



Metronidazole PRODUCT DATA SHEET

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Product Name:	Metronidazole
Product Number:	M011
CAS Number:	443-48-1
Molecular Formula:	$C_6H_9N_3O_3$
Molecular Weight:	171.15 g/mol
Form:	Powder
Appearance:	White or yellowish crystalline powder
Source:	Synthetic
Melting Point:	159-163°C
Storage Conditions:	2-8°C
Description:	Metronidazole is a bioactive small molecule and broad-spectrum nitromidazole antibiotic used against anaerobic bacteria in addition to parasites. It is sparingly soluble (<10 mg/mL) in aqueous solution.
Mechanism of Action:	Metronidazole has a unique mode of action, its metabolites forming unstable molecules which are incorporated into cellular DNA, and inhibit DNA replication and transcription. This mechanism has a bactericidal effect on anaerobic cell-encoded β -lactamases.
Spectrum:	Metronidazole is mostly used to combat anaerobic Gram-positive and Gram-negative bacteria including <i>Clostridium difficile</i> and <i>Bacteroides fragilis</i> . It can also be used for parasites like <i>Entamoeba histolytica</i> , <i>Giardia lamblia</i> and <i>Trichomonas vaginalis</i> .

Microbiology Applications The effect of Metronidazole, along with gentamicin and vancomycin, was evaluated in the gut microbiome of the *T-bet*^{-/-}*Rag2*^{-/-} ulcerative colitis (TRUC) mouse model. This model is useful for studying gut microbiome contributions to colonic inflammatory pathogenesis under disease state and treatment-induced remission and reviewing the microbes and microbial pathways involved in IBD and host-microbiota responses, offering the potential for therapeutic manipulation of the gut microbiome in colitis (Rooks et al, 2014).

Metronidazole is commonly used in clinical in vitro microbiological antimicrobial susceptibility tests (panels, discs, and MIC strips) against Gram-positive and Gram-negative anaerobic microbial isolates. Medical microbiologists use AST results to recommend antibiotic treatment options. Representative MIC values include:

- *Clostridium difficile* 0.25 µg/mL – 0.5 µg/mL
- *Bacteroides fragilis* 0.125 µg/mL -1 µg/mL
- For a complete list of Metronidazole MIC values, [click here](#).

References:

Bottino MC et al (2013) Bioactive nanofibrous scaffolds for regenerative endodontics. *J. Dent. Res.* 92(11):963-969 PMID 24056225

Lofmark S, Edlund C and Nord CE (2010) Metronidazole Is still the drug of choice for treatment of anaerobic infections. *Clin. Infect. Dis.* 50 Suppl 1:S16-23

Rooks et al (2014) Gut microbiome composition and function in experimental colitis during active disease and treatment-induced remission. *ISME J* 8(7):1403-1417 PMID 24500617

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