

<b>Product Name:</b>	Tazobactam
<b>Product Number:</b>	T001
<b>CAS Number:</b>	89786-04-9
<b>Molecular Formula:</b>	$C_{10}H_{12}N_4O_5S$
<b>Molecular Weight:</b>	300.29
<b>Form:</b>	Powder
<b>Appearance:</b>	White or almost white crystalline powder
<b>Source:</b>	Synthetic
<b>Water Content (Karl Fischer):</b>	Not more than 4.0%
<b>pH:</b>	2.0 - 2.5
<b>Storage Conditions:</b>	2-8°C
<b>Description:</b>	<p>Tazobactam is a penicillanic acid sulfone derivative and beta-lactamase inhibitor with antibacterial activity. Tazobactam was discovered by Dr. R.G. Micetech at the University of Alberta in 1982. Tazobactam contains a beta-lactam ring and irreversibly binds to beta-lactamase at or near its active site. This protects other beta-lactam antibiotics from beta-lactamase catalysis. This drug is used in conjunction with beta-lactamase susceptible penicillins to treat infections caused by beta-lactamase producing organisms.</p> <p>Tazobactam alone showed an MIC of <math>\leq 8</math> mg/liter (range 2 to 32 mg/liter) against several <i>Acinetobacter baumannii</i> strains. Tazobactam in combination with <u>piperacillin</u>, successfully restored the activity of piperacillin against <math>\beta</math>-lactamase-producing bacteria. Tazobactam exhibited inhibitory activity and protected piperacillin against Richmond and Sykes types II, III, IV and V <math>\beta</math>-lactamases, staphylococcal penicillinase and extended-spectrum <math>\beta</math>-lactamases. Tazobactam showed species-specific activity against class I chromosomally-mediated enzymes.</p> <p>TOKU-E offers two forms of tazobactam: tazobactam (T001) and <u>tazobactam sodium</u> (T031). Tazobactam is slightly soluble in aqueous solution (9.59 mg/mL). Tazobactam sodium is freely soluble in aqueous solution.</p>
<b>Mechanism of Action:</b>	<p>Tazobactam 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.</p>

**Spectrum:**

Tazobactam exhibits little useful antimicrobial activity, although weak activity against *Acinetobacter* spp. and *Borrelia burgdorferi* has been reported.

Tazobactam inhibits a wide range of  $\beta$ -lactamases, including the group 2 penicillinases from *Staph. aureus*, the TEM-1 and SHV-1  $\beta$ -lactamases, many extended-spectrum enzymes, and the common group 2e cephalosporinases of *B. fragilis*. Against the group 1 cephalosporinases, activity is strongly influenced by the amount of enzyme produced. The inhibitor-resistant group 2br  $\beta$ -lactamases are poorly inhibited and group 3 metallo- $\beta$ -lactamases are not inhibited at clinically useful levels. It is a poor inducer of  $\beta$ -lactamases of Gram-positive and Gram-negative organisms.

**Microbiology Applications**

Tazobactam is often combined with the extended-spectrum  $\beta$ -lactam antibiotic piperacillin in the drug zosyn or Tazocin (piperacillin/tazobactam), used in infections due *Pseudomonas aeruginosa*. Tazobactam broadens the spectrum of piperacillin by making it effective against organisms that express  $\beta$ -lactamase and would normally degrade piperacillin.

**References:**

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