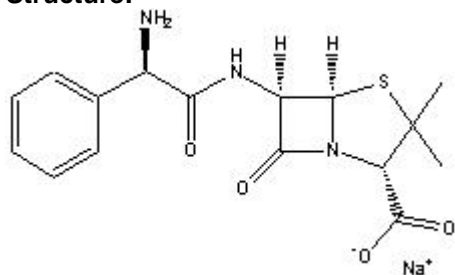


## TECHNICAL INFORMATION

Catalog Number: 190148, 194199, 194526

### Ampicillin, sodium salt

#### Structure:


**Molecular Formula:** C<sub>16</sub>H<sub>18</sub>N<sub>3</sub>O<sub>4</sub>SNa

**Molecular Weight:** 371.4

**CAS #** 69-52-3

**Synonyms:** D[-]-a-Aminobenzylpenicillin; 6-[D(-)-a-Aminophenylacetamido]penicillanic acid

**Physical Description:** White to off-white powder

Ampicillin rapidly loses activity when stored above a pH of 7.0.<sup>4,5,11</sup> Optimal conditions for storage are at +4°C, pH 3.8 to 5. At these conditions the solutions will retain more than 90% activity for approximately one week. Buffer compositions may also effect stability: Optimally Tris buffers should have a pH of approximately 5, citrate buffers at 7, acetate buffers at 6.<sup>4,5</sup> Autoclaving solutions of ampicillin will destroy activity. Solutions can be sterilized by filtration (0.22 um filter) and stored frozen (-20°C or below). Frozen solutions can be stored for up to 3 months.

**pKa Values (at 25°C):**<sup>12</sup>

pKa = 2.5 (-COOH)

pKa = 7.3 (-NH<sub>2</sub>)

**Description:** Ampicillin is a semi-synthetic derivative of penicillin, active as a broad-spectrum antibiotic. It is inactivated by beta-lactamases and for this reason a beta-lactamase inhibitor should be considered when using ampicillin. Against gram-positive bacteria, ampicillin has a similar mode of action as benzylpenicillin; against gram-negative bacteria, it has a similar mode of action as chloramphenicol and tetracyclines. In *E. coli* it inhibits cell wall synthesis.<sup>18</sup> Also described for the use of enhancing luminol chemiluminescence.<sup>15</sup>

**Suggested Effective Concentrations:** 100 mg/liter for both gram positive and gram negative bacteria. It is typically stable in media at 37°C for approximately 3 days.<sup>26</sup>

#### Availability:

Catalog Number	Description	Size
190148	Ampicillin, sodium salt	5 g 25 g 100g
194199	Ampicillin, sodium salt, gamma-irradiated, molecular biology reagent	20 mg 50 mg
194526	Ampicillin, sodium salt, cell culture reagent	5 g 25 g 100 g

**Solubility:** Soluble in water (50 mg/ml); soluble in 1 M Ammonium Hydroxide, dilute acids or bases<sup>12</sup>; practically insoluble in alcohol, chloroform, ether and fixed oils.

#### References:

- Basaez, L. and Vanysek, P., "Transport studies of beta-lactam antibiotics and their degradation products across electrified water/oil interface." *Journal of Pharmaceutical and Biomedical Analysis*, v. **19:1-2**, 183-192 (1999).
- Bennish, M.L., Salam, M.A., Haider, R. and Barza, M., "Therapy for shigellosis. II. Randomized, double-blind comparison of ciprofloxacin and ampicillin." *J. Infect. Dis.*, v. **162:3**, 711-716 (1990).
- Bundgaard, H., *J. Pharm. Pharmac.*, v. **26**, 385-392 (1974).

- Florey, K. (ed.), *Analytical Profiles of Drug Substances*, (Academic Press, NY) **vol. 2**, 1-61 (1973).
- Gallelli, "Stability studies of drugs used in intravenous solutions, part one." *Amer. J. Hosp. Pharm.*, **v. 24**, 425-433 (1967).
- Gavalda, J., et al., "Efficacy of ampicillin plus ceftriazone in treatment of experimental endocarditis due to *Enterococcus faecalis* strains highly resistant to aminoglycosides." *Antimicrob. Agents Chemother.*, **v. 43:3**, 639-646 (1999).
- Grimshaw, W.T., Colman, P.J. and Weatherley, A.J., "The efficacy of sulbactam-ampicillin in the therapy of respiratory disease associated with ampicillin resistant *Pasteurella* species in housed calves." *Vet. Rec.*, **v. 121:17**, 393-396 (1987).
- Joseph, T.A., Pyati, S.P. and Jacobs, N., "Neonatal early-onset *Escherichia coli* disease. The effect of intrapartum ampicillin." *Arch. Pediatr. Adolesc. Med.*, **v. 152:1**, 35-40 (1998).
- Kaye, K.S., Harris, A.D., Gold, H. and Carmeli, Y., "Risk factors for recovery of ampicillin-sulbactam-resistant *Escherichia coli* in hospitalized patients." *Antimicrob. Agents Chemother.*, **v. 44:4**, 1004-1009 (2000).
- Lapointe, J.R., Beliveau, C., Chicoine, L. and Joncas, J.H., "A comparison of ampicillin-cefotaxime and ampicillin-chloramphenicol in childhood bacterial meningitis: an experience in 55 patients." *J. Antimicrob. Chemother.*, **v. 14 Suppl. B**, 167-180 (1984).
- Lynn, B., "The stability and administration of intravenous penicillins." *Brit. J. Intravenous Therapy*, **v. 2**, 22 (1981).
- *Martindale: The Extra Pharmacopoeia*, **30th Ed.**, 116-118, p. xxi (1993).
- Mendelman, P.M., et al., "Failure to detect ampicillin-resistant, non-beta-lactamase- producing *Haemophilus influenzae* by standard disk susceptibility testing." *Antimicrob. Agents Chemother.*, **v. 30:2**, 274-280 (1986).
- *Merck Index*, **12th Ed.**, No. 628.
- Milbrath, D.S., *Biolumin. Chemilumin., Proc. Int. Biolumin. Chemilumin. Symp.*, Schoelmerich, J. (Ed.), Wiley Chichester, UK, **v. 4**, 515 (1987).
- Mushinsky, R.F., et al., "Stability of sulbactam/ampicillin in diluents for parenteral administration." *Rev. Infect. Dis.*, **v. 8 Suppl. 5**, S523-527 (1986).
- Neu, H.C., "Aminopenicillins - clinical pharmacology and use in disease states." *Int. J. Clin. Pharmacol. Biopharm.*, **v. 11:2**, 132-144 (1975).
- Nguyen-Disteche, M., *Eur. J. Biochem.*, **v. 41**, 457 (1974).
- Rodriguez, W.J., et al., "Sulbactam/ampicillin vs chloramphenicol/ampicillin for the treatment of meningitis in infants and children." *Rev. Infect. Dis.*, **v. 8 Suppl. 5**, S620-629 (1986).
- Salam, M.A. and Bennish, M.L., "Therapy for shigellosis. I. Randomized, double-blind trial of nalidixic acid in childhood shigellosis." *J. Pediatr.*, **v. 113:5**, 901-907 (1988).
- Sambrook, Fritsch and Maniatis, *Molecular Cloning: A Laboratory Manual*, 2nd Ed., p. A.6 (and 1.6) (1989).
- Schenck, F.J. and Callery, P.S., "Chromatographic methods of analysis of antibiotics in milk." *Journal of Chromatography A*, **v. 812:1-2**, 99-109 (1998).
- Sorensen, L.K., et al., "Simultaneous determination of seven penicillins in muscle, liver and kidney tissues from cattle and pigs by a multiresidue high-performance liquid chromatographic method." *Journal of Chromatography B: Biomedical Sciences and Applications*, **v. 734:2**, 307-318 (1999).
- Verdon, E., et al., "Stability of penicillin antibiotic residues in meat during storage: Ampicillin." *Journal of Chromatography A*, **v. 882:1-2**, 135-143 (2000).
- van der Voet, G.B., Mattie, H. and van Furth, R., "Comparison of in vitro and in vivo ampicillin susceptibility of *Escherichia coli* pretreated with low concentrations of mecillinam and ampicillin." *Scand. J. Infect. Dis.*, **v. 15:1**, 97-101 (1983).
- Perlman, D., "Use of Antibiotics in cell culture media." *Methods in Enzymology: Cell Culture*, Jakoby, W.B. and Pastan, I.H. (eds.), Academic Press: New York, p. 112 (1979).