



Fermenta Biotech Limited

Enzymatica - Transforming Chemistry...

IMMOBILIZED ENZYMES & BIOCATALYSIS TECHNOLOGIES

# BIOCATALYSIS CREATES GREEN CHEMISTRY



Fermenta Biotech Limited

## About us:

Fermenta Biotech Ltd. (FBL), founded in 1951, is a pioneer in immobilized enzyme technology with the mission to contribute to the emerging transformation of Biocatalysis. The company's objective is to identify, validate, patent and commercialize enzyme based technologies for green manufacturing.

The enzyme manufacturing unit in Kullu and the DBT approved R&D facility in Thane have consistently developed and sustained FBL's leadership in providing advanced enzyme technologies.

## Products:

Variants of **Penicillin G Amidase** enzyme (E.C.3.5.1.11) and **Candida antarctica Lipase (CALB)** enzyme (E.C. 3.1.1.3)

Both type of enzymes serve as remarkable tools for biocatalysing specific organic reactions in aqueous / suspension / solvent phase providing benefits such as high specificity, mechanical stability, recyclability and reduced chemical production.

CALB lipase finds widescale application in Green Fuels and Chiral Chemistry.

FBL facility at Kullu, Himachal Pradesh



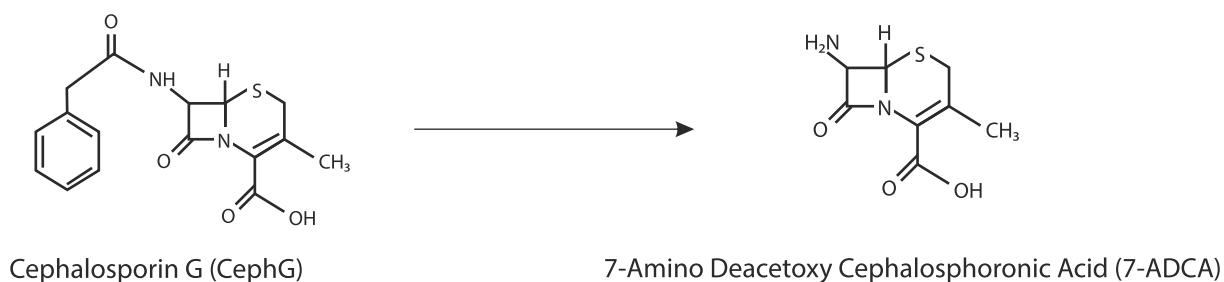
## A. PENICILLIN G AMIDASE - BIOCATALYST - (FERMASE PA 850)

**Enzyme Code:** E.C.3.5.1.11 / CAS No. 9014-06-6

**Source:** *E. coli*

For biocatalytic hydrolysis of amide bonds for  $\beta$ -lactam intermediates

### REACTION SCHEMATICS



- High operational stability of product
- High yield
- Short reaction time
- Simple recovery process
- Consistent performance

## B. PENICILLIN G AMIDASE BIOCATALYST (FERMASE PS 250)

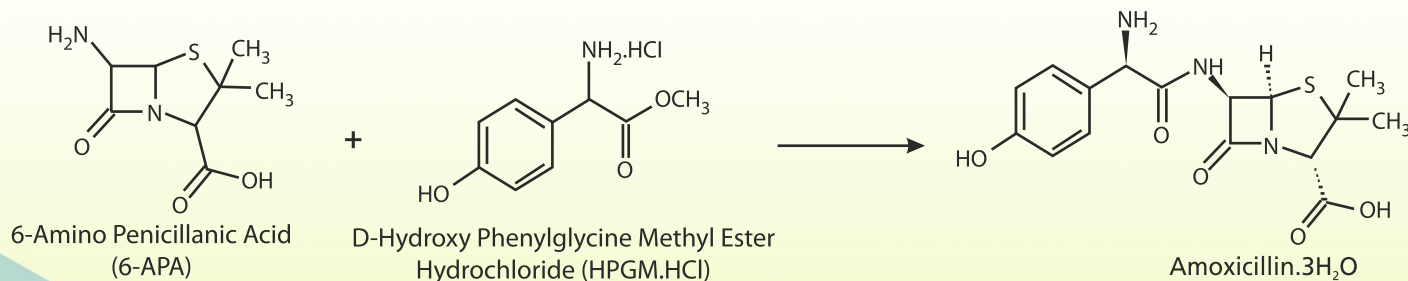
**Enzyme Code:** E.C.3.5.1.11 / CAS No. 9014-06-6

**Source:** *Achromobacter* CCM 4824

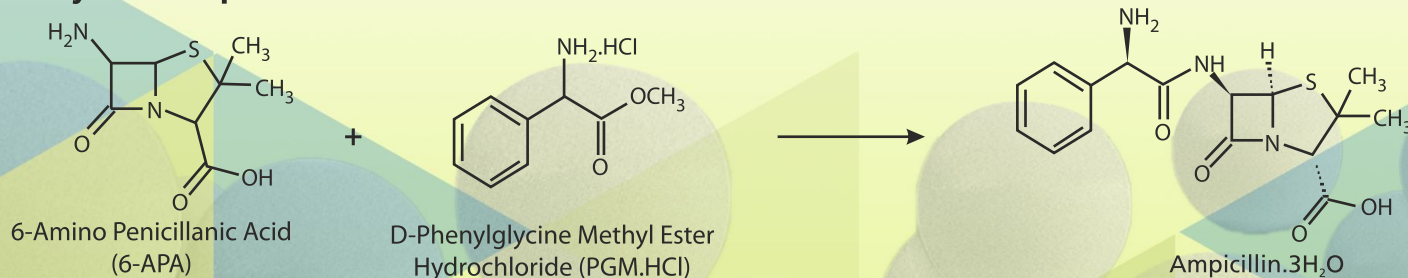
For biocatalytic synthesis of  $\beta$ -lactam antibiotics (Amoxicillin / Ampicillin)

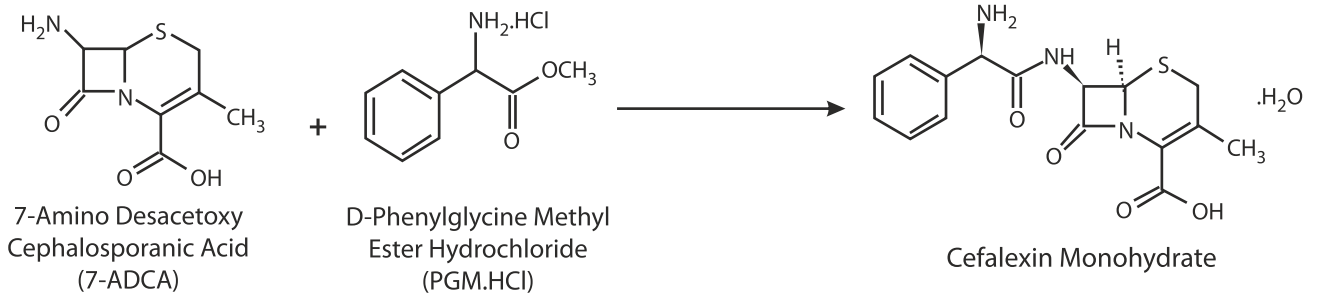
### REACTION SCHEMATICS

#### Enzymatic Amoxicillin

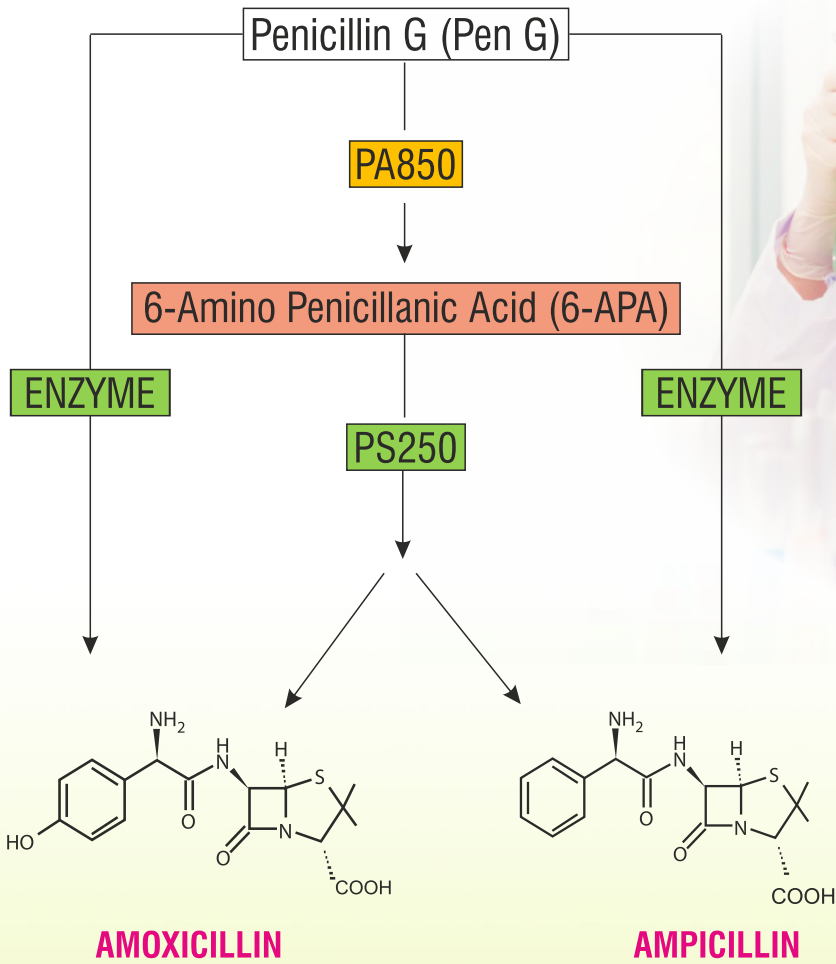


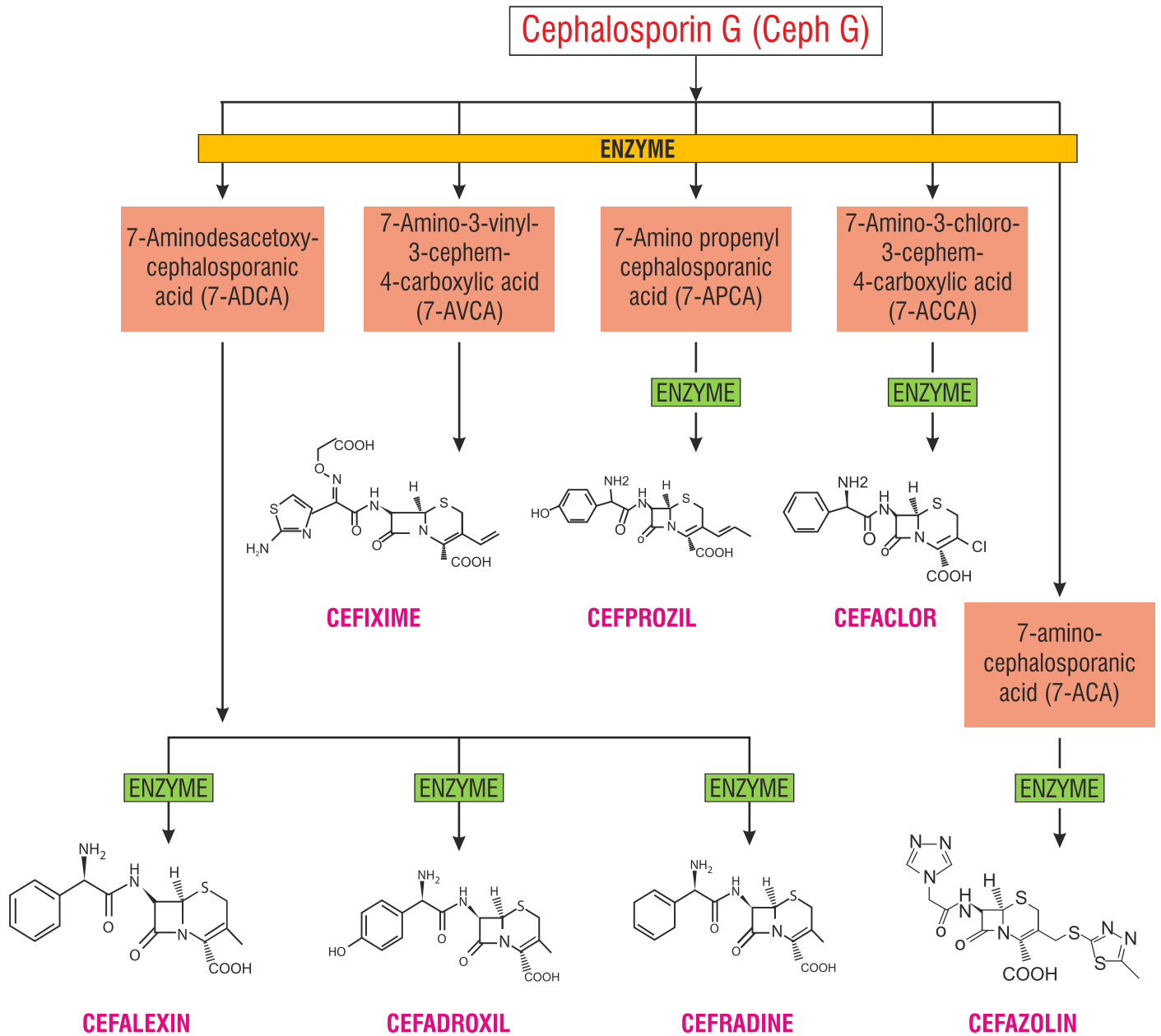
#### Enzymatic Ampicillin





- Suitable in suspension reaction
- High conversion & yield
- Totally aqueous phase reaction
- Easy product recovery





### C. CANDIDA ANTARCTICA LIPASE B

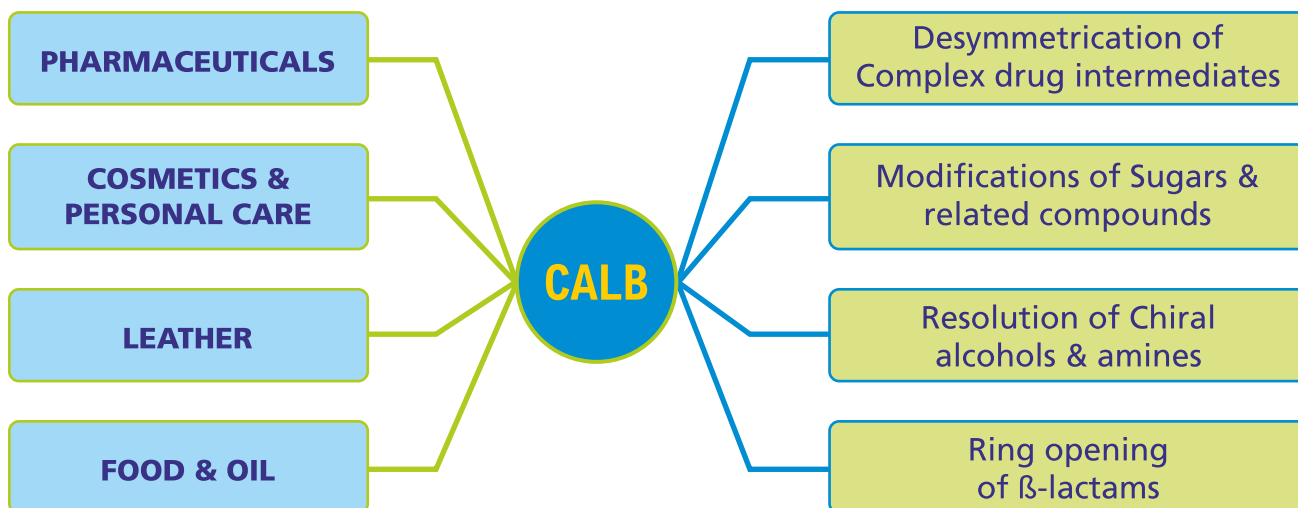
**Enzyme Code:** E.C.3.1.1.3 / CAS No. 9001-62-1

- *Candida antarctica* lipase B (CALB) expressed in GRAS Strains
- Available as liquid and immobilized Biocatalyst
- Immobilized biocatalyst on varied epoxy and adsorbent supports which offer different specificity and stability

#### PRODUCT VERSIONS:

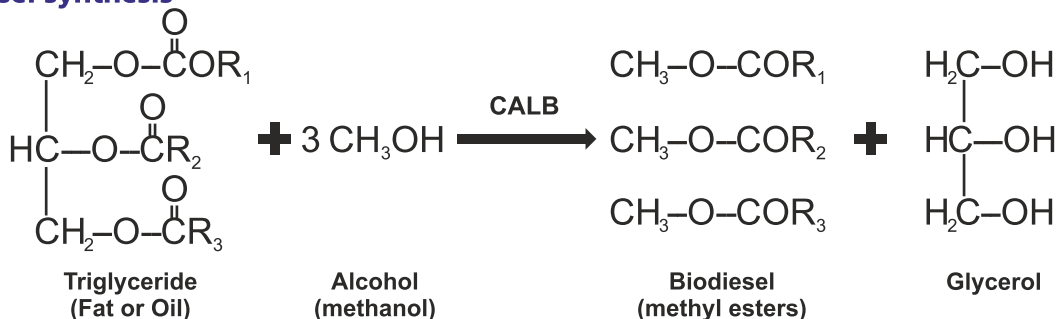
Product Name	Form	Activity
BIOCATALYST CALB 1L - 10L	Liquid	NLT 1000 - 10000 TBU/mL
BIOCATALYST CALB 10L	Liquid	NLT 10000 TBU/mL
BIOCATALYST CALB <sub>TA</sub> 10000	Immobilized	NLT 10000 PLU/g
BIOCATALYST CALB 1000 - 5000	Immobilized	NLT 1000 - 5000 PLU/g

**APPLICATIONS:**

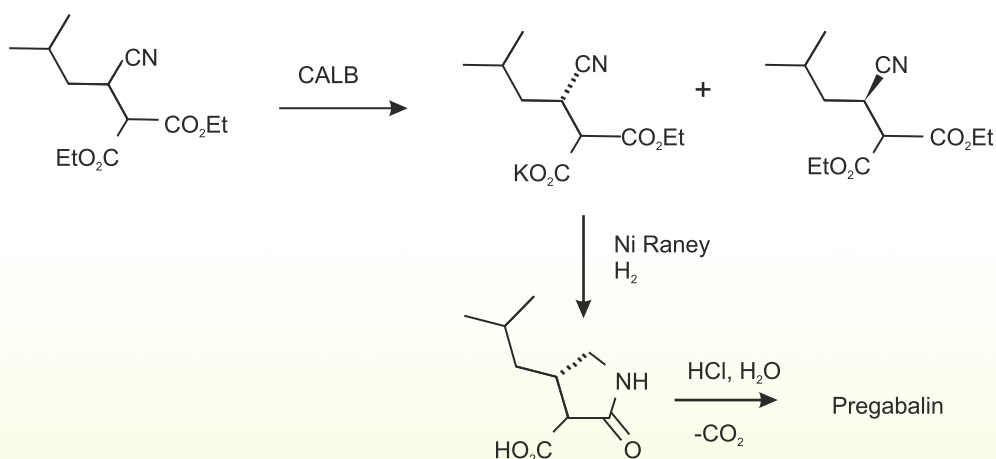


Examples:

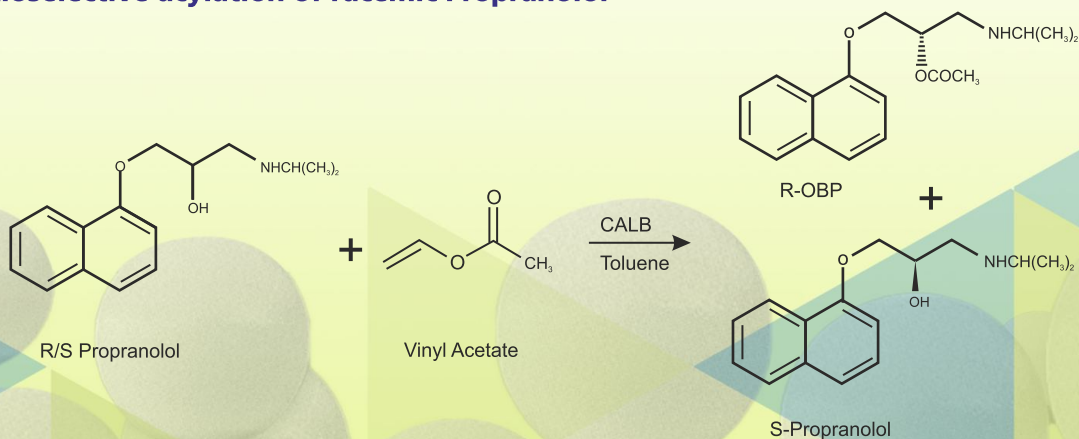
**Biodiesel synthesis**



**For Pregabalin by enzymatic kinetic resolution of a cyano-diester**

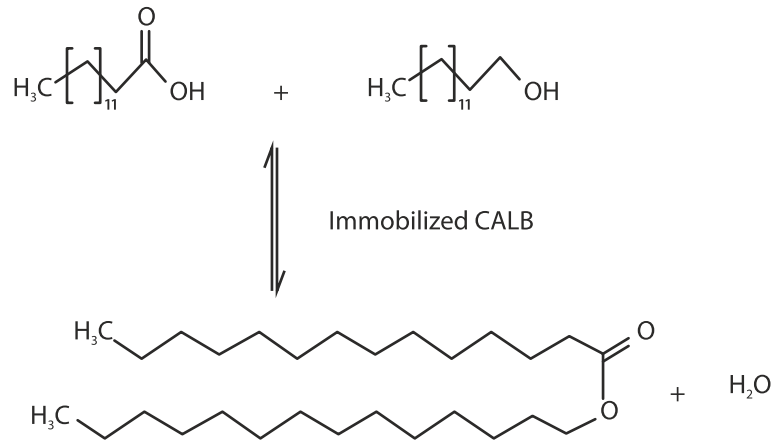


**Enantioselective acylation of racemic Propranolol**

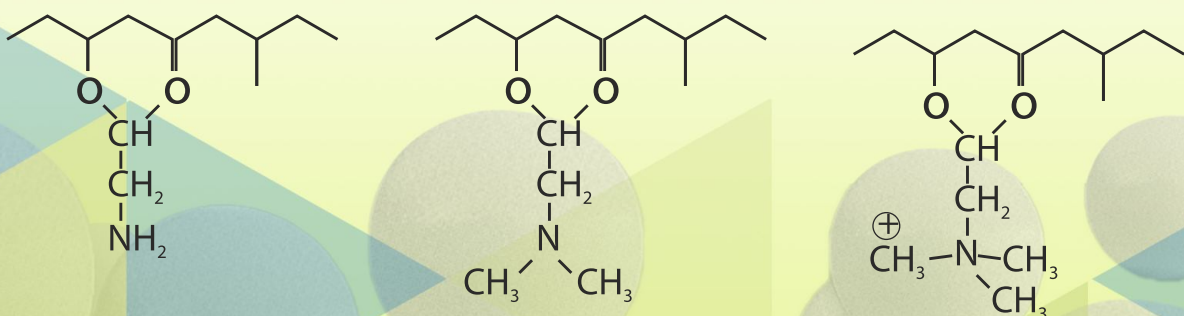
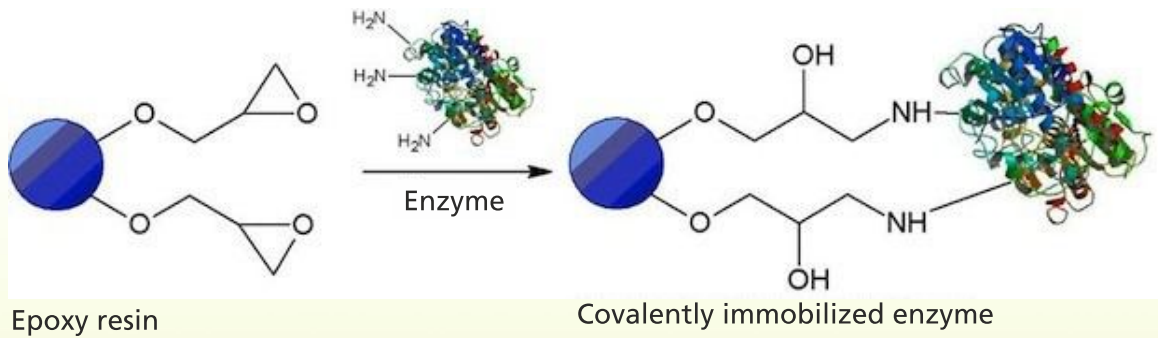
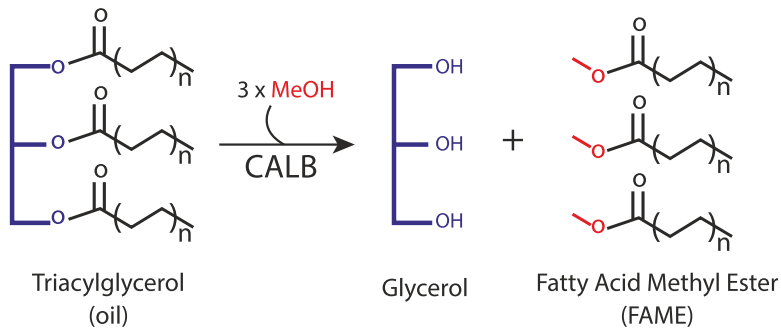


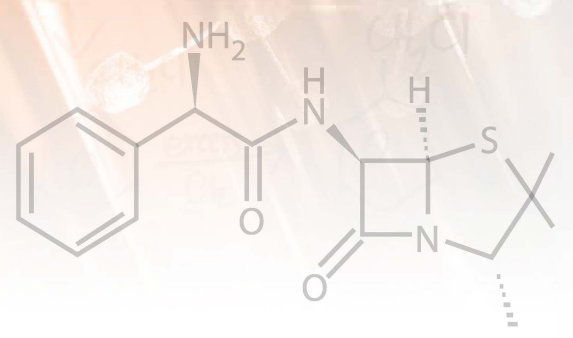
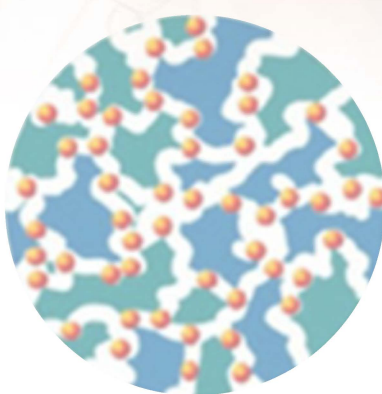
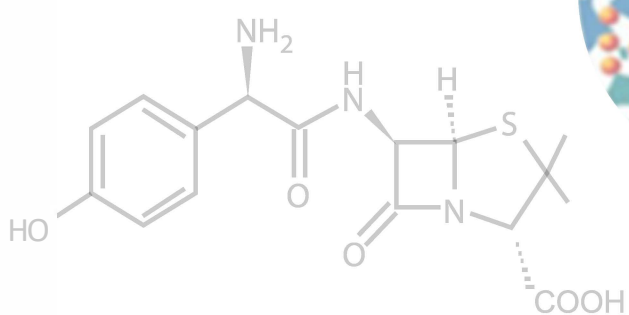
### For chiral alcohol

Esterification of fatty acids (eg. Myristic acid) with fatty alcohols (eg. Myristyl alcohol) catalyzed by immobilized CALB to produce wax esters (myristyl myristate).



### Synthesis of FAME (Fatty Acid Methyl Ester)





**Fermenta Biotech Limited**

A - 1501, Thane One, 'DI L' Complex, Ghodbunder Road, Majiwada, Thane(West) - 400610, India.  
 Tel: +91 22 6798 0800 / 888 • Fax: +91 22 6798 0899  
 E mail: [info@fermentabiotech.com](mailto:info@fermentabiotech.com) • Website: [www.fermentabiotech.com](http://www.fermentabiotech.com)