# Ceftriaxone Disodium Salt Hemi Heptahydrate

Catalog No. AS-2007 | CAS 104376-79-6

⚠ **For Laboratory Use Only — Not for Human or Veterinary Use**

## 1. Product Identification

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| **Product Name** | Ceftriaxone Disodium Salt Hemi Heptahydrate |
| **Synonyms** | Disodium Ceftriaxone Salt; Ceftriaxone $Na_2$; Rocephin® (pharmaceutical grade) |
| **Catalog Number** | AS-2007 |
| **CAS Number** | 104376-79-6 |
| **Molecular Formula** | $C_{18}H_{16}N_8Na_2O_7S_3 \cdot 3.5H_2O$ |
| **Molecular Weight** | 661.60 g/mol |
| **Class** | Third-Generation Cephalosporin Antibiotic |
| **Grade** | Research Grade |
| **Supplier** | AuSaMicS Pty Ltd \| 31 Longview CT, Thomastown VIC 3074 Australia |
| **ABN** | 56 676 640 467 |

## 2. Physical & Chemical Properties

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| **Appearance** | White to slightly yellowish crystalline powder |
| **Odour** | Odourless |
| **Solubility** | Freely soluble in water; slightly soluble in methanol; practically insoluble in ethanol and acetone |
| **pH (1% aq. sol.)** | 6.0 – 8.0 |
| **Melting Point** | Decomposes above 155 °C (no defined melting point) |
| **Storage Temp.** | 2 – 8 °C, protected from light and moisture |
| **Hygroscopicity** | Hygroscopic — store in tightly sealed container |
| **Specific Rotation** | $[\alpha]D^{20}$ = −150° to −170° (c = 1, $H_2O$) |

## 3. Biological Activity & Mechanism of Action

Ceftriaxone is a potent third-generation cephalosporin antibiotic with broad-spectrum bactericidal activity against both Gram-positive and Gram-negative organisms. It exerts its antibacterial effect by irreversibly inhibiting the

transpeptidase enzymes (penicillin-binding proteins, PBPs) involved in the final cross-linking step of peptidoglycan biosynthesis. This disrupts the structural integrity of the bacterial cell wall, leading to osmotic lysis and cell death.

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| **Target** | Penicillin-Binding Proteins (PBPs 1a, 1b, 2, 3) |
| **Action** | Inhibition of peptidoglycan cross-linking → cell wall lysis |
| **Gram-positive spectrum** | Staphylococcus aureus (MSSA), Streptococcus spp., Streptococcus pneumoniae |
| **Gram-negative spectrum** | Escherichia coli, Klebsiella spp., Haemophilus influenzae, Neisseria spp., Proteus mirabilis, Salmonella spp. |
| **MIC Range** | 0.001 – 0.5 µg/mL (organism-dependent) |
| **Resistance Mechanism** | β-lactamase hydrolysis; PBP alteration; efflux pumps |

## 4. Preparation & Reconstitution Guidelines

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| **Recommended Solvent** | Sterile water for injection or 0.9% NaCl (saline) |
| **Typical Stock Conc.** | 10 mg/mL (reconstitute 100 mg in 10 mL solvent) |
| **Working Dilution** | 0.1 – 100 µg/mL (application-dependent) |
| **Filter Sterilisation** | 0.22 µm cellulose acetate filter recommended for cell-based assays |
| **Stability (solution)** | Use within 24 hours at 2 – 8 °C; do not freeze reconstituted solution |
| **Avoid** | Calcium-containing solutions (e.g., Lactated Ringer's) — risk of precipitation |

## 5. Recommended Research Applications

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| **Antibacterial Testing** | MIC/MBC determination; disk diffusion; broth microdilution assays |
| **Cell Wall Biology** | Studying peptidoglycan synthesis inhibition; bacterial morphology studies |
| **Biofilm Studies** | Biofilm disruption and inhibition against clinical isolates |
| **Resistance Research** | β-lactamase activity; resistance gene expression analysis |
| **Microbiome Studies** | Selective pressure assays; dysbiosis modelling |
| **In Vitro Cell Culture** | Antibiotic protection assays; intracellular infection models |
| **NOT suitable for** | In vivo (animal) or human therapeutic use |

## 6. Handling, Safety & Storage

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| **PPE Required** | Lab coat, nitrile gloves, safety glasses; use in a well-ventilated area or fume hood |

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| **Sensitisation** | Known β-lactam sensitiser — avoid inhalation or skin contact; penicillin-allergic individuals should take particular care |
| **First Aid — Skin** | Wash thoroughly with soap and water |
| **First Aid — Eyes** | Rinse with copious water for ≥15 min; seek medical attention |
| **First Aid — Ingestion** | Do not induce vomiting; seek immediate medical advice |
| **Disposal** | Inactivate by autoclaving (121 °C, 20 min) before disposal; comply with local regulations |
| **Storage** | 2 – 8 °C, in original sealed container, away from direct light and moisture |
| **Shelf Life** | 24 months from date of manufacture when stored as recommended |

## 7. Quality & Purity Specifications

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| **Purity (HPLC)** | ≥ 98% |
| **Identification** | IR, NMR (conforming to reference spectrum) |
| **Loss on Drying** | 8.0 – 11.0% (105 °C, 4 h) |
| **Heavy Metals** | ≤ 20 ppm |
| **Residual Solvents** | Within ICH Q3C limits |
| **Microbiological** | Total aerobic count ≤ 100 CFU/g |
| **Certificate** | Certificate of Analysis (COA) available upon request |

## 8. Regulatory & Compliance Information

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| **GHS Classification** | Not classified as hazardous under GHS/WHS Regulations (Australia) |
| **SUSMP Schedule** | Schedule 4 (Prescription Only) — this product is for research use only |
| **ADG Code** | Not classified as Dangerous Goods for transport purposes |
| **SDS Availability** | Safety Data Sheet available at www.ausamics.com.au or on request |
| **Use Restriction** | For in vitro research use only by qualified personnel in licensed laboratory facilities |

## 9. Key References

1. Neu, H.C. (1985). Cephalosporins in the treatment of serious infections. Drug Intelligence & Clinical Pharmacy, 19(7-8), 500–506.

2. Paladino, J.A. (1991). Ceftriaxone sodium: a third-generation cephalosporin. Drug Intelligence & Clinical Pharmacy, 25(10), 1075–1084.

3. Clinical and Laboratory Standards Institute (CLSI). Performance Standards for Antimicrobial Susceptibility Testing. Current edition.

4. European Committee on Antimicrobial Susceptibility Testing (EUCAST). Breakpoint tables for interpretation of MICs. Current edition.

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