



# Methicillin Sodium PRODUCT DATA SHEET

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<b>Product Name:</b>	Methicillin Sodium
<b>Product Number:</b>	M029
<b>CAS Number:</b>	132-92-3
<b>Molecular Formula:</b>	$C_{17}H_{19}N_2NaO_6S$
<b>Molecular Weight:</b>	402.40
<b>Form:</b>	Powder
<b>Appearance:</b>	White or almost white powder
<b>Solubility:</b>	Acetone: 0.35 mg/mL Ethanol: 40 mg/mL Water: Freely soluble
<b>Source:</b>	Semi-synthetic
<b>Water Content (Karl Fischer):</b>	$\leq 10.0\%$
<b>Melting Point:</b>	196-197°C (dec.)
<b>Optical Rotation:</b>	+225°
<b>Storage Conditions:</b>	-20°C
<b>Description:</b>	Methicillin Sodium is a narrow spectrum $\beta$ -lactam antibiotic in the penicillin family and is commonly used as a selective agent in pathogen isolation media, and in antimicrobial susceptibility testing. It is soluble in aqueous solution (0.3 mg/mL).
<b>Mechanism of Action:</b>	$\beta$ -lactams interfere with penicillin binding protein (PBP) activity involved in the final phase of peptidoglycan synthesis. PBP's are enzymes which catalyze a pentaglycine crosslink between alanine and lysine residues providing additional strength to the cell wall. Without a pentaglycine crosslink, the integrity of the cell wall is severely compromised and ultimately leads to cell lysis and death. Resistance to $\beta$ -lactams is commonly due to cells containing plasmid encoded $\beta$ -lactamases. Methicillin is mostly resistant to $\beta$ -lactamases.
<b>Spectrum:</b>	Methicillin targets primarily the cell wall of Gram-positive organisms especially <i>Staphylococcus aureus</i> .

**Microbiology Applications** Because of its widespread resistance among medically significant microbes, methicillin may be used as a selective agent in pathogen isolation media to inhibit insignificant microbial background growth.

Methicillin Sodium is commonly used in clinical *in vitro* microbiological antimicrobial susceptibility tests (panels, discs, and MIC strips) against Gram-positive microbial isolates. Methicillin is particularly used to test MRSA (Methicillin-resistant *Staphylococcus aureus*). Medical microbiologists use AST results to recommend antibiotic treatment options. Representative MIC values include:

- *Staphylococcus aureus* 0.5 µg/mL - 32 µg/mL

For a representative list of Methicillin MIC values, [click here](#).

**References:**

Joshi SG et al (2010) Control of methicillin-resistant *Staphylococcus aureus* in planktonic form and biofilms: A biocidal efficacy study of nonthermal dielectric-barrier discharge plasma. A. J. Infect. Cont. 38(4):293-301

Kehrenberg C, Cuny C, Strommenger B, Schwarz S, Witte W (2009) Methicillin-resistant and -susceptible *Staphylococcus aureus* strains of clonal lineages ST398 and ST9 from swine carry the multidrug resistance gene *cf*. Antimicrob. Agents Chemother. 2009 Feb;53(2):779-81. PMID 19047652

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

Sjöström JE, Löfdahl S, and Philipson L (1975) Transformation reveals a chromosomal locus of the gene(s) for methicillin resistance in *Staphylococcus aureus*. J. Bacteriol. 123 (3):905-915

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