)

	Galleria mellonella		(Bombelli et al., 2017)
	Waxworm		(Kundungal et al., 2019)
	Green alga <i>Scenedesmus</i> <i>dimorphus</i> , blue- green alga <i>Anabaena</i> <i>spiroides</i> and Diatom <i>Navicula pupula</i>	PE bags in urban water	(Kumar et al., 2017)
alga	<i>Phormidium</i> <i>lucidum</i> and <i>Oscillatoria subbrevis</i>	PE bag in domestic sewage	(Sarmah et al., 2018)
	<i>Aspergillus niger</i> ,	Engineering	
	<i>Aspergillus flavus</i> and <i>Aspergillus oryzae</i>	Indian Institute of RV	(DSouza et al., 2021)
	<i>Acinetobacter</i> sp. NyZ450 and <i>Bacillus</i> sp. NyZ451	Tenebrio molitor gut	(Yin et al., 2020)
	MgZJC1 and SmZJC2	Indian meal moth gut	(Lou et al., 2022)

<i>Bacillus pumilus</i> , <i>Bacillus halodenitrificans</i> and <i>Bacillus cereus</i>		(Roy et al., 2008)
<i>Lysinibacillus xylanilyticus</i> and <i>Aspergillus niger</i>	Landfill	(Esmaeili et al., 2013)
<i>Bacillus</i> and <i>Paenibacillus</i>	Municipal landfill site	(Park et al., 2019)
<i>Alternaria</i> sp. CPEF-1 and <i>Trametes</i> sp. PE2F-4	Soil	(Yang et al., 2024)

Table S2 PE degrading enzyme efficiency and activity

Enzyme type	Source	PE degradation rate or enzyme activity	Reference
Alkane monooxygenase	<i>Pseudomonas aeruginosa</i> E7	Degradation of 18.5 % LMWPE during 78 days	(Jeon et al., 2015b)
	<i>Pseudomonas aeruginosa</i> E4	Degradation of 19.3 % LMWPE during 80 days	(Gyung et al., 2012b)
Multi-copper oxidase	<i>Klebsiella pneumoniae</i> Mk-1	85.19 U/L	(Zhang et al., 2023)
	<i>Acinetobacter baumannii</i> Rd-H2	159.82 U/L	(Zhang et al., 2022c)

	<i>Sterigmatomyces halophilus</i>		
	SSA1575、 <i>Meyerozyma</i>	2114 ± 47 U/L	
	<i>guilliermondii</i> SSA1547 and		
	<i>Meyerozyma guilliermondii</i> SSA1547		
	<i>Sterigmatomyces halophilus</i>		
Laccase	SSA1575	995 ± 35 U/L	(Elsamahy et al., 2023)
	<i>Meyerozyma guilliermondii</i>		
	SSA1547	1115 ± 20 U/L	
	<i>Meyerozyma caribbica</i>		
	SSA1654	1077 ± 32 U/L	
	<i>Aspergillus carbonarius</i> and <i>A.</i>		
	<i>fumigates</i>	325 U/L	(Sayed et al., 2021)
	<i>Sterigmatomyces halophilus</i>		
	SSA1575、 <i>Meyerozyma</i>		
	<i>guilliermondii</i> SSA1547 and	1975 ± 36 U/L	
	<i>Meyerozyma guilliermondii</i> SSA1547		
Manganese	<i>Sterigmatomyces halophilus</i>		
peroxidase	SSA1575	1126 ± 32 U/L	(Elsamahy et al., 2023)
	<i>Meyerozyma guilliermondii</i>		
	SSA1547	950 ± 25 U/L	
	<i>Meyerozyma caribbica</i>		
	SSA1654	840 ± 21 U/L	
	<i>Aspergillus carbonarius</i> and <i>A.</i>	583 U/L	(Sayed et

	<i>fumigates</i>		al., 2021)
	<i>Sterigmatomyces halophilus</i>		
	SSA1575、 <i>Meyerozyma</i>	2113 ± 57 U/L	
	<i>guilliermondii</i> SSA1547 and		
	<i>Meyerozyma guilliermondii</i> SSA1547		
	<i>Sterigmatomyces halophilus</i>		
Lipase	SSA1575	660 ± 18 U/L	(Elsamahy et al., 2023)
	<i>Meyerozyma guilliermondii</i>		
	SSA1547	1136 ± 46 U/L	
	<i>Meyerozyma caribbica</i>		
	SSA1654	889 ± 26 U/L	
