

## Product Information

## Nuclease P<sub>1</sub> from *Penicillium citrinum*

Lyophilized powder, ≥200 units/mg protein (E<sup>1%</sup>/280, 3'-5'-Phosphodiesterase)

**N8630**

### Product Description

CAS Registry Number: 54576-84-0

Enzyme Commission (EC) Number: 3.1.30.1

Synonyms: Nuclease 5'-Nucleotidohydrolase, 3'-Phosphohydrolase, Endonuclease P<sub>1</sub>

Nuclease P<sub>1</sub> is a zinc-metalloprotein, glycoprotein, and phosphodiesterase that hydrolyzes 3'→5' phosphodiester bonds in both RNA and single-stranded DNA.<sup>1-5</sup> It also cleaves 3'-phosphomonoester bonds in both ribonucleoside-3'-mononucleotides deoxyribonucleoside-3'-mononucleotides. By comparison, Nuclease P<sub>1</sub> is far less effective at hydrolysis of 2'-phosphomonoester bonds of nucleoside-2'-mononucleotides.<sup>1</sup> As one example, Nuclease P<sub>1</sub> hydrolyzes 2'-AMP at a 3,000-fold lower rate compared to hydrolysis of 3'-AMP.<sup>3</sup>

Nuclease P<sub>1</sub> contains 270 amino acid residues and ~17-19% carbohydrate content.<sup>4,6</sup> Three zinc (Zn<sup>+2</sup>) ions are present per protein molecule.<sup>5</sup> Early studies on the enzyme estimated its molecular mass in the range of 42-50 kDa, by such methods as gel filtration chromatography, sedimentation velocity, sedimentation equilibrium, and SDS-PAGE.<sup>4</sup> A more recent study used SDS-PAGE to obtain a molecular mass value of 43 kDa.<sup>7</sup> Another publication performed mass spectrometry analysis on Nuclease P<sub>1</sub> and determined a molecular mass of 36-37 kDa, by mass spectrometry.<sup>6</sup> Several publications have reported crystallographic studies on Nuclease P<sub>1</sub>.<sup>8,9</sup>

Nuclease P<sub>1</sub> has an optimal activity temperature of approximately 70 °C.<sup>2</sup> For long incubations, temperatures at < 60 °C may be more suitable. Nuclease P<sub>1</sub> is optimally active in the pH range of 5-8.<sup>2</sup>

Among various applications,<sup>10</sup> Nuclease P<sub>1</sub> has been used for enzyme-based organic chemistry synthesis reactions.<sup>11</sup> Several theses<sup>12-15</sup> and dissertations<sup>16-23</sup> have cited use of product N8630 in their protocols.

### Precautions and Disclaimer

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

Store the product, as lyophilized powder, at 2-8 °C.

Regarding solution stability:

- One publication has reported that a 0.05 mg/mL solution of Nuclease P<sub>1</sub> in 0.1 M ammonium acetate (pH 4.5) lost ~75-80% of its activity after standing at 4 °C for 3 days.<sup>1</sup>
- A different report has indicated that purified Nuclease P<sub>1</sub> in solution can be stored in 50 mM sodium acetate, pH 5.4, with 3 mM zinc ion, for 3 months at 4 °C.<sup>7</sup>
- A further study reports that a Nuclease P<sub>1</sub> solution at 56,400 units/mL activity concentration can be stored at -20 °C for 3 months, although the specific solvent system was not defined.<sup>24</sup>

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N8630pis Rev 07/22 GCY,HLD,RXR

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