



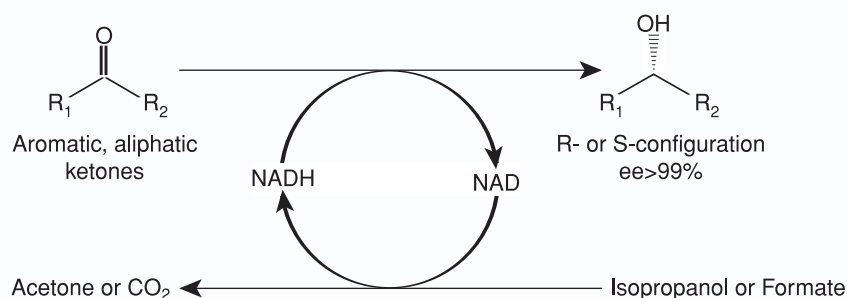
Johnson Matthey Catalysts

Catalysis & Chiral Technologies

CHIRAL TECHNOLOGIES Carbonyl Reductases Technology

Enzymes are used for synthetic applications in the field of organic chemistry and the production of enantiopure chiral compounds as building blocks for pharmaceuticals or catalysts. Oxidoreductases enzymes are particularly well-suited for the asymmetric synthesis of chiral compounds. A collection of several recombinant NAD(P)H dependent S- and R-selective enzymes has been successfully developed by X-Zyme and are now available through Johnson Matthey.

Regeneration of the Cofactor Using Formate DH, Alcohol DH or Glucose DH



Typical Process Characteristics

Substrate Concentration:
up to 470 mM of ketones

Conversion:
97%

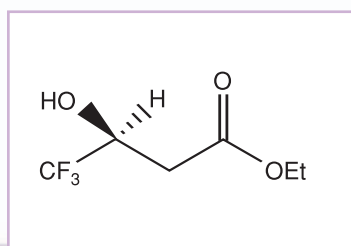
pH Optimum:
6.0 Reduction and 8.0 oxidation

Temperature:
25 – 42°C

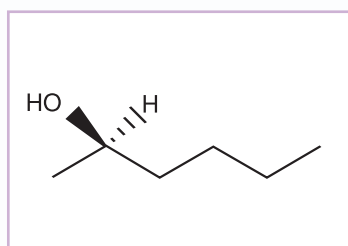
Activity:
500 U/ml at 30°C with acetophenone as substrate

These enzymes show a high enantioselectivity and own a very broad substrate range. In addition to keto esters, which are reduced to their corresponding chiral hydroxy esters, a variety of different compounds such as primary and secondary alcohols, aldehydes, ketoacetals, aliphatic and aromatic ketones, cyclic ketones and diketones can be converted.

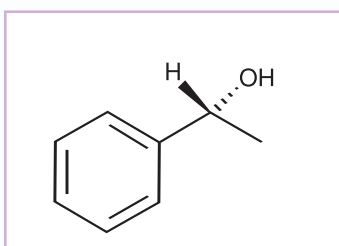
Applications of Oxidoreductases



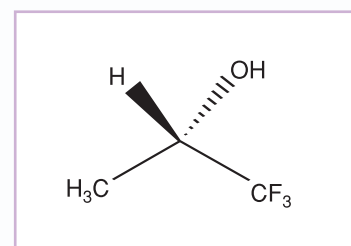
Ethyl (R)-4,4,4-trifluoro-3-hydroxybutyrate
CAS [85571-85-3]
MW = 186.13
C₆H₉F₃O₃



(R)-2-Hexanol
CAS [26549-24-6]
MW = 102.18
C₆H₁₄O



(R)-1-Phenylethanol
CAS [1517-69-7]
MW = 122.17
C₈H₁₀O



(S)-1,1,1-Trifluoro-2-propanol
CAS [17556-48-8]
MW = 114.07
C₃H₄F₃O

Above products, along with a range of hydroxy compounds, can be produced with a high ee of >99%.

Johnson Matthey offers technical expertise for the development, screening and supply of enantioselective bio and chemo-catalysts. Together, this combined portfolio of catalytic technologies allows us to design the most efficient synthetic route for our clients.

These enzymes can be purchased through Johnson Matthey Research Chemicals, Alfa Aesar, www.alfa.com.

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