Permeabilizer Pluronic F-127 (10% in H_2O)

Cat. No.: P1516104 | Pack size: 1 mL, 10 mL | Storage: Room temperature

Product Introduction

Permeabilizer Pluronic F-127, 10% in H_2O is a ready-to-use, low-toxicity polymeric nonionic surfactant. Its amphiphilic PEGPPG-PEG block structure enables micelle formation in aqueous phase, which instantaneously encapsulates and solubilizes hydrophobic AM esters (e.g., Fluo-3 AM, Fluo-4 AM, Fluo-8 AM, Fluo-20 AM, Fura-2 AM, Indo-1 AM, Rhod-2 AM, Calcein AM, CFDA-SE, SBFI AM, PBFI AM, Quest Fluor-8 AM, Quest Rhod-4 AM) or other lipophilic probes (e.g., Di-4-ANEPPS, Di-8-ANEPPS, $DiOC_2(3)$, $DiOC_6(3)$, RH421). This allows these dyes to rapidly and uniformly penetrate live cell membranes without the need for organic co-solvents, significantly improving loading efficiency and reducing cytotoxicity. The 10% aqueous solution can be directly diluted for use, compatible with fluorescence microscopy, flow cytometry, and high-throughput platforms, and is widely applied in experiments such as calcium imaging, membrane potential detection, and drug delivery.

The efficiency of loading live-cell ion indicators and hydrophobic probes into cells has long been a critical bottleneck in cell function research. Traditional DMSO loading methods are prone to causing cell membrane damage, dye aggregation, and batch-to-batch variability. Pluronic F-127 achieves uniform dye distribution through mild solubilization and transient membrane perturbation mechanisms without compromising membrane integrity, and has become a standard permeabilization enhancer in neuroscience, oncology, and drug screening. Its low immunogenicity, reversible action, and broad compatibility with various fluorescent probes make it a core tool for constructing high-fidelity "real-time in situ" cell function maps.

Note: *Aliases include Poloxamer 407, poloxamer 407, polyether, or polyoxyethylene polyoxypropylene.*

Note: *Pluronic is a trademark and registered trademark of BASF.*

Application Scope

Nonionic surfactant; controlled-release drug carrier; dye water solubility enhancer; AM ester indicator loading aid; membrane potential and membrane permeability probe carrier;

Product Features

1. Imported raw materials, stable and reliable: The product uses cell-culture-grade imported raw materials, with purity >99% per batch, ensuring strong consistency in experimental results;

2. Ready-to-use formulation, easy operation: Ready to use upon opening, no tedious pre-treatment required;

3. Low toxicity and high efficiency, cell-friendly: Cell viability >95%, dye loading efficiency increased by 3-5 times;

4. Universal platform, wide application: Compatible with mainstream imaging and detection equipment, supporting scenarios such as calcium imaging, membrane potential detection, and drug delivery;

5. Thermogelation property, expanding application scenarios: Supports the construction of sustained-release drug systems, suitable for scientific research and industrial development.

Product Parameters

1. Molecular formula: $H(C_2H_4O)_x(C_3H_6O)_y(C_2H_4O)zOH$;

2. Molecular weight: ~12,500;

3. CAS number: 9003-11-6;

4. Color and appearance: Colorless liquid;

5. Concentration (M/V): 10%.

Product Components

Component	250 T
Permeabilizer Pluronic F-127, 10% in H_2O	1 mL

Note: *Usage count is calculated based on 500 µL of 0.08% Pluronic F-127 solution per use, with a final working concentration of 0.04% in a total volume of 1 mL.*

Precautions

1. Store the product at room temperature; do not refrigerate. The product tends to form a gel under low-temperature conditions. If this occurs, place the product in a water bath at 50-65 °C for 5-10 minutes and vortex until it becomes a colorless liquid, which does not affect product performance.

2. The working concentration of the product should not be too high. When used with high-intensity fluorescent dyes such as Fluo-8, the recommended working concentration is below 0.1%; when used with low-intensity fluorescent dyes (e.g., Indo-1 AM, 5-CFDA AM, Fura Red AM), the working concentration can be appropriately increased.

3. This product is for research use only and must not be stored in ordinary residential premises.

4. For your safety and health, please follow the standard laboratory safety regulations in your institution.

Instructions for Use

I. Pre-Experiment Preparation

1. Reagent Preparation:

(1) Remove reagents from storage conditions (e.g., 4 °C) and equilibrate to room temperature (15-25 °C).

(2) Prepare cell culture medium, buffer (e.g., Hanks or 20 mM Hepes buffer), and fluorescent dye (e.g., AM ester ion indicators).

2. Control Setup:

(1) Negative control: Cells without dye or Pluronic F-127;

(2) Positive control: Cells known to normally take up the dye;

(3) Solvent control: Cells with only solvent (e.g., DMSO or buffer), used to exclude solvent interference.

II. Operational Steps

Protocol 1: Loading AM ester ion indicators into cells at 5 μM (conditions may vary for different cells or dyes)

1. Prepare Pluronic F-127 working stock solution:

Dilute the 10% Pluronic F-127 at a ratio of 1:125 using cell-culture-grade water or buffer (e.g., Hanks or 20 mM Hepes buffer) to obtain a 0.08% Pluronic F-127 solution.

2. Prepare dye working stock solution:

Dilute the 5 mM AM ester dye at a ratio of 1:500 using cell-culture-grade water or buffer (e.g., Hanks or 20 mM Hepes buffer) to obtain a 10 μM AM ester dye solution.

Note: *Dye working solution preparation instructions: The dye working stock solution should be prepared at twice the final target working concentration. The recommended final working concentration is 0.01%-0.1%, and the specific concentration needs to be optimized based on cell type and dye type. For example, for most AM ester dyes (e.g., Fluo-4 AM), 0.04% Pluronic F-127 usually provides good cell loading results.*

3. Prepare staining working solution:

Mix the 0.08% Pluronic F-127 solution and 10 μM AM ester dye solution in equal volumes (1:1 by volume) to obtain a mixed solution with a Pluronic F-127 working concentration of 0.04% and an AM ester dye working concentration of 5 μM.

4. Label cells:

After removing the medium from the cells to be labeled, add an appropriate amount of the above mixed solution and incubate at room temperature for 10 min to 1 h.

Note: *The labeling time can be appropriately adjusted according to the dye type and cell characteristics. Pluronic F-127 is suitable for most mammalian cells, including suspension and adherent cells. However, for certain special cell types (e.g., primary cells or sensitive cell lines), it is recommended to optimize the Pluronic F-127 concentration and incubation time through pre-experiments to minimize potential cytotoxicity risks.*

5. Wash cells:

(1) After labeling, wash the cells 2-3 times with buffer or fresh cell culture medium, and centrifuge to remove the supernatant.

(2) Resuspend in buffer and prepare for detection.

III. Result Interpretation

1. Qualitative analysis (fluorescence microscopy): Observe the distribution and intensity of intracellular fluorescence signals:

(1) Normal uptake: Uniform or specific fluorescence signals visible inside cells;

(2) Poor uptake: Weak or unevenly distributed fluorescence signals, indicating the need to optimize Pluronic F-127 concentration or incubation time;

(3) Background interference: Strong extracellular or background fluorescence indicates insufficient washing or excessively high dye concentration;

2. Quantitative analysis (flow cytometry): Collect cell fluorescence intensity data using a flow cytometer:

(1) Analysis indicators: Mean fluorescence intensity (MFI): reflects intracellular dye uptake; positive cell ratio: proportion of successfully labeled cells;

(2) Data interpretation: If MFI is significantly higher than the negative control, the dye is successfully loaded; if the positive rate is low or MFI is low, it is recommended to optimize the Pluronic F-127 concentration or incubation time;

Frequently Asked Questions and Answers

1. Q: What are the disadvantages of DMSO compared to Pluronic F-127? How does Pluronic F-127 bring about changes?

A: DMSO (dimethyl sulfoxide) is a commonly used organic solvent that can dissolve many hydrophobic compounds, but it also causes several problems:

a. High cytotoxicity: Concentrations exceeding 0.1% may damage cells and affect experimental results;

b. Signal interference: DMSO itself may affect cell membrane potential, ion channels, or signaling pathways, leading to data bias;

c. Limited solubilization capacity: For some highly hydrophobic dyes or drugs, DMSO's solubilization capacity is insufficient, and precipitation is prone to occur;

d. Inconvenient operation: DMSO is hygroscopic, volatile, and corrosive to certain plastics, requiring strict experimental conditions;

Pluronic F-127 is a nonionic surfactant widely used in biological experiments, with the greatest advantages of safety, efficiency, and stability:

a. Low toxicity and good biocompatibility: Pluronic F-127 is almost non-toxic to cells and does not significantly affect cell viability and function even at high concentrations, making it ideal for long-term or high-sensitivity experiments;

b. Significantly improves water solubility of hydrophobic molecules: It can form micellar structures in water to encapsulate hydrophobic molecules (e.g., fluorescent dyes, drugs, AM ester probes), greatly improving their solubility, avoiding precipitation, and ensuring smooth experiments;

c. Reduces or replaces DMSO: In many experiments, Pluronic F-127 can partially or completely replace DMSO, fundamentally reducing solvent toxicity, minimizing interference, and improving data reliability and reproducibility;

d. Enhances loading efficiency and signal stability: During cell loading of ion indicators (e.g., Fluo-3 AM, Fura-2 AM), Pluronic F-127 promotes dye entry into cells, reduces leakage and aggregation, resulting in stronger and more stable signals.

2. Q: Why did my Pluronic F-127 turn into a gel at 4 °C? Can it still be used?

A: This is a normal phenomenon. Pluronic F-127 forms a gel at low temperatures, but this does not affect its performance. Before use, simply place it at room temperature (15-25 °C) and let it stand until it is completely dissolved and clear, then it can be used normally.

3. Q: How to determine if Pluronic F-127 has expired?

A: If the product appears cloudy, precipitated, has an odor, or cannot return to a clear state after dissolution, it may have deteriorated or been contaminated, and use is recommended to be discontinued. In addition, if dye loading efficiency decreases significantly in experiments, it may indicate reduced product activity, and a new batch is recommended for replacement.

4. Q: Can Pluronic F-127 be mixed with other reagents?

A: Yes. Pluronic F-127 is compatible with most buffers, media, and fluorescent dyes. However, avoid mixing with highconcentration ionic solutions (e.g., >100 mM Ca^{2+} or Mg^{2+}) or strong acids/bases, as this may affect micelle formation and solubilization.

5. Q: How to optimize experimental conditions for Pluronic F-127?

A: Optimization is recommended through the following steps: a. Concentration gradient experiment: Test the effects of different concentrations (e.g., 0.01%, 0.02%, 0.05%, 0.1%) on cell viability and dye loading efficiency; b. Incubation time optimization: Typically 10-60 min, adjusted according to dye and cell type; c. Temperature optimization: Room temperature or 37 °C is acceptable, but 37 °C may accelerate dye uptake;

6. Q: Does Pluronic F-127 affect fluorescence signals?

A: At recommended concentrations, Pluronic F-127 does not significantly affect fluorescence signals. On the contrary, it improves dye solubility and cell loading efficiency, thereby enhancing signal intensity and stability. However, high concentrations may increase background fluorescence, requiring optimization.

Specifications

Attribute	Value
Synonyms	Permeabilizer Pluronic F-127 | Pluronic F-127 | Poloxamer 407
Specifications & Purity	BioReagent,for fluorescence analysis,for cell culture,sterile,10%
Stability And Storage	Store at room temperature long term (12 months).
Storage Conditions	Room temperature
Shipped In	Normal

Product Images

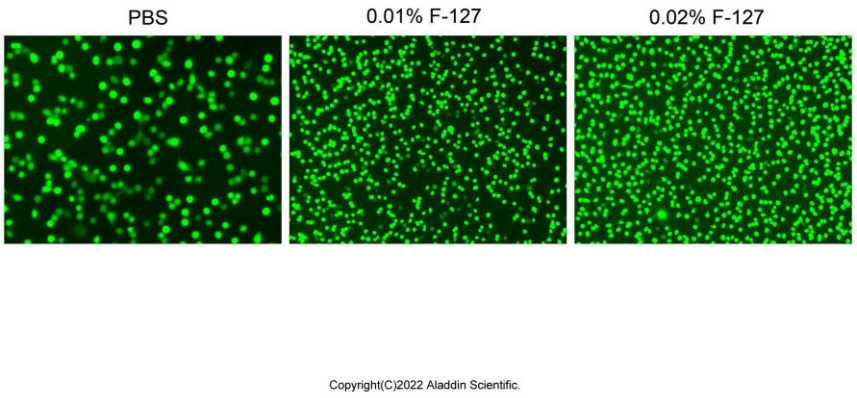

Figure 1. IF analysis of L-929 cells labeled with CFDA-SE (Green), with or without Pluronic F-127.

Contact & Global Offices

Whether you have a technical question, need help with a quotation, or want to inquire about an order, our regional teams are ready to assist. Please contact the office for your region; for general inquiries, the North American office is the corporate primary.

NORTH AMERICAN SALES, SUPPORT & GENERAL INQUIRIES	EU SALES, LOGISTICS & LOCALIZED SUPPORT
Aladdin Scientific Corporation	**Aladdin Biochem Deutschland GmbH**
14078 Meridian Parkway, Riverside, CA 92518, USA	Westring 2, 33142 Büren, Germany
Phone: 1-833-552-7181	Phone: +02951 9383958
Sales: sales@aladdinsci.com	Support: support.eu@aladdinsci.com
Customer Service: custserv@aladdinsci.com	

Limitations & Disclaimer

- For Research Use Only (RUO). Not for use in human or animal diagnostics, therapeutics, or in vivo applications. Not for food, cosmetic, or household use.

- This product is not a CE-marked in vitro diagnostic device under IVDR (EU) 2017/746 and is not an FDA-cleared device under 21 CFR. Use is restricted to verified businesses, institutions, and qualified professionals for research and development purposes.
- Where any kit component is classified as hazardous under CLP (EC) 1272/2008 or OSHA HCS (29 CFR 1910.1200), the product Safety Data Sheet (SDS) takes precedence over this document for handling, storage, and disposal information.
- Performance depends on sample type, sample condition, handling, and operator technique. Users are responsible for validating the product for their specific application.
- Aladdin product labels, SDS, COA, and approved specifications take precedence over this document. If product formulation, label, SDS, storage conditions, pack size, or quality specifications change, this document must be reviewed and reissued.