



# Puromycin Dihydrochloride PRODUCT DATA SHEET

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<b>Product Name:</b>	Puromycin Dihydrochloride
<b>Product Number:</b>	P001
<b>CAS Number:</b>	58-58-2
<b>Molecular Formula:</b>	$C_{22}H_{29}N_7O_5 \cdot 2 HCl$
<b>Molecular Weight:</b>	544.43
<b>Form:</b>	Powder
<b>Appearance:</b>	White or off-white powder
<b>Solubility:</b>	Water: Freely soluble at pH 7
<b>Water Content (Karl Fischer):</b>	≤12.0%
<b>Melting Point:</b>	168-178°C
<b>Storage Conditions:</b>	2-8°C
<b>Description:</b>	<p>Puromycin dihydrochloride (DiHCl) is an aminonucleoside antibiotic derived from <i>Streptomyces alboniger</i>. Puromycin DiHCl is routinely used in cell culture application as a selective agent in transfection and transformation protocols.</p> <p>For more puromycin products, <a href="#">click here</a>.</p>

**Conti et al.** used puromycin DiHCl from TOKU-E to select for eGFP expressing A549 cells. "[Polymeric Nanocarriers And Their Oral Inhalation Formulations For The Regional Delivery of Nucleic Acids To The Lungs.](#)"

**Sandoval-Jaime et al.** used puromycin DiHCl from TOKU-E to select for stably transfected cells. "[Recovery of murine norovirus and feline calicivirus from plasmids encoding EMCV IRES in stable cell lines expressing T7 polymerase.](#)"

**Mutonga et al.** used puromycin from TOKU-E to select for resistant cells transformed with a vector containing SUV39H2 (a histone methyltransferase) and a puromycin resistance gene. "[Targeting Suppressor of Variegation 3-9 Homologue 2 \(SUV39H2\) in Acute Lymphoblastic Leukemia \(ALL\).](#)"

**Lu et al.** used blasticidin S HCl and puromycin dihydrochloride from TOKU-E to select for transfected AS-B145 and BT-474 cells. "[Ovatodiolide Inhibits Breast Cancer Stem/Progenitor Cells through SMURF2-Mediated Downregulation of Hsp27](#)"

**Mechanism of Action:** Puromycin Dihydrochloride inhibits protein synthesis in two ways. Puromycin associates with the donor substrate, peptidyl-tRNA, in the P site and functions as an acceptor substrate. Puromycin DiHCl can also compete with aminoacyl tRNA to bind with the A' site within the peptidyl transferase center causing premature chain termination.

### **Mechanism of resistance**

Puromycin resistance is conferred by the *pac* gene and is isolated from *Streptomyces alboniger*. The *pac* gene is a 600 nucleotide fragment of DNA and encodes puromycin N-acetyltransferase. Puromycin N-acetyltransferase inactivates puromycin by acetylating the amino group in the puromycin tyrosinyl moiety. Acetylated puromycin is biologically inactive and does not associate with prokaryotic or eukaryotic ribosomes.

**Spectrum:** Puromycin dihydrochloride is active against both prokaryotic and eukaryotic cells. Puromycin DiHCl is active against gram-positive microorganisms, less active against acid-fast bacilli and gram-negative microorganisms. Puromycin can prevent growth of bacteria, algae, protozoa, and mammalian cells and acts quickly, killing 99% of cells within 2 days.

**Microbiology Applications** Puromycin dihydrochloride can be used to select for puromycin resistant bacteria that have been transformed with the *pac* gene. Resistant *E. coli* transformants can be isolated on pH adjusted LB medium using a puromycin concentration of 100-125 µg/mL.

Puromycin dihydrochloride can also be used as a selectable marker in mollicute research and has been successfully used to select for various *Mycoplasma* species after transformation with the puromycin resistance gene (*pac*). Tetracycline is traditionally used as a selectable marker for *Mycoplasma*; however, puromycin does not have any clinical value, is a potent protein synthesis inhibitor, and can be used to screen for a wide range of puromycin resistant *Mycoplasma* spp. Because of its unique mechanism of action, there is a low possibility of spontaneous resistance to puromycin by a point mutation.

**Cancer Applications** Puromycin DiHCl has shown anti-tumor activity when tested against numerous cell lines.

**References:**

Azzam, M. E. "Mechanism of Puromycin Action: Fate of Ribosomes after Release of Nascent Protein Chains from Polysomes." *PNAS* 70.12 (1973): 3866-3869. [www.ncbi.gov](http://www.ncbi.gov). Web. 4 Sept. 2012.

Vara, J. "Cloning and Expression of a Puromycin N-acetyl Transferase Gene from *Streptomyces Alboniger* in *Streptomyces Lividans* and *Escherichia Coli*." *Gene* 33.2 (1985): 195-206. [www.ncbi.gov](http://www.ncbi.gov). Web. 7 Sept. 2012.

Algire, Mikkel A. "New Selectable Marker for Manipulating the Simple Genomes of *Mycoplasma* Species." *Antimicrobial Agents and Chemotherapy* 53.10 (2009): 4429-432. [ncbi.nlm.nih.gov](http://ncbi.nlm.nih.gov). Web. 5 Nov. 2014.

Lacalle R. et al., 1989. Molecular analysis of the *pac* gene encoding a puromycin N-acetyl transferase from *Streptomyces alboniger*. *Gene*. 79:375-80.