DATASHEET

TETRAHYDROBIOPTERIN

Synonym: 2-amino-6-[(1R,2S)-1,2-dihydroxypropyl]-5,6,7,8-tetrahydro-4(1H)-pteridinone

Please note that none of the products shown below are sterile. They are sold in ampoules for laboratory use only.

CAS No. 17528-72-2

CAS No. 69056-38-8

CAS No. 109784-74-9

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Prod. No.</th>
<th>Abbreviation</th>
<th>Molecular Formula</th>
<th>M.W.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(6R,S)-5,6,7,8-Tetrahydro-L-biopterin dihydrochloride</td>
<td>11.209</td>
<td>6R,S-BH₄₂HCl</td>
<td>C₉H₁₅N₅O₃⋅2HCl</td>
<td>314.2</td>
</tr>
<tr>
<td>(6R)-5,6,7,8-Tetrahydro-L-biopterin dihydrochloride</td>
<td>11.212</td>
<td>6R-BH₄₂HCl</td>
<td>C₉H₁₅N₅O₃⋅2HCl</td>
<td>314.2</td>
</tr>
<tr>
<td>(6S)-5,6,7,8-Tetrahydro-L-biopterin sulfate</td>
<td>11.215</td>
<td>6S-BH₄₂H₂SO₄</td>
<td>C₉H₁₅N₅O₃⋅H₂SO₄</td>
<td>339.3</td>
</tr>
</tbody>
</table>

Chemical reduction of biopterin yields two diastereoisomers, 6R- and 6S-BH₄. 6R-BH₄ is the natural form of tetrahydrobiopterin. The 6R,S-BH₄ that we manufacture contains about 70% of 6R-BH₄ and 30% of 6S-BH₄.

Description
White to light yellow powder

Biochemical functions
Tetrahydrobiopterin is a natural occurring cofactor of the aromatic amino acid hydroxylases and is involved in the synthesis of tyrosine and the neurotransmitters dopamine and serotonin. It is also essential for nitric oxide synthase catalysed oxidation of L-arginine to L-citrullin and nitric oxide. Tetrahydrobiopterin is involved in many other biochemical functions, many of which have been just recently discovered.

Solubility
6R- and 6R,S-BH₄₂HCl are freely soluble in water. The solubility of 6S-BH₄₂H₂SO₄ is 2.3 g per 100 g of water (22°C). A 1 mM solution of 6R-BH₄ in water gives a pH of 3.0 and a 1 M solution of 6R-BH₄ in water gives a pH of 0.45.

Analytical methods
HPLC conditions:
column: Whatman Partisil 10 SCX
eluant: 30 mM NaH₂PO₄, pH 3
flow rate: 1.5 ml/min
wavelength: 254 nm
solution: 160 mg BH₄ / 100 g H₂O with degassed ascorbic acid solution (0.16%)
Analytical methods (contd.)

UV

<table>
<thead>
<tr>
<th>Analytical Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UV</td>
<td>$\varepsilon_{267} = 16 \times 10^3 \text{ M}^{-1} \text{ cm}^{-1}$ in 0.1N HCl</td>
</tr>
</tbody>
</table>

TLC: BH$_4$ solutions are not stable in the presence of air to perform TLC.

Purity

Product no. 11.212 is > 99.5% pure, contains less than 0.1% of 6S-BH$_4$ and has no sodium chloride.

Stability

Tetrahydrobiopterin is very hygroscopic.

It reacts with oxygen especially in neutral and alkaline solutions. Due to oxidation tetrahydrobiopterin solutions become yellow but at -20°C or colder, solutions are relatively stable.

0.1 mM solutions of tetrahydrobiopterin in water are much less stable than 1 mM solutions, i.e. after 1 hour open at room temperature, 0.1 mM solutions degrade by about 25% whereas 1 mM solutions degrade only by 2%. After 3 hours, 0.1 mM solutions degrade by more than 60% and 1 mM solutions degrade only by 10%.

Dry powder has different stability depending on conditions, as described in the table below.

<table>
<thead>
<tr>
<th>Conditions</th>
<th>RT</th>
<th>-20°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>In ampoules</td>
<td>several months</td>
<td>several years</td>
</tr>
</tbody>
</table>

Storage

Storage conditions are not controlled during shipment and we cannot guarantee that the customer will receive the shipment within 6 weeks. There is no cause for concern when ampoules are delayed in the post as they are stable for several months at room temperature. Customers who have purchased 6R-BH$_4$ in the past can estimate the time required for shipment.

On arrival we recommend that the powder is stored at -20°C or colder. After an ampoule has been opened, the remainder should be put in a vial and then it can be stored in a freezer.

Solutions of tetrahydrobiopterin should be prepared in oxygen free water with the lowest possible pH value and frozen as soon as possible. In order to increase the stability of BH$_4$ solutions, ascorbic acid, DTT or other antioxidants, may be added.

Safety information

Tetrahydrobiopterin is known to be safe for the intended use. Avoid prolonged inhalation of the fine dust of tetrahydrobiopterin which is very acidic. Otherwise there are no special precautions required in handling this product.

References


Further data sheets can be found on our website www.schircks.ch

The information in this publication is based on our current knowledge and experience. It does not relieve users or processors from carrying out their own precautions and tests.