Erythromycin
PRODUCT DATA SHEET

issue date 01/06/2020

Product Name:	Erythromycin
Product Number:	E002
CAS Number:	114-07-8
Molecular Formula:	$C_{37}H_{67}NO_{13}$
Molecular Weight:	733.93
Form:	Powder
Appearance:	White powder
Solubility:	Alcohol: Freely soluble Water: 2 mg/mL Note: Solubility decreases with increasing temperature.
Source:	Biosynthetic: *Saccharopolyspora erythraea* (formerly *Streptomyces erythraeus*).
Water Content (Karl Fischer):	≤10.0%
Melting Point:	135-140°C
Optical Rotation:	-71° to -78°
Storage Conditions:	<30°C
Description:	Erythromycin is a broad-spectrum macrolide antibiotic derived from *Saccharopolyspora erythraea* (formerly *Streptomyces erythraeus*) that inhibits bacterial protein synthesis. It is composed largely of Erythromycin A, with small amounts of Erythromycin B and C. It is typically used at a concentration of 100 mg/L. Erythromycin is soluble in ethanol, 2M HCl (50 mg/ml), but sparingly soluble in aqueous solution (2 mg/mL). For other Erythromycin products, click here.
Mechanism of Action:	Macrolide antibiotics inhibit bacterial growth by targeting the 50S ribosomal subunit preventing peptide bond formation and translocation during protein synthesis. Resistance to Erythromycin is commonly attributed to mutations in 50S rRNA preventing erythromycin binding allowing the cell to synthesize proteins free of error.
Spectrum:	Erythromycin is a broad spectrum antibiotic targeting Gram-negative and Gram-positive bacteria. It is also effective against *Mycoplasma* (ie *M. pneumoniea*), *Mycobacteria*, and spirochetes.

Microbiology Applications

Erythromycin is commonly used in clinical *in vitro* microbiological antimicrobial susceptibility tests (panels, discs, and MIC strips) against Gram-positive, Gram-negative, and *Mycoplasma* species. Medical microbiologists use AST results to recommend antibiotic treatment options for infected patients. Representative MIC values include:

- *Mycoplasma pneumoniae* 0.0019 µg/mL – 0.0078 µg/mL
- *Legionella pneumophila* 0.008 µg/mL – 1 µg/mL
- For a complete list of erythromycin MIC values, click here.

Plant Biology Applications

Erythromycin has been used in combination with nystatin and streptomycin for eliminating contaminants in rubber (*Hevea brasiliensis*) tissue culture (Leiffert et al.) (1991).

Cancer Applications

HERG (Human Ether-a-go-go Related Gene) may serve as a molecular marker and modulating target for individualized cancer therapy. Erythromycin, active as modulator and a HERG K+ channel blocker, suppressed the growth of various cancer cells and the potency was correlated with HERG expression levels. Erythromycin also enhanced the G2/M arrest induced by vincristine in HT-29 cells. (Chen et al, 2005).

References:

Aoki Y and Kao PN (1999) Erythromycin inhibits transcriptional activation of NF-kappaB, but not NFAT, through calcineurin-independent signaling in T cells. Antimicrob. Agents Chemother. 43(11):2678-2684 PMID 10543746

Aoshiba K, Nagai A, and Konno K (1995) Erythromycin Shortens Neutrophil Survival by Accelerating Apoptosis. Antimicrob. Agents and Chemother. 39(4):872-877 PMID 7785987

Chen S, Jiang M and Zhen Y (2005) HERG K+ channel expression-related chemosensitivity in cancer cells and its modulation by erythromycin. Cancer Chemother Pharmacol 56: 212-220. PMID 15812674

Lovmar M and Tenson T (2003) The Mechanism of Action of Macrolides, Lincosamides and Streptogramin B Reveals the Nascent Peptide Exit Path in the Ribosome. Molec. Microbiol 330(5):1005-1014 PMID 12860123

Leifert C, Ritchie JY and Waites WM (1991) Contaminants of plant-tissue and cell cultures. World J. Microbiol. Biotechnol. 7: 452469

Oliynk M et al (2007) Complete genome sequence of the erythromycin-producing bacterium *Saccharopolyspora erythraea NRRL233338. Nature Biotechnol. 25:447-453 PMID 17369815*

Peeters T et al (1989) Erythromycin is a motilin receptor agonist. Am. J. Physiol 257 (3):G470-G474 PMID 2782416