

Carbenicillin Disodium Salt

Catalog No: ASA-2049 | CAS: 4800-94-6 | β -Lactam Antibiotic — Penicillin Group

Broad-spectrum antibacterial agent for bacterial transformation, plant tissue culture, and microbiology research

1. Chemical & Physical Properties

Property	Value
Chemical Name	Carbenicillin Disodium Salt
CAS Number	4800-94-6
Molecular Formula	C ₁₇ H ₁₆ N ₂ Na ₂ O ₆ S
Molecular Weight	422.36 g/mol
Appearance	White to off-white crystalline powder
Solubility	Freely soluble in water; slightly soluble in ethanol
pH (1% aq. solution)	6.0 – 7.0
Purity	≥ 98.0% (HPLC)
Chemical Class	β -Lactam antibiotic — penicillin group

2. Mechanism of Action

Carbenicillin exerts its antibacterial effect by irreversibly inhibiting bacterial cell wall synthesis. It binds covalently to penicillin-binding proteins (PBPs) — the transpeptidases responsible for cross-linking peptidoglycan strands — thereby preventing cell wall formation and triggering bacterial lysis. As a disodium salt, carbenicillin offers enhanced water solubility and superior hydrolytic stability compared to ampicillin, resulting in a significantly slower rate of degradation in aqueous media at standard incubation temperatures.

3. Antimicrobial Spectrum

Organism	Activity	Notes
<i>Pseudomonas aeruginosa</i>	Active	Primary distinguishing spectrum vs. ampicillin
<i>Escherichia coli</i>	Active	Standard selection organism for transformation
Enterobacteriaceae (general)	Active	Broad enteric coverage
<i>Agrobacterium tumefaciens</i>	Active	Effective elimination post-plant transformation
Gram-positive bacteria	Limited	Generally lower activity; not primary indication

4. Research Applications

Application	Technical Notes
Bacterial Transformation	Selection of transformed <i>E. coli</i> harbouring carbenicillin-resistance plasmids. Reduced satellite colony formation vs. ampicillin due to superior hydrolytic stability.
Plant Tissue Culture	Elimination of <i>Agrobacterium tumefaciens</i> following plant transformation. Low phytotoxicity at standard working concentrations (50–100 µg/mL). Minimal interference with plant regeneration.
Microbiology Research	Preparation of selective culture media for Gram-negative organisms. Contamination control in mixed culture and environmental microbiology experiments.
Antibiotic Resistance Studies	Model compound for beta-lactam resistance research. Substrate for beta-lactamase activity assays. Used in MIC determination studies.
Molecular Cloning	Selectable marker maintenance in recombinant DNA cloning workflows. Compatible with standard molecular biology protocols.
Pharmaceutical Research	Reference standard and model compound in antimicrobial pharmacology studies.

5. Preparation & Working Concentrations

Parameter	Details
Reconstitution Solvent	Sterile distilled water (preferred) or sterile PBS
Recommended Stock Concentration	50 mg/mL in sterile water
Working Concentration (Bacterial)	50–100 µg/mL (standard for <i>E. coli</i> selection)
Working Concentration (Plant Culture)	250–500 µg/mL (<i>Agrobacterium</i> elimination)
Sterilisation Method	Filter sterilisation — 0.22 µm membrane (do not autoclave)
Aliquot Storage	–20°C; avoid repeated freeze-thaw cycles

6. Key Features & Advantages

- Superior stability vs. ampicillin — significantly slower hydrolysis rate reduces satellite colony contamination in selection plates
- Broad Gram-negative coverage — active against *Pseudomonas aeruginosa*, *E. coli*, and enteric species
- Freely water-soluble — easy preparation of filter-sterilised stock solutions without organic solvents
- Effective in plant tissue culture — suppresses *Agrobacterium* overgrowth post-transformation with low regeneration interference
- Compatible with standard filter sterilisation (0.22 µm membrane)
- High purity (≥ 98.0%) — consistent batch-to-batch performance
- Stocked in Australia — fast local delivery within 1–3 business days

7. Storage & Stability

Storage Condition	Details
Powder — Long-term	-20°C; sealed container; 2 years from manufacture date
Powder — Short-term	2–8°C for up to 2 weeks
Stock Solutions	-20°C in single-use aliquots; stable for 6 months
Protection	Protect from moisture, light, and heat

8. Regulatory & Safety Notice

⚠ Research Use Only

This product is intended exclusively for laboratory research use by qualified professionals in controlled settings. Not approved for human or veterinary therapeutic use, food, feed, or pharmaceutical manufacturing.

Antibiotic compounds may be subject to regulatory controls. Buyers must confirm compliance with applicable local, state, and federal regulations. International customers must verify import eligibility with local regulatory authorities.