



Ticarcillin Disodium w/ Clavulanate Potassium (15:1) (Timentin) PRODUCT DATA SHEET

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Product Name:	Ticarcillin Disodium w/ Clavulanate Potassium (15:1) (Timentin)
Product Number:	T020
CAS Number:	116876-37-0
Molecular Weight:	N/A
Form:	Powder
Appearance:	White or off white to yellow powder
Solubility:	Freely soluble
Source:	Mixture
Water Content (Karl Fischer):	Not more than 3.7%
pH:	5.5-7.5
Storage Conditions:	2-8 °C
Description:	<p>Ticarcillin Disodium w/ Clavulanate Potassium (15:1) or Timentin is a 15:1 mixture of the antibiotic ticarcillin disodium and the beta-lactamase inhibitor, clavulanate potassium.</p> <p>Ticarcillin disodium, is an extended-spectrum (4th generation) β-lactam in the carboxypenicillin family that acts as a cell wall synthesis inhibitor. Ticarcillin has bactericidal activity against many gram-positive and gram-negative bacteria, particularly <i>Pseudomonas aeruginosa</i>. As a beta-lactam antibiotic, ticarcillin is susceptible to β-lactamase degradation. When combined with Clavulanate Potassium (potassium salt of clavulanic acid), a beta-lactamase inhibitor, ticarcillin's antibacterial activity is greatly increased. Clavulanic acid is effective against organisms expressing class A β-lactamases (including CTX-M and the ESBL derivatives of TEM-1, TEM-2, and SHV-1); and are generally less effective against class B, C, and D β-lactamases.</p> <p>In plant biology, timentin is used most commonly in the regeneration medium for elimination of the Agrobacterium post-transformation of foreign DNA into plant cells.</p> <p>TOKU-E offers two forms of ticarcillin disodium: <u>ticarcillin disodium (T027)</u> and ticarcillin disodium w/clavulanate potassium (15:1) (Timentin)(T020). Both forms are freely soluble in aqueous solution.</p> <p>This product is considered a dangerous good. Quantities above 1 g may be subject to additional shipping fees. Please contact us for specific questions.</p>

Mechanism of Action: β -lactams, like Ticarcillin Disodium, USP, interfere with PBP (penicillin binding protein) 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 β -lactams is commonly due to cells containing plasmid encoded β -lactamases.

Clavulanic acid is a "suicide" or "mechanism based" beta-lactamase inhibitor. Clavulanic acid contains a beta-lactam ring that binds strongly to beta-lactamase at or near its activation site, thereby permanently inhibiting enzymatic activity. This action protects other beta-lactam antibiotics (penicillins, cephalosporins, etc.) from beta-lactamase catalysis, thereby enhancing their antibacterial activity.

Spectrum: Ticarcillin disodium with clavulanate potassium (Timentin) has a broad spectrum of activity, including gram-negative cocci other than enterococci and methicillin-resistant staphylococci; Enterobacteriaceae, including drug-resistant strains; *P. aeruginosa*; and gram-positive and gram-negative anaerobes.

Microbiology Applications Ticarcillin disodium is commonly used in clinical *in vitro* microbiological antimicrobial susceptibility tests (panels, discs, and MIC strips) against gram positive and gram negative microbial isolates. Medical microbiologists use AST results to recommend antibiotic treatment options for infected patients. Representative MIC values include:

- *Haemophilus influenzae* 0.2 μ g/mL – 0.8 μ g/mL
- *Streptococcus pneumoniae* 0.1 μ g/mL – 1.6 μ g/mL
- For a complete list of ticarcillin disodium MIC values, [click here](#).

Plant Biology Applications

Many *Agrobacterium* isolates are highly susceptible to ticarcillin disodium w/ clavulanate potassium (timentin). *Agrobacterium* strains carrying the standard pBR322 beta-lactamase gene are also susceptible to timentin. Timentin activity against *Agrobacterium* wild-type strains is three logs greater than with comparable doses of carbenicillin.

In *agrobacterium*-mediated plant transformation experiments, 0.1mg/ml ticarcillin disodium with clavulanate potassium (15:1) (timentin) is enough to counter-select *Agrobacterium*. Carbenicillin and cefotaxime can be used in the same applications, however, a study by Nauerby et. al. (1997) found timentin to be less toxic.

The appropriate dose in tissue culture medium is 0.1 mg/ml (not 0.1 mg/liter) of 15:1 mixture. At these concentrations, timentin exhibits no phytotoxicity to *Arabidopsis* root cultures.

References:

Guzmán, Flavio, MD. "Beta Lactams Antibiotics (penicillins and Cephalosporins) Mechanism of Action." *Medical Pharmacology*. Pharmacology Corner, 29 Nov. 2008. Web. 21 Aug. 2012.

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

Nauerby B., Billing K. and Wyndale R., Influence of the antibiotic timentin on plant regeneration compared to carbenicillin and cefotaxime in concentrations suitable for elimination of *Agrobacterium tumefaciens*. *Plant Science*, Vol. 3, pp. 169-177, 1997.

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