

Product Name: Trimethoprim

Product Number: T011

CAS Number: 738-70-5

Molecular Formula: $C_{14}H_{18}N_4O_3$

Molecular Weight: 290.32

Form: Powder

Appearance: White or yellowish-white powder

Melting Point: 199°C - 203°C

Storage Conditions: 2-8 °C

Description: Trimethoprim is a synthetic derivative of trimethoxybenzyl-pyrimidine with bacteriostatic and antiprotozoal properties. As a dihydrofolate reductase inhibitor, trimethoprim binds tightly to the bacterial enzyme, blocking the production of tetrahydrofolic acid from dihydrofolic acid, arresting folic acid synthesis.

When Trimethoprim is combined with sulfonamides, like sulfamethoxazole (S045), the two compounds show bactericidal effects, but are only bacteriostatic when used separately. The activity is attributed to their synergistic effect in inhibiting folic acid metabolism in bacteria.

Trimethoprim has a wide antibacterial spectrum and is active against most gram-positive and gram-negative aerobic bacteria, including *Nocardia*, *Brucella*, Gram-negative bacilli, and some Gram-positive bacteria like *Streptococcus*, *Toxoplasma* and some other coccidians. It is used to treat recurrent cystitis, mild acute prostatitis, urinary tract infections, asymptomatic bacteriuria during pregnancy and respiratory tract infections.

TOKU-E offers two forms of trimethoprim: trimethoprim (T011) and trimethoprim lactate (T012). Trimethoprim has low solubility in aqueous solution (0.4 mg/mL). Trimethoprim lactate is freely soluble in aqueous solution (19.6 mg/mL).

Mechanism of Action: Trimethoprim interferes with the cellular metabolism of folic acid in the bacterial cell by blocking the biosynthesis of nucleotides. Trimethoprim binds to dihydrofolate reductase and inhibits the reduction of dihydrofolic acid to tetrahydrofolic acid. Tetrahydrofolic acid is an essential precursor in the thymidine synthesis pathway and interference with this pathway inhibits bacterial DNA synthesis.

Spectrum:

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Microbiology Applications

Trimethoprim 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:

- *Escherichia coli* 0.25 µg/mL - 64 µg/mL
- *Haemophilus influenzae* 0.15 µg/mL - 16 µg/mL
- For a complete list of trimethoprim MIC values, [click here](#).

Media Supplement

Trimethoprim can be used as a selective agent in several types of isolation media:

[Columbia Blood Agar](#) - *Campylobacter* selective supplement (Skirrow)

[Columbia Blood Agar](#) - *Campylobacter* selective supplement (Blaser-Wang)

[Campylobacter Agar](#) - *Campylobacter* Selective Supplement (Preston)

[Columbia Blood Agar](#) - *Helicobacter pylori* Selective Supplement (Dent)

[Bolton Broth](#) - Bolton Broth Selective Supplement

[Campylobacter Agar Base](#) - Modified Preston *Campylobacter* Selective Supplement

[Bolton Broth](#) - Modified Bolton Broth Selective Supplement

[Chromogenic *Bacillus cereus* Agar](#) - Chromogenic *Bacillus cereus* Selective Supplement

Plant Biology Applications

Trimethoprim can be used in combination with rifampicin to provide sufficient coverage against pathogenic microbes. When used without other supplemental antibiotics, trimethoprim was not shown to provide sufficient coverage (Pollock et al.1983).

References:

Weir, D. G., and J. Scott. "Mechanism of the Antimicrobial Drug Trimethoprim Revisited." *PubMed* (2000): 2519-524. www.ncbi.gov. 14 Dec. 2000. Web. 21 Aug. 2012.