Nitrofurantoin
PRODUCT DATA SHEET

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Product Name:	Nitrofurantoin
Product Number:	N006
CAS Number:	67-20-9
Molecular Formula:	$C_8H_6N_4O_5$
Molecular Weight:	238.16
Form:	Powder
Appearance:	Yellow crystalline powder
Solubility:	soluble in DMF (80 mg/ml). Practically insoluble in aqueous solution at 0.0795 mg/mL
Source:	Synthetic
Water Content (Karl Fischer):	< 1.0%
Storage Conditions:	Ambient. Protect from light.
Description:	Nitrofurantoin is broad-spectrum nitrofuran antibiotic that is used as a substrate of bacterial glycoprotein nitrofuran reductase. It is bacteriostatic against Gram-positive and Gram-negative bacteria. It has been found to have *in vitro* anti-cancer activities in bladder cancer cells. Nitrofurantoin is soluble in DMF. It is practically insoluble in aqueous solution. We also offer: • Nitrofurantoin Sodium (N061)
Mechanism of Action:	Nitrofurantoin has a unique mode of action in that it does not require growth or active metabolism to exert its effect. Upon entering a susceptible cell, nitrofurantoin is activated by bacterial enzymes (nitrofuran reductase) and targets ribosomes and nucleic acids which inhibit bacterial growth and leads to death of the bacterial cells. Resistance to Nitrofurantoin may be chromosomal or plasmid-mediated.
Spectrum:	Nitrofurantoin is a broad spectrum antibiotic frequently used to treat bacterial infections of the urinary tract. Nitrofurantoin has been found to be effective against certain β-lactam resistant strains of VRE or vancomycin resistant *Enterococcus*; a glycopeptide antibiotic resistant "superbug." It is also used agasint Enterococci, Staphylococci, Streptococci, Corneybacteria, and *E. coli.* *M*ost strains of *Proteus* spp. and *Pseudomonas aeurginosa* are resistant to Nitrofurantoin.

Microbiology Applications

Nitrofurantoin is commonly used in clinical *in vitro m*icrobiological 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. Representative MIC values include:

- *E. coli* 32 µg/mL - 64 µg/mL
- For a representative list of nNtrofurantoin MIC values, click here.

Nitrofurantoincan be used against *Lysteria monocytogene*s-persisters *in vitro*, and was effective against both growing and dormant cells (Knudsen et al, 2013).

In general, organisms are said to be susceptibile if the MIC is 32 ug/ml or less. The activity of this compound is pH dependent, and mean MIC rises sharply with pH >6.

Cancer Applications

Nitrofurantoin was evaluated for its cytotoxic activity against bladder cancer cells using three transitional cell carcinoma lines (HTB9 (grade 2); T24 (gr 3) and TccSup (gr. 4) at concentrations ranging from 0 to 2000 ug/ml. MTT assay. Significant, dose-dependent cytotoxicity was seen at 7.8 ug/ml conc. in all 3 cell lines. (Kamat and Lamm, 2004).

References:

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