

EUCODIS | LIPASES



EUCODIS Bioscience offers a collection of more than 40 unique lipases of microbial origin, carefully selected and engineered for applications in the chemical, pharmaceutical and food & feed industry.

Superior activity in multiple applications

- Production of nutritionally valuable fats and oils
- Hydrolysis/Esterification of C4-C22 fatty acids
- Emollient ester synthesis for cosmetics
- Biocatalytic stereospecific resolution of chiral alcohols
- Bioplastic precursor modification refinement

Our novel collection of lipases can be purchased as a screening kit or individually from mg to kg amounts. Upon requests, bulk quantities or higher purity lipase preparations can be supplied – tailored to match the application of our customers. All lipases are produced under ISO 9001 standards in media with animal-free components, please inquire for lipases expressed in GRAS organisms.

Production of nutritionally functional fats and oils rich in poly-unsaturated fatty acids

Lipase	Modification of PUFA*-rich plant oils					
	Hydrolysis				Transesterification	
	oil A	oil B	oil C	oil D	sn1,3 position	sn2 position
CalB	1	1	1	1	+++	+
EL001	11	8	27	40	+++	+
EL012	1	1	5	4	+++	0
EL013	5	4	12	17	+++	+
EL016	1	1	3	4	+++	0
EL070	53	40	132	158	+++	+

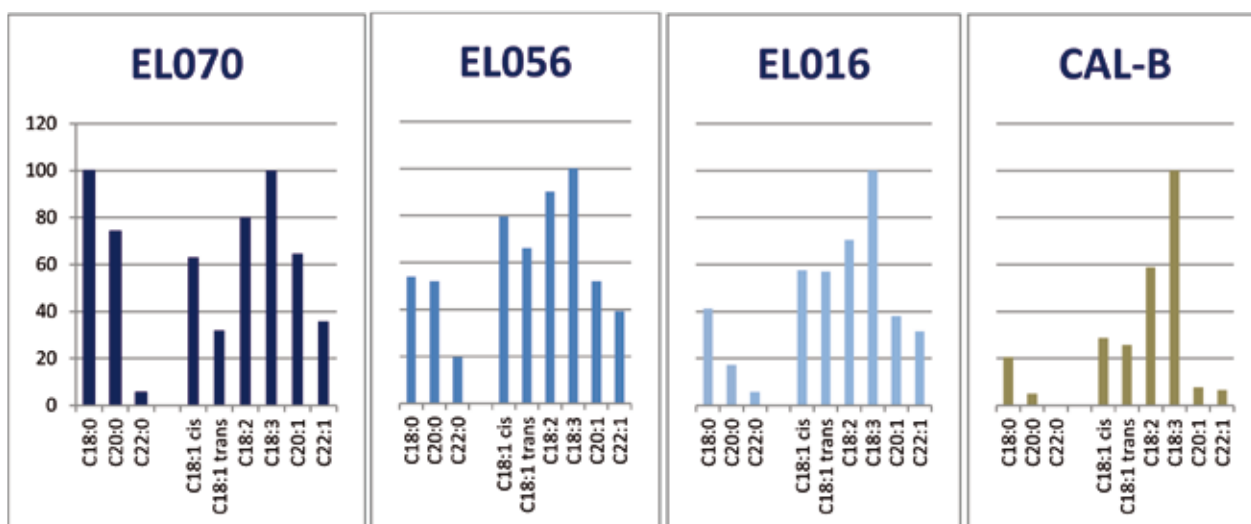
Hydrolysis: Efficacy given as fold-increase in activity compared to CalB

Transesterification: +++/++/+ transesterification detectable, (+) weak, 0 no transesterification

*PUFA: Poly-unsaturated fatty acids

EUCODIS Lipases show superior activity modifying high value PUFA-rich oils by hydrolysis and/or (trans)-esterification.

Application potential of EUCODIS Lipases on high-value oils and fats

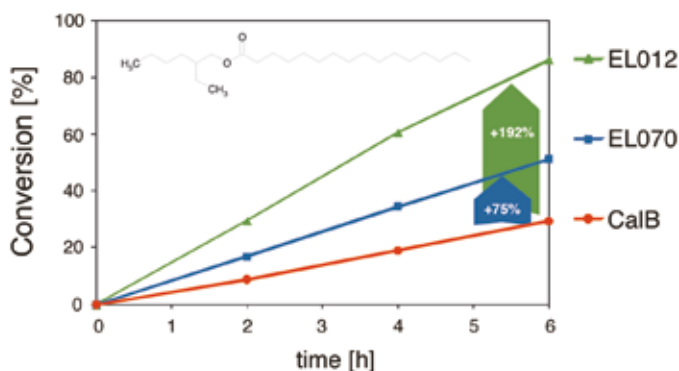


Relative substrate activity of three EUCODIS lipases on saturated and unsaturated para-nitrophenyl fatty acid esters. Activity on C 18:3 was set as 100% for each tested lipase.

EUCODIS Lipases show high activities on long chain fatty acid esters. Complex substrate mixtures can be processed selectively with respect to chain length and saturation degree.

Production of emollient esters for pharmaceuticals and cosmetics

Synthesis of 2-ethyl-1-hexanol palmitate



Palmitate esters of	EL001	EL012	EL070
2-propanol	+++	++	++
Cetylalcohol	++	+++	+++
2-ethyl-1-hexanol	+	+++	++
Retinol	0	++	0

EUCODIS Lipases exhibit superior performance in the synthesis of high value pharmaceutical or cosmetic esters than benchmark enzyme CalB. **EUCODIS Lipases** will enable your process development to realize the benefits of green chemistry.

Acylation and esterification of chiral secondary alcohols

Compound R=H R=Ac	Enzyme number	Time (h)	Results			
			Alcohol (% ee)	Ester (% ee)	Conversion (%)	E
	EL-03	101	11	98	10	110
	EL-68	101	10	92	10	26
	CALB	101	3	>99	<1	>200
	EL-01	16	23	>99	22	>200
	EL-70	16	30	99	27	>200
	CALB	16	<1	94	1	32
	EL-12	101	3	53	5	3.4
	EL-14	101	3	1	75	1.0
	CALB	101	N/A	N/A	<1	N/A

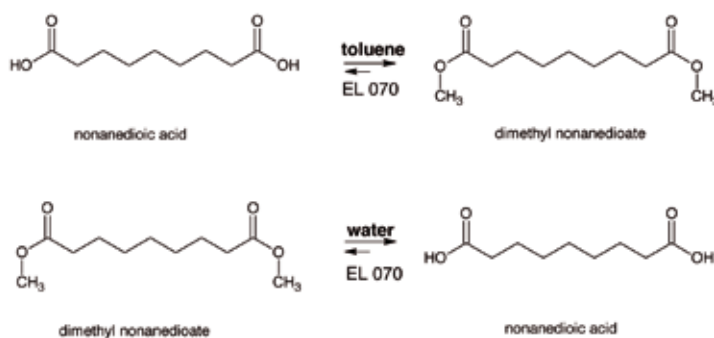
Maeve O'Neill et al, Tetrahedron: Asymmetry 23 (2012) 583-586

Activity profiles of six EUCODIS lipases and CalB (benchmark) on three secondary alcohols are displayed.

Selected **EUCODIS Lipases** demonstrate higher stereo-specificity with higher conversion rates than CalB on difficult to resolve chiral secondary alcohols.

Bioplastic modification refinement

Purification/Enrichment of long chain dicarboxylic fatty acids by esterification



EL070: 100 mg; methanol: 3,3% (v/v); azelaic acid: 100 mg; toluene 30 °C, 12 h. ¹ structure confirmed by NMR

EUCODIS LIPASE	SUBSTRATE	PRODUCT ¹	CONVERSION (%)
EL070	Azelaic acid	Azelaic dicarboxylic acid	100 %

EUCODIS Lipases permit complete green conversion of dicarboxylic acids to the corresponding esters enabling the distillation of long chain dicarboxylic esters. Subsequent saponification reaction can be also catalyzed by EUCODIS Lipases.

Other related products available

Lipase Suicide Inhibitor Substrates

- Determination of lipase and hydrolase activity, even in complex protein mixtures
- Molar amount of enzyme can be determined by **active site titration** experiments
- **Irreversible inhibition** of lipases and hydrolases
- 4 different chromogenic and fluorogenic substrates available.

About EUCODIS Bioscience

EUCODIS Bioscience is an application-driven enzyme engineering and manufacturing company with a proven track record of providing tailor-made solutions to our customers in the biopharmaceutical, fine chemicals, cosmetics and other industries.



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