

## 1 Nomenclature

**EC number**

3.5.2.19

**Systematic name**

streptothricin-F hydrolase

**Recommended name**

streptothricin hydrolase

**Synonyms**

sstH &lt;3&gt; (&lt;3&gt; gene name [2]) [2]

sttH &lt;1,2,3&gt; (&lt;1,2,3&gt; gene name [1,3]) [1,3]

## 2 Source Organism

<1> *Streptomyces albulus* [1]<2> *Streptomyces noursei* (UNIPROT accession number: C5NU54) [1]<3> *Streptomyces albulus* (UNIPROT accession number: Q1MW86) [2,3]

## 3 Reaction and Specificity

**Catalyzed reaction**streptothricin-F + H<sub>2</sub>O = streptothricin-F acid**Natural substrates and products****S** streptothricin-D + H<sub>2</sub>O <2> (Reversibility: ?) [1]**P** streptothricin-D acid**S** streptothricin-F + H<sub>2</sub>O <2> (Reversibility: ?) [1]**P** streptothricin-F acid**S** Additional information <3> (<3> the true role of SttH may not be its involvement in resistance against streptothricins, instead, it may catalyze the hydrolysis of naturally occurring cyclic amide compounds in the metabolism of *Streptomyces albulus* [3]) (Reversibility: ?) [3]**P** ?**Substrates and products****S** streptothricin-D + H<sub>2</sub>O <1,2,3> (Reversibility: ?) [1,2]**P** streptothricin-D acid (<1,2,3> the product is identified by reverse-phase HPLC [1,2])

- S** streptothricin-F + H<sub>2</sub>O <1,2,3> (Reversibility: ?) [1,2]  
**P** streptothricin-F acid (<1,2,3> the product is identified by reverse-phase HPLC [1,2])  
**S** Additional information <3> (<3> the true role of SttH may not be its involvement in resistance against streptothricins, instead, it may catalyze the hydrolysis of naturally occurring cyclic amide compounds in the metabolism of *Streptomyces albus* [3]; <3> this enzyme catalyzes the hydrolysis of the amide bond of streptolidine lactam, thereby conferring streptothricin resistance [3]) (Reversibility: ?) [3]  
**P** ?

**Metals, ions**

Additional information <3> (<3> no metal ions required [2]) [2]

**K<sub>m</sub>-Value (mM)**

0.96 <3> (streptothricin-F, <3> pH 6.5, 30°C [2]) [2]  
 1.3 <2> (streptothricin-F, <2> pH 6.5, 30°C [1]) [1]  
 3.1 <1> (streptothricin-F, <1> pH 6.5, 30°C [1]) [1]  
 3.2 <2> (streptothricin-D, <2> pH 6.5, 30°C [1]) [1]  
 5.74 <3> (streptothricin-D, <3> pH 6.5, 30°C [2]) [2]  
 17.2 <1> (streptothricin-D, <1> pH 6.5, 30°C [1]) [1]

**pH-Optimum**

6.5 <3> [2]  
 7 <1,2> [1]

**Temperature optimum (°C)**

45 <3> [2]  
 55 <1,2> [1]

**Temperature range (°C)**

45-65 <3> (<3> 45°C: maximal activity, 65°C: about 90% of maximal activity [2]) [2]

**4 Enzyme Structure****Molecular weight**

50000 <3> (<3> gel filtration [2]) [2]

**5 Isolation/Preparation/Mutation/Application****Cloning**

<1> (expression in *Escherichia coli*) [1]  
 <2> (expression in *Escherichia coli*) [1]  
 <3> [2]

**Engineering**

- C158S <2> (<2> no activity detected [1]) [1]  
C176S <1> (<1> no activity detected [1]) [1]

**References**

- [1] Maruyama, C.; Hamano, Y.: The biological function of the bacterial isochorismatase-like hydrolase SttH. *Biosci. Biotechnol. Biochem.*, **73**, 2494-2500 (2009)
- [2] Hamano, Y.; Matsuura, N.; Kitamura, M.; Takagi, H.: A novel enzyme conferring streptothricin resistance alters the toxicity of streptothricin D from broad-spectrum to bacteria-specific. *J. Biol. Chem.*, **281**, 16842-16848 (2006)
- [3] Hamano, Y.; Maruyama, C.; Kimoto, H.: Construction of a knockout mutant of the Streptothricin-resistance gene in *Streptomyces albulus* by electroporation. *Actinomycetologica*, **20**, 35-41 (2006)