Puromycin Dihydrochloride
PRODUCT DATA SHEET

issue date 01/06/2020

Product Name:	Puromycin Dihydrochloride
Product Number:	P001
CAS Number:	58-58-2
Molecular Formula:	$C_{22}H_{29}N_7O_5 \cdot 2\ HCl$
Molecular Weight:	544.43
Form:	Powder
Appearance:	White or off-white powder
Solubility:	Water: Freely soluble at pH 7
Water Content (Karl Fischer):	≤12.0%
Melting Point:	168-178°C
Storage Conditions:	2-8°C

Description:

Puromycin Dihydrochloride (syn: Puromycin DiHCl) is the hydrochloride salt of Puromycin, an aminonucleoside antibiotic with anti-trypanosomal and antineoplastic properties. Puromycin was isolated from *Streptomyces alboniger* in the 1950s. Puromycin Dichloride is routinely used in cell culture as a selective agent in transfection and transformation protocols to select for cells that have been transformed with the *pac* gene and express puromycin-N-acetyl-transferase. Puromycin DiHCl is soluble in water.

We also offer:

- Puromycin (P097)
- Puromycin Aminonucleoside (P041)
- Puromycin DiHCl Solution (10 mg/ml in 20 mM HEPES)(P025-P026)

Mechanism of Action:

Puromycin Diihydrochloirde inhibits protein synthesis in two ways: 1) Puromycin associates with the donor substrate, peptidyl-tRNA, in the P site and functions as an acceptor substrate. 2) Purmycin DiHCl can compete with aminoacyl tRNA to bind with the A′ site within the peptidyl transferase center causing premature chain termination.

Mechanism of resistance

Resistance to Puromycin is conferred by the *pac* gene, a 60 nt fragment that encodes puromycin N-acetyltransferase. The enzyme inactivates Puromycin by acetylating the amino group in the tyrosinyl moiety. Acetylated Puromycin is biologically inactive and does not associate with prokaryotic or eukaryotic ribosomes.

Spectrum:

Puromycin can prevent growth of bacteria, algae, protozoa, and mammalian cells and acts quickly, killing 99% of cells within 2 days. Puromycin diHCl is active against both prokaryotic and eurkaryotic cells. It is active against Gram-positive bacteria and less active against Gram-negative and acid-fast bacilli.

Microbiology Applications

Puromycin Dihydrochloride can be used to select for Puromycin resistant bacteria that have been transformed with the *pac* gene. Resistant *E. colii* 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 maker 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 Dihydrochloride has shown anti-tumor activity when tested against numerous cell lines.

References:

References for TOKU-E Product:

Conti et al. used Puromycin Dihydrochloride to select for eGFP expressing A549 cells. "Polymeric Nanocarriers And Their Oral Inhalation Forumlations For The Regional Delivery of Nucleic Acids To The Lungs."

Sandoval-Jaime et al. used Puromycin Dihydrochloride 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."

Lu et al. used Puromycin Dihydrochloride to select for transfected AS-B145 and BT-474 cells. "Ovatodiolide Inhibits Breast Cancer Stem/Progenitor Cells through SMURF2-Mediated Downregulation of Hsp27"

References

Algire MA (2009) New selectable marker for manipulating the simple genomes of *Mycoplasma* species. Antimicrob. Agents and Chemother. 53(10):4429-4432

Azzam ME (1973) Mechanism of Puromycin action: Fate of ribosomes after release of nascent protein chains from polysomes." *PNAS* 70.12:3866-3869.

Lacalle R et al (1989) Molecular analysis of the *pac* gene encoding a puromycin N-acetyl transferase from *Streptomyces alboniger*. Gene. 79:375-380

Vara J (1985) Cloning and expression of a Puromycin N-acetyl transferase gene from *Streptomyces alboniger* in *Streptomyces lividans* and *Escherichia coli.* Gene 33(2):195-206