

Product Information

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

Catalog Number **SAE0003**
Storage Temperature $-70\text{ }^{\circ}\text{C}$

EC 1.13.11.27

Synonyms: 4-HPPD, p-HPPD, α -ketoisocaproate dioxygenase, α -KICD,¹ F-ag,² 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 -ketoisocaproate to β -hydroxyisovalerate.³ 4-HPPD requires Fe^{2+} as an essential cofactor.¹

4-HPPD has been identified as a potential biomarker of drug-induced liver injury in rat studies.³ An (Asp \rightarrow 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 \rightarrow Ser) mutant have indicated this mutation leads to the production of quionolacetic acid (QAA) rather than homogenistate.⁴ In turn, QAA is a precursor to the biosynthesis of a two-electron oxidized form of hawkinsin, a biomarker for hawkinsinuria.⁵

Kinetic studies of the catalytic reaction mechanism of 4-HPPD from *Streptomyces avermitilis* have been reported.^{6,7} 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-cyclohexanedione has been reported.⁸

Gene ID or Accession Number: 1211215
Molecular mass: ~ 41.8 kDa (calculated)
Optimal pH: ~ 7.0
Isoelectric point:¹ ~ 5.85
Extinction coefficient: $\epsilon_{280} = 41,200\text{ M}^{-1}\text{ cm}^{-1}$

Unit definition: One unit will oxidize $1\text{ }\mu\text{mole}$ of molecular oxygen per minute at pH 7.0 at $25\text{ }^{\circ}\text{C}$ 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 $10\text{ }\mu\text{M}$ ferrous ammonium sulfate, 1 mM DTT, and 4-HPPD (typically $50\text{--}750\text{ nM}$) 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 ($500\text{ }\mu\text{M}$). The rate of dioxygen consumption can be assessed between $0\text{--}20$ 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 $-70\text{ }^{\circ}\text{C}$.

References

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4. Brownlee, J.M. *et al.*, *Biochemistry*, **49(33)**, 7218-7226 (2010).
5. Item, C.B. *et al.*, *Mol. Genet. Metab.*, **91(4)**, 379-383 (2007).
6. Johnson-Winters, K., *et al.*, *Biochemistry*, **42(7)**, 2072-2080 (2003).
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