Chloramphenicol acetate
PRODUCT DATA SHEET

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Product Name:	Chloramphenicol acetate
Product Number:	C172
CAS Number:	10318-16-8
Molecular Formula:	$C_{13}H_{14}Cl_2N_2O_6$
Molecular Weight:	365.2
Appearance:	White solid
Storage Conditions:	-20°C
Description:	Chloramphenicol acetate is the major product of chloramphenicol acetyltransferase, and is a natural co-metabolite of chloramphenicol with lower potency. It is broad-spectrum, effective against a wide variety of Gram-positive and Gram-negative bacteria. Chloramphenicol acetate is soluble in ethanol, methanol, DMF and DMSO. For more Chloramphenicol products, click here.
Mechanism of Action:	After entering a bacterial cell, Chloramphenicol reversibly binds to the peptidyltransferase center at the 50S ribosomal subunit of 70S ribosome, preventing peptide bond formation. Resistance to Chloramphenicol may be due to decreased cell permeability or a mutation in the 50S ribosomal subunit.
Spectrum:	Chloramphenicol is effective against Gram-positive and Gram-negative bacteria, both aerobic and anaerobic bacteria. It is also effective against Mycoplasmas, Chlamydiae, and Rickettsiae.

Microbiology Applications

Chloramphenicol 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 meningitides* 0.06 µg/mL - 8 µg/mL
- *Streptococcus pneumoniae* 0.25 µg/mL – 4 µg/mL
- For a complete list of chloramphenicol MIC values, click here.

Bacterial resistance to chloramphenicol is enzymatic inactivation by acetylation via different types of chloramphenicol acetyltransferases (CATs), and this feature has been exploited for gene selection. Chloramphenicol is routinely used to select for transformed cells that express the chloramphenicol resistance gene, *cat.*

Media Supplement

Chloramphenicol is used as a selective agent in:

Dermasel Agar, - Dermasel Selective Supplement. Selection of dermatophyte fungi from hair, nails, and skin scrapings.

Chromogenic *Candida* Agar - *Candida* Selective Supplement

Plant Biology Applications

Chloramphenicol is gene selection agent for resistant plants containing the *cat* gene.

Chimeric genes made up of the nopaline synthase promoter and bacterial coding sequences that specify resistance to chloramphenicol were inserted into a Ti plasmid vector and used to transform tobacco protoplasts. The use of a non-oncogenic Ti plasmid was used and phenotypically normal fertile plants regenerated from the resistant calli, thus providing a natural environment for studying gene expression and development of plant cells. (De Bloc et al, 1984).

Cancer Applications

Researchers at the University of Manchester, UK found a conserved phenotypic dependence on the biogenesis of mitochondria for the expansion of cancer stem cells. Since Chroramphenicol can inhibit mitochrondrial biogenesis, it was found to inhibit tumor-sphere formation in MCF7 cells. This approach is mutation-independent, and treats cancer like a single disease of ‘stemness’, independent of tumor type. This approach was successful *in vitro* with 12 different cancer cell lines, across 8 different tumor types (breast, DCIS, ovarian, prostate, lung, pancreatic, melanoma, and glioblastoma (brain). (Lamb et al, 2015).

References:

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Schwarz S, Kehrenberg C, Doublet B, Cloeckaert A (2004) Molecular basis of bacterial resistance to chloramphenicol and florfenicol, FEMS Microbiol. Rev. 28(5):519–542 PMID 15539072

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