EUCODIS BIOSCIENCE

INTELLIGENT ENZYME SOLUTIONS

BROAD RANGE OF INDUSTRIAL APPLICATIONS

Pharmaceutical applications	Biocatalytic conversions, e.g. in chemical building blocks or APIs, antibiotics syntheses
Waste water treatment	Oxidation of chemical effluents from industrial waste
Fabric industry	Colorizing and decolorizing dyes
Food and flavor industry	Synthesis of flavors
Cosmetics	Fragrances

All enzymes are exclusively available from **EUCODIS Bioscience**. They can be purchased initially as a screening kit to support your efforts in identifying the optimal biocatalyst for your favorite reaction. Bulk quantities and enzyme formulations with higher purity will be tailored to match the application requirements of our customers. All our products are produced according to ISO9001 standards.

ABOUT US

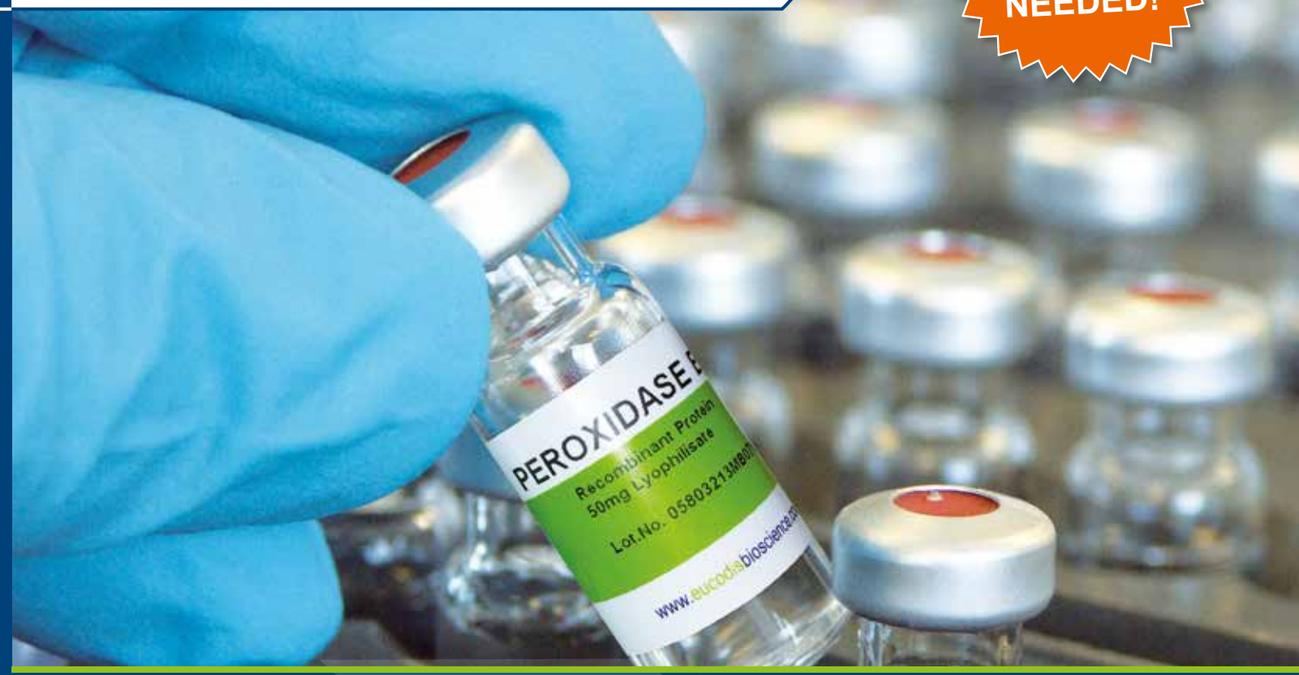
EUCODIS is an established enzyme **engineering** and **manufacturing** company headquartered in Vienna, Austria. EUCODIS delivers **high-performance enzyme solutions** for special applications in biopharma, fine chemicals and cosmetics industry.

EUCODIS also provides custom services, ranging from individual enzyme development and evolution, strain and process development to routine protein manufacturing up to the kg scale.

FLY-PER-V5.0-2017-10-03

EUCODIS | PEROXIDASES

NO CO-FACTOR RECYCLING NEEDED!



EUCODIS Bioscience offers a collection of more than 8 carefully selected recombinant peroxidases of bacterial, fungal and plant origin with distinct properties for customers in the chemical, flavor, feed cosmetics, paper and other industries. Eucodis Peroxidases use hydrogen peroxide as a co-substrate to catalyze reactions similar to cytochrome P450 oxidoreductases, but eliminating the need for expensive cofactor recycling systems.
Eucodis Peroxidases belong to the class of the heme-peroxidases. The enzymes with heme as prosthetic group can be used in oxygenation reactions using hydrogen peroxide as a co-substrate.

- 8 novel oxidative enzymes for industrial applications
- Biocatalytic oxidation reactions beyond known dehydrogenases, P450 enzymes, reductases:
  - highest activity, specificity and selectivity,
  - mild conditions,
  - minimize side reactions, reducing waste and process energy,
  - hydrogen peroxide as co-substrate, eliminating the need for cofactor recycling systems.

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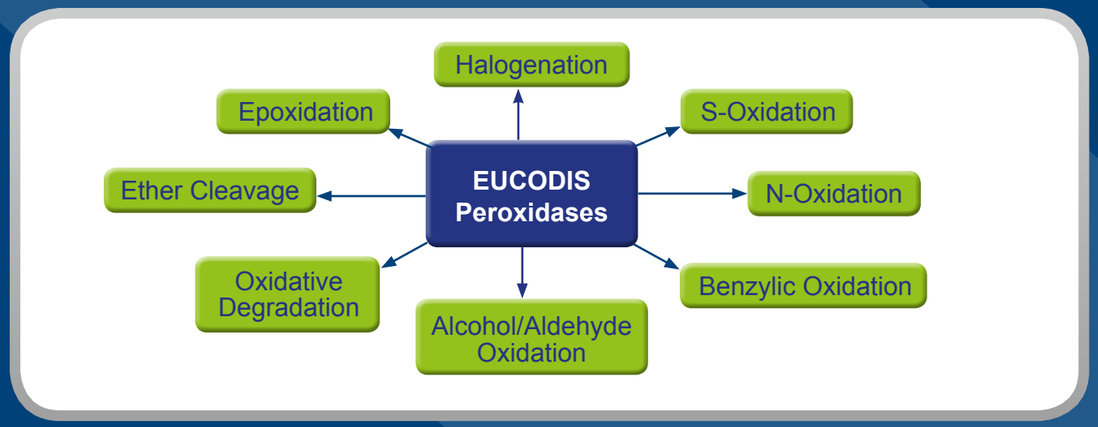
TYPICAL PEROXIDASE REACTIONS OF INDUSTRIAL RELEVANCE



PEROXIDASE HIGHLIGHTS

Peroxidases belong to a class of oxidoreductases. These enzymes are promiscuous by nature and are capable of catalyzing complex and diverse organic compounds to a more reactive intermediate in a stereospecific manner. As a result, they play an important role in pharmaceutical industry (synthesis of precursors to APIs), fragrance and flavor industries and fine chemical industries.

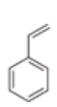
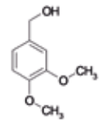
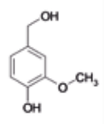
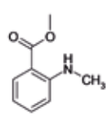
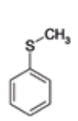
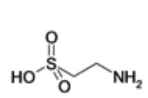
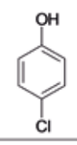
Peroxidase	Model Reactions								
	Epoxidation	Oxidation of alcohols		N-Demethylation	S-oxidation	Halogenation		Aromatic ring hydroxylation	Dehalogenation
	Styrene	Veratryl Alcohol	Vanillyl alcohol	N-methyl anthranilate	Thioanisole	Taurin/ Cl^-	Taurin/ Br^-	Pyrene	4-chlorophenol
									
EP001	-	+	+	-	+	+	+	-	+
EP003	-	+	+	-	-	+	+	-	-
EP004	-	+	+	-	+	-	-	+	-
EP009	-	-	+	-	+	-	-	-	-
EP010	-	+	+	-	+	-	-	+	-
EP012	+	+	+	+	+	-	-	-	-
EP013	+	+	+	+	-	-	-	+	-
EP014	+	+	+	-	-	-	-	-	-

Table 1: Reactions catalyzed by EP Kit Peroxidases. The substrates are reference standards for each model reaction type catalyzed by Peroxidases.

STYRENE EPOXIDATION

Epoxidation of C-C double bonds provide products with a more reactive group compared to the starting material. Chiral epoxides are used as an important intermediate in fine chemical synthesis and pharmaceutical intermediates, e.g. as critical intermediates during the production of hydroxy-esters, diols and alcohols. These compounds can also be directly used in the manufacture of plasticizers, surfactants, stabilizers and paints.

Currently, chiral epoxides can either be produced chemically using Jacobsen's catalyst or indirect biocatalytic methods. Alternatively, chloroperoxidases from *C. fumago* can be used to catalyse the epoxidation.

Advantage of Eucodis Peroxidases:

- Efficient and specific
- Mild reaction conditions
- Avoid use of toxic reaction conditions
- Simple separation of enzyme from reaction products

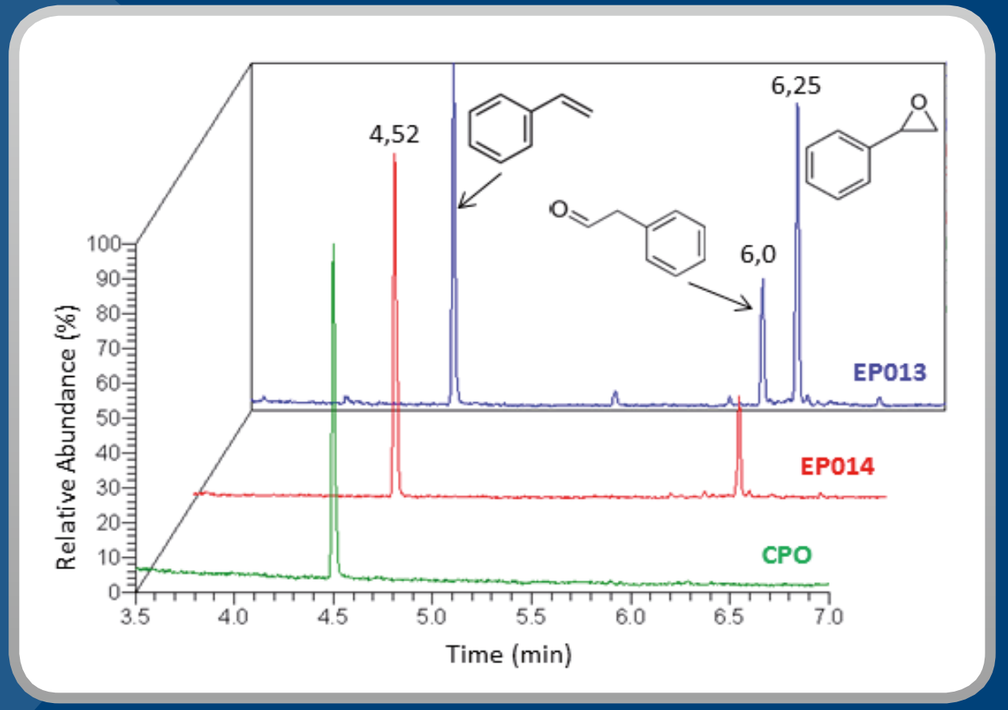


Figure 1: Gas Chromatograms indicating the catalysis of Styrene (peak at 4.52 min) to Styrene epoxide (peak at 6.25 min) by EUCODIS Peroxidases EP013 and EP014. Comparison to currently available *C. fumago* chloroperoxidase.