

Product Name:	Sulfadiazine
Product Number:	S012
CAS Number:	68-35-9
Molecular Formula:	$C_{10}H_{10}N_4O_2S$
Molecular Weight:	250.28 g/mol
Form:	Powder
Appearance:	White or almost white crystalline powder.
Source:	Synthetic
Storage Conditions:	2-8°C
Description:	<p>Sulfadiazine is a sulfonamide antibiotic that was developed in 1940 by Richard Roblin at the Stamford Research Laboratories of the American Cyanamid Company to be a more potent and less toxic alternative to Sulfapyridine. Sulfadiazine is a bacteriostatic folic acid synthesis inhibitor that shows broad spectrum activity against gram-positive bacteria, gram-negative bacteria and Chlamydia.</p> <p>Sulfadiazine is a competitive inhibitor of the bacterial enzyme dihydropteroate synthetase. This enzyme is needed for the proper processing of para-aminobenzoic acid (PABA) which is essential for folic acid synthesis. The inhibited reaction is necessary in these organisms for the synthesis of folic acid.</p> <p>Sulfadiazine is sparingly soluble in aqueous solution (0.077 mg/mL).</p> <p>Synonyms: 4-Amino-<i>N</i>-(2-pyrimidinyl)benzenesulfonamide, <i>N</i>¹-(Pyrimidin-2-yl)sulfanilamide</p>
Mechanism of Action:	<p>Sulfadiazine is a competitive inhibitor of the bacterial enzyme dihydropteroate synthetase. This enzyme is needed for the proper processing of para-aminobenzoic acid (PABA) which is essential for folic acid synthesis. The inhibited reaction is necessary in these organisms for the synthesis of folic acid.</p>
Spectrum:	<p>Sulfadiazine is a broad-spectrum antibiotic targeting a wide range of gram-positive and gram-negative bacteria especially those which cause urinary tract infections.</p>

Microbiology Applications Sulfadiazine 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:

- *Neisseria meningitidis* 0.5 µg/mL – 200 µg/mL
- For a complete list of sulfadiazine MIC values, [click here](#).

Sulfadiazine is a component of SPS agar (Sulfite Polymyxin Sulfadiazine Agar), that can be used for the detection, isolation, and enumeration of *Clostridium perfringens* and *Clostridium botulinum* in food; as well as the detection of *V. cholerae* and *V. vulnificus* in the environment.

Sulfadiazine is commonly used with pyrimethamine to treat toxoplasmosis in patients with acquired immunodeficiency syndrome. It is also used to treat newborns with congenital infections. Sulfadiazine has been used to control acute infections when studying murine models of reactivated toxoplasmosis.

Plant Biology Applications

Sulfadiazine is a herbicide that is able to inhibit folic acid synthesis in plants. Sulfadiazine and the resistance gene *sul*, create an effective selection system for the creation of transgenic tobacco and algae. Col transformation experiments in tobacco revealed that *sul* is even superior to *nptII*, the currently most efficient selectable marker gene, and thus provides an attractive marker for the high throughput genetic transformation of plants and algae

References:

"Sulfadiazine: Mechanism of Action." *Cancer News Network*. N.p., 2009. Web. 21 Aug. 2012.

Tabatabaei, I., Dal Bosco, C., Bednarska, M., Ruf S., Meurer, J., Bock, R. (2018) A highly efficient sulfadiazine selection system for the generation of transgenic plants and algae. *Plant Biotechnol. J.*, <https://doi.org/10.1111/pbi.13004>

Minden, V., Deloy, A., Volkert, A. M., Leonhardt, S. D., & Pufal, G. (2017). Antibiotics impact plant traits, even at small concentrations. *AoB PLANTS*, 9(2), plx010. doi:10.1093/aobpla/plx010