**NAD⁺-Specific Formate Dehydrogenase PseFDH GAV**

Mutant formate dehydrogenase from *Pseudomonas* sp.101 with improved affinity for NAD⁺ and increased chemical and thermal stability (version PseFDH GAV) overexpressed in *E.coli*.

Formate: NAD⁺ oxidoreductase: EC 1.2.1.2, CAS [9028-85-7]

\[
\text{NAD}^+ + \text{HCOO}^- \rightarrow \text{CO}_2 + \text{NADH}
\]

**Ordering Information:**

<table>
<thead>
<tr>
<th>Cat. No. EPF 002-1</th>
<th>1000 U</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cat. No. EPF 002-2</td>
<td>10 000 U</td>
</tr>
<tr>
<td>Cat. No. EPF 002-3</td>
<td>100 000 U</td>
</tr>
<tr>
<td>Cat. No. EPF 002-4</td>
<td>1 000 000 U</td>
</tr>
</tbody>
</table>

Store at 2 – 8 °C

**Application:**

NADH regeneration in coupled reactions of chiral compounds synthesis using dehydrogenases

**Description:**

technical grade enzyme with specific activity 5-8 U/mg

(one unit is defined as the amount of enzyme which catalyses the formation of 1.0 μmol NADH per min at pH 7.0 and 30°C).

Compared to wt-PseFDH version PseFDH GAV has improved thermal stability (2.5 fold), higher resistance against chemical modification (> 100 fold) and better affinity for NAD (see table and figures below).

**Storage:**

no loss of activity within at least 12 months at 2-8 °C.

The enzyme is delivered without cooling in 0.1 M phosphate buffer, pH 7.0,

1 M ammonium sulfate, 15 mM EDTA.

Homogeneous preparations of PseFDH GAV are also available.

**Properties of recombinant wild-type and mutant formate dehydrogenases from *Pseudomonas* sp.101 (PseFDH) and recombinant formate dehydrogenase from *Candida boidinii* (CboFDH)**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Recombinant wild-type PseFDH</th>
<th>Recombinant mutant PseFDH GAV</th>
<th>Recombinant wild-type CboFDH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific activity, U/mg (30 °C)</td>
<td>10.0</td>
<td>10.0</td>
<td>6.5 b)</td>
</tr>
<tr>
<td>Kₘ NAD⁺, μM</td>
<td>60±5</td>
<td>35±3</td>
<td>45±3 b)</td>
</tr>
<tr>
<td>Kₘ formate, mM</td>
<td>7.7±1.2</td>
<td>7.5±1.1</td>
<td>5.5±0.4 b)</td>
</tr>
<tr>
<td>pH-optimum</td>
<td>6.0 – 9.0 d)</td>
<td>6.0 – 9.0</td>
<td>no data</td>
</tr>
<tr>
<td>Thermal stability, Tₘ, °C</td>
<td>63</td>
<td>64</td>
<td>57 b)</td>
</tr>
<tr>
<td>Improved chemical stability</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
</tbody>
</table>

a) Only commercially available formate dehydrogenases are presented in the Table. CboFDH from *Biocatalytics Inc.* has the same properties as the enzyme from *Julich Chiral Solutions* (former *Julich Fine Chemicals*).


e) Tₘ - temperature at which enzyme loses 50% of initial activity after 20 min incubation.

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Comparison of thermal stability of recombinant wild-type formate dehydrogenase from *C. boidinii* and recombinant wild-type and mutant enzymes from *Pseudomonas* sp.101

![Graph showing normalized melting curves for wt-CboFDH, wt-PseFDH, PseFDH GAV, and PseFDH T7 enzymes.](http://www.innotech-msu.com/products/NADFDHGAV.pdf)

Differential scanning calorimetry of recombinant wild-type FDHs from *C. boidinii* (wt-CboFDH) and *Pseudomonas* sp.101 (wt-PseFDH) and mutant enzymes from *Pseudomonas* sp.101 with increased thermal and chemical stability PseFDH GAV (Cat. No. EPF 002) and increased thermal stability PseFDH T7 (Cat. No. EPF 003). Normalized melting curves. Protein concentration 1 mg/ml, 0.1 M phosphate buffer, pH 7.0, heating rate 0.1 grad per min.

**References**


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