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Title: Genetic improvement of polyester degrading enzymes

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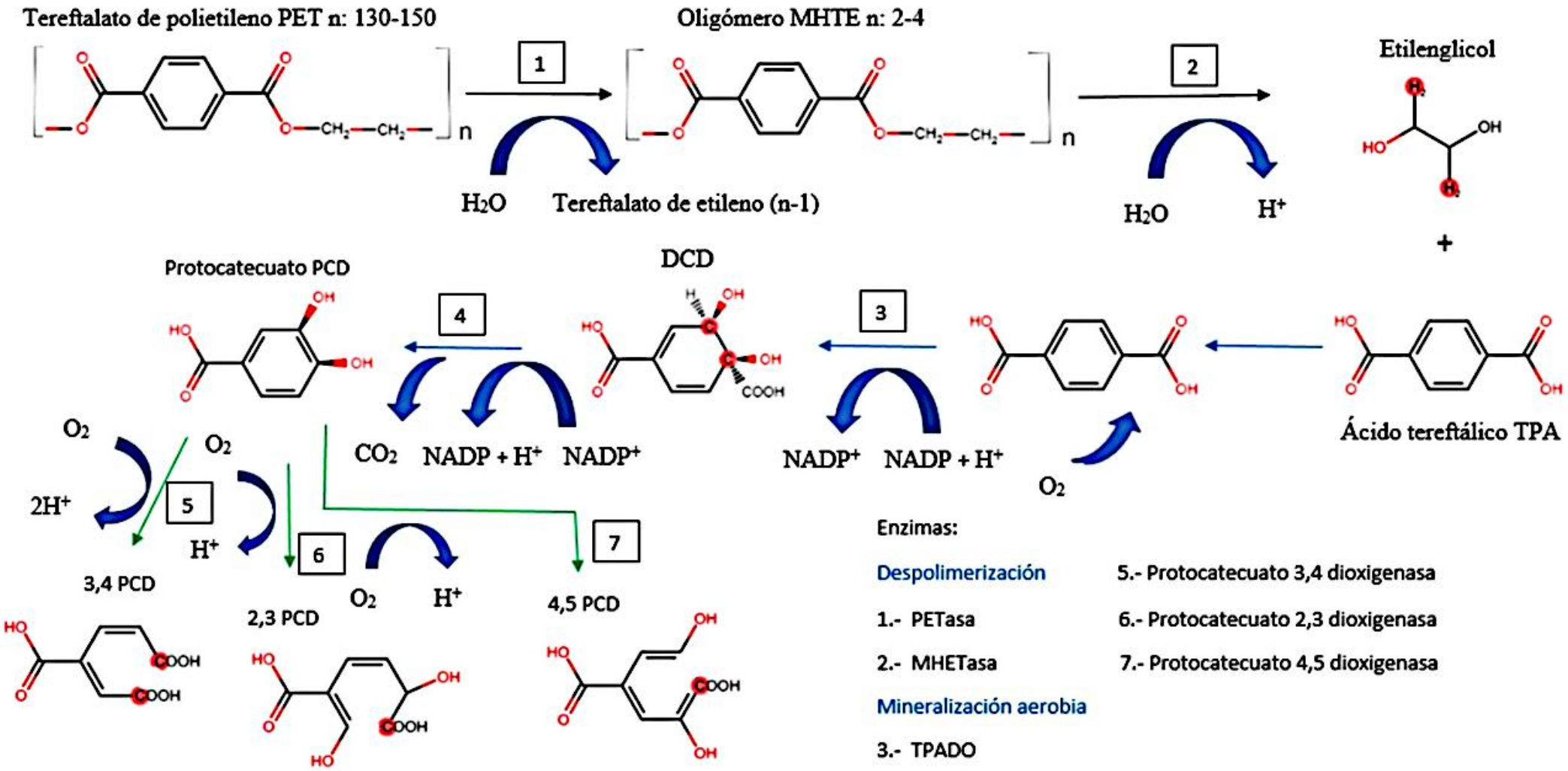
Introduction

Moharir and Kumar, 2019

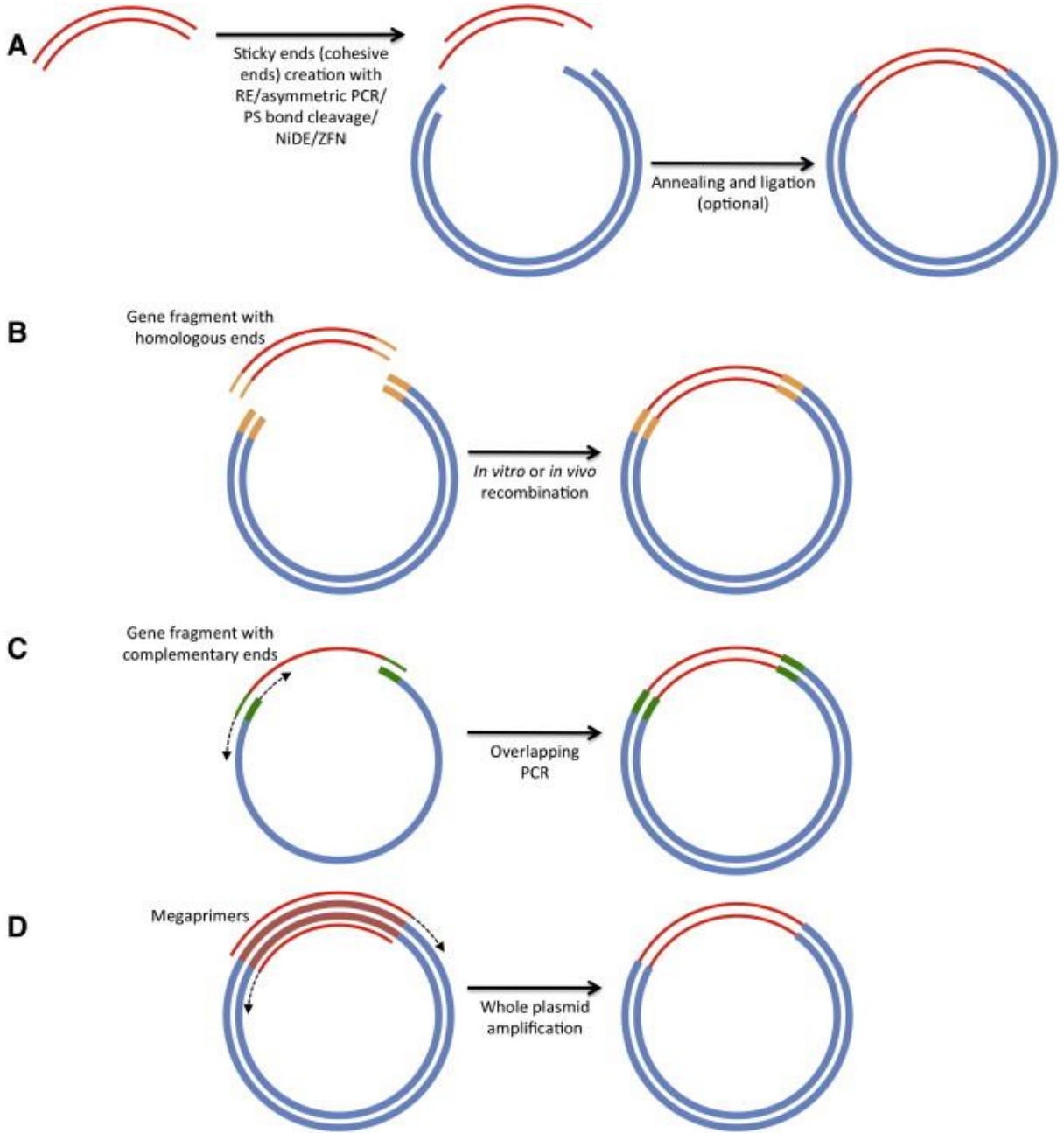
Procesos de degradación de poliésteres



Enzimas degradadoras de poliéster

Enzyme		pH	T	polyester
Lipase	Candida cylindracea	7	30	Poli(succinato de butilenoco-adipato de butileno
Esteresas	Mucor miehei	7	37	Poli(ácido láticoco-glicólico)
cutinasa	CUTMR	8	30	PET,PCL y PES

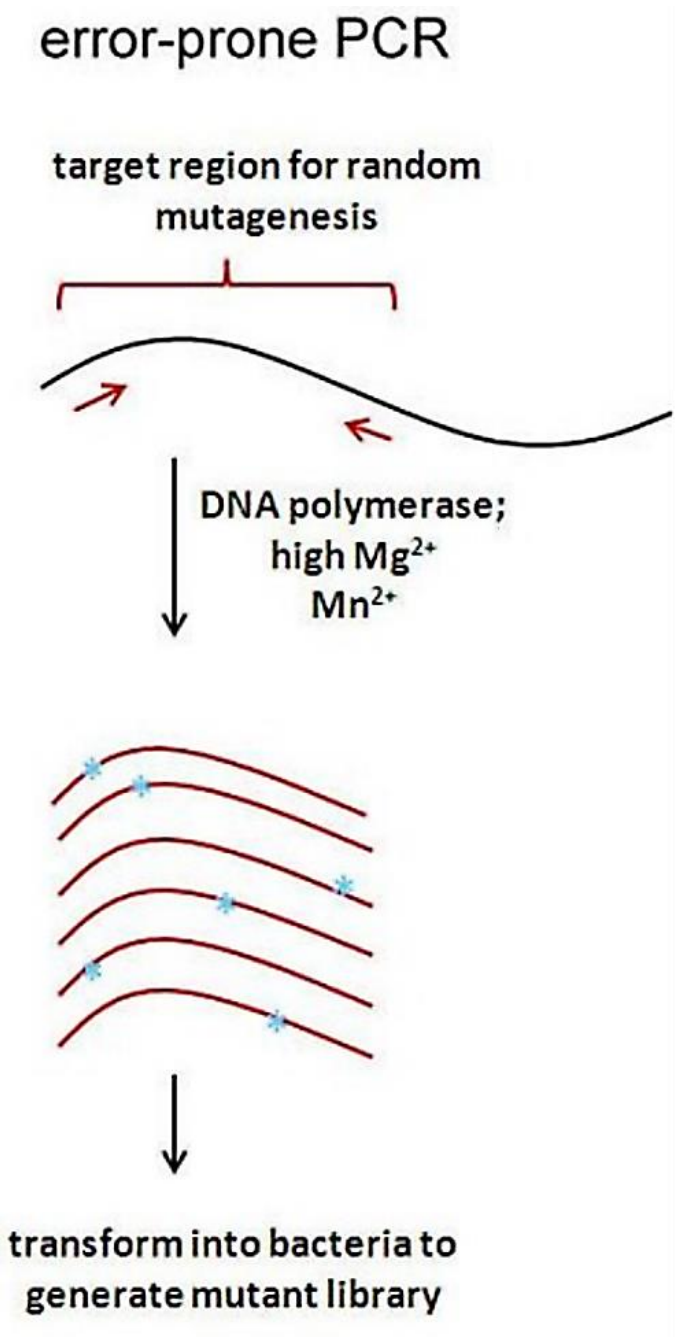
Site-directed mutagenesis



Tee et al., 2013

Error-prone PCR

This method is used to introduce random mutations in a DNA segment >100 bp that are too long to be synthesized chemically (Wilson and Keefe et al., 2000).



Wilson and Keefe et al., 2000

Modified enzymes for the degradation of polyesters.

Enzyme	Mutation	Substrate	REF
IsPETase	C203S, C2395,W185A, S214H, I208A, W159A, M161A, Y87A, T88A, W168H.	PET Film	Han *et al.*, 2017
IsPETase	S160A, D206A, H237A, Y87A, M161A, W185A, I208A, W159A, S238A, N241A, R280A, C203S, C239S, S238F, W159H	PET Film	Joo *et al.*, 2018
IsPETase	S238F/W159H, W185A.	PET Film	Austin *et al.*,2018
IsPETase	P181A, S121D/D186H, S121E, D186H, D186F, P181G, P181S, P181A/S121D/D186H.	PET Film	Son *et al.*,2019
IsPETase	S160A,D206A, H237A, Y87B, M161A, W185A, I208A, W159A, S238A, N241A, R280A, C203S, C239S, S238F, W159H.	BHET	Sagong *et al.*, 2020
IsPETase	S160A, D206A, H237A, W159A, W159H, M161A, A209I, Q119A.	BHET	Liu *et al.*, 2018
IsMHETase	R411K, F415S, F424D, F424E, F424H, F424I, F424L, F424N, F424T, F424V, R411K/F424N, R411K/F424V, F415H/F424N.	MHET	Sagong *et al.*, 2020

Conclusions

The enzymes have been improved to meet industrial requirements. These improvements have been made through various molecular techniques, such as site-directed mutagenesis and error-prone PCR. For the modifications it is necessary to consider strategies and selective practices imitating the evolutionary processes of nature, thus creating enzymes with new characteristics of industrial interest.

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