4-Hydroxyphenylpyruvate Dioxygenase from Streptomyces avermitilis recombinant, expressed in E. coli

Catalog Number SAE0003
Storage Temperature –70 °C

EC 1.13.11.27
Synonyms: 4-HPPD, p-HPPD, α-ketoisocaprate dioxygenase, α-KICD, F-ag, F-antigen

Product Description
4-Hydroxyphenylpyruvate Dioxygenase (4-HPPD) is a key enzyme in the catabolism of tyrosine and phenylalanine. 4-HPPD catalyzes the synthesis of homogenistate (2,5-dihydroxyphenylacetate) from 4-hydroxyphenylpyruvate (4-HPP) and molecular oxygen. It also catalyzes the conversion of α-ketoisocaprate to β-hydroxyisovalerate. 4-HPPD requires Fe²⁺ as an essential cofactor.

4-HPPD has been identified as a potential biomarker of drug-induced liver injury in rat studies. An (Asp → Ser) mutation in 4-HPPD has been identified as a genetic indication of the inherited condition hawkinsinuria. Studies on Streptomyces avermitilis 4-HPPD to produce an (Asp → Ser) mutant have indicated this mutation leads to the production of quionolacetic acid (QAA) rather than homogenistate. In turn, QAA is a precursor to the biosynthesis of a two-electron oxidized form of hawkinsin, a biomarker for hawkinsinuria.

Kinetic studies of the catalytic reaction mechanism of 4-HPPD from Streptomyces avermitilis have been reported. The crystal structure of a complex of the Fe(II) form of Streptomyces avermitilis 4-HPPD with 2-[2-nitro-4-(trifluoromethyl)benzoyl]-1,3-cyclohexanediene has been reported.

Gene ID or Accession Number: 1211215
Molecular mass: ~41.8 kDa (calculated)
Optimal pH: ~7.0
Isoelectric point: ~5.85
Extinction coefficient: ε₂₈₀ = 41,200 M⁻¹ cm⁻¹

Unit definition: One unit will oxidize 1 µmole of molecular oxygen per minute at pH 7.0 at 25 °C in the presence of 4-HPP.

Steady-state assay information: Routine enzyme assays can be performed using a model DW1 Hansetech Oxygraph oxygen electrode. The reaction mixture contains 10 µM ferrous ammonium sulfate, 1 mM DTT, and 4-HPPD (typically 50–750 nM) in 20 mM HEPES buffer (pH 7.0). After initial observation of the non-enzymatic rate of oxygen consumption because of Fenton chemistry, the enzymatic reaction was initiated by the addition of 4-HPP (500 µM). The rate of dioxygen consumption can be assessed between 0–20 seconds.

Precautions and Disclaimer
This product is for R&D use only, not for drug, household, or other uses. Please consult the Safety Data Sheet for information regarding hazards and safe handling practices.

Storage/Stability
The recommended long-term storage temperature for the product is –70 °C.

References