

Product Name:	Ampicillin Sodium
Product Number:	A042
CAS Number:	69-52-3
Molecular Formula:	$C_{16}H_{18}N_3NaO_4S$
Molecular Weight:	371.39
Form:	Powder
Appearance:	White or almost white powder, hygroscopic
Source:	Semi-synthetic
Water Content (Karl Fischer):	≤2.0%
pH:	8.0-10.0
Storage Conditions:	2-8°C
Description:	<p>Ampicillin sodium is a member of the β-lactam family structurally similar to penicillin. The compound inhibits bacterial cell wall synthesis. Ampicillin resistance is used as a selectable marker to confirm successful cell transformation, as only cells containing plasmid-encoded ESBLs (Extended Spectrum β-lactamases) survive. Ampicillin is freely soluble in water (50 mg/ml).</p> <p>TOKU-E offers five forms of Ampicillin:</p> <ul style="list-style-type: none">• Ampicillin Sodium (A042)• <u>Ampicillin Anhydrous (A043)</u>• <u>Ampicillin/Sulbactam (2:1) (A071)</u>• <u>Ampicillin Trihydrate, USP (A009)</u>• <u>Ampicillin Trihydrate, EP (A020)</u>
Mechanism of Action:	<p>Like all β-lactams, Ampicillin interferes with PBP (penicillin binding protein) activity otherwise involved in the final phase of peptidoglycan synthesis. PBPs are enzymes which catalyze a pentaglycine crosslink between alanine and lysine residues. Without a pentaglycine crosslink, the integrity of the cell wall is severely compromised ultimately leading to cell lysis.</p>
Spectrum:	<p>Ampicillin sodium targets Gram-negative non ESBL (Extended Spectrum β-lactamase) bacteria including <i>Staphylococcus</i> and <i>Streptococcus</i> species and medically important enteric pathogens such as <i>Shigella</i> and <i>Salmonella</i>. Interestingly, ampicillin has been found to be effective against certain β-lactam sensitive VRE or vancomycin resistant <i>Enterococcus</i>; a glycopeptide antibiotic resistant "superbug."</p>

Microbiology Applications Ampicillin sodium is often used to select for cells that have been transformed with a plasmid containing the ampR gene which confers resistance to ampicillin. Ampicillin sodium is typically used at a concentration of 50-100 µg/mL.

Media Supplements

Ampicillin sodium can be used as a selective agent in several types of isolation media:

Aeromonas Medium Base - Ampicillin Selective Supplement

References:

Pitout JD, Sanders CC, Sanders WE (1997) Antimicrobial resistance with focus on beta-lactam resistance in gram-negative bacilli. Am. J. Med 103(1):51-59 PMID 9236486

Waxman DJ and Strominger JL (1983) Penicillin-binding proteins and the mechanism of action of beta-lactam antibiotics. Ann. Rev. Biochem 52:825-869 PMID 6351730

Yang W, Zhang L, Lu Z, Tao W, Zhai Z (2001) A new method for protein coexpression in *Escherichia coli* using two incompatible plasmids. Protein. Expr. Purif. 22(3):472-478 PMID 11483011

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