Major Red Plus Stain

Instruction Manual

Catalog No. : MRP-500

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Packing list

MRP-500

1x Major Red Plus Stain, Light-Protected Brown Cryogenic Vial, 500μL/vial.

Signed by:
Date:

major science is liable for all missing or damaged parts / accessories within 7 days after customer received this instrument package. Please contact major science immediately regarding this issue. If no response within such time period from consignee party, that will be consignee party's whole responsibility.

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Warning

Major Red Plus Stain is a non-mutagenic fluorescent dye designed for safe and sensitive detection of double-stranded DNA (dsDNA) in agarose or polyacrylamide gels. It provides instant band visualization under blue light or UV illumination. Although **Major Red Plus Stain** is a safety staining dye, it is strictly intended for laboratory use only and is not for human or animal use. Always handle with gloves, a lab coat, and protective eyewear. Avoid ingestion, inhalation, and direct contact with skin or eyes. Dispose of waste according to institutional safety guidelines. It is strongly recommended that users read the following safety and handling instructions carefully before using this reagent.

Safety Information

Product Name: **Major Red Plus Stain**

General Safety

- This product is intended for laboratory use only, not for human or animal use.
- Handle in accordance with standard laboratory practices.
- Do not ingest, inhale, or allow contact with skin or eyes.

Hazard Assessment

- Major Red Plus is a non-mutagenic and non-carcinogenic alternative to ethidium bromide.
- Current studies indicate it poses low toxicity under normal laboratory conditions.
- Despite reduced hazards, safe laboratory handling procedures must always be followed.

Personal Protective Equipment (PPE)

- Wear laboratory coat, disposable gloves, and protective eyewear when handling the reagent.
- Use in a well-ventilated area or under a fume hood if aerosol formation is possible.
- First Aid Measures
- Skin Contact: Wash thoroughly with soap and water.

- Eye Contact: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Seek medical attention if irritation persists.
- Inhalation: Move to fresh air. Seek medical attention if breathing difficulty occurs.
- Ingestion: Rinse mouth with water. Seek medical advice immediately.

Spill and Disposal

- Absorb spills with an appropriate inert material and dispose of in accordance with institutional and local regulations.
- Do not dispose of in sinks or regular trash. Follow chemical waste disposal guidelines.

Storage

- Store at room temperature, protected from light.
- Keep container tightly closed when not in use.
- Avoid exposure to strong oxidizers or extreme temperatures.

Disclaimer

- The information provided is based on current knowledge and intended to describe the product in terms of health, safety, and environmental requirements. It should not be considered a guarantee of any specific product property.

Note: While Major Red Plus Stain is significantly safer than traditional stains, it should always be handled with the same care as other laboratory reagents.

Section 1 Introduction

1.1 Overview

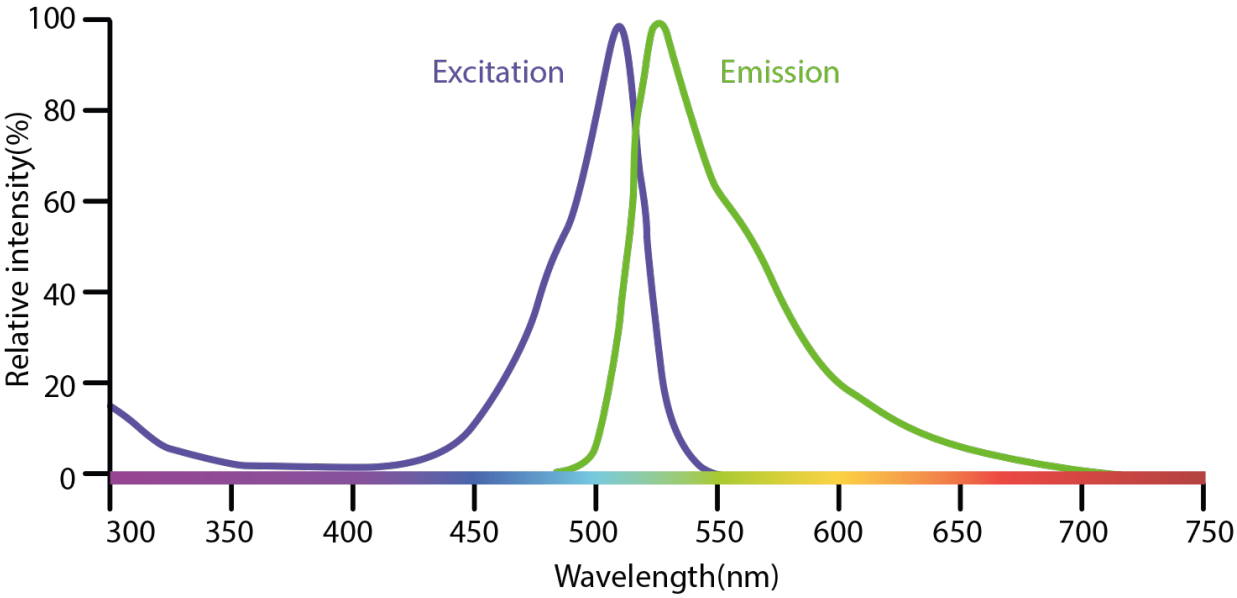
Major Red Plus Stain is a non-mutagenic fluorescent dye that enables instant visualization of DNA/RNA bands in agarose gels under blue light or UV illumination. Formulated in major science's 6X DNA Loading Buffer, it is used to prepare DNA markers and samples for electrophoresis on agarose or polyacrylamide gels. **Major Red Plus Stain** offers high sensitivity for detecting double-stranded DNA (dsDNA). The loading buffer contains tracking dyes to facilitate monitoring of DNA migration during electrophoresis. This product provides a safe, non-hazardous alternative to ethidium bromide, making it ideal for laboratories seeking environmentally friendly DNA staining solutions.

1.2 Features

- Non-toxic: The unique oily nature and high molecular weight of **Major Red Plus Stain** prevent penetration through cell membranes. Ames test results demonstrate that its mutagenicity is significantly lower than that of ethidium bromide (EtBr/EB).
- High sensitivity: Suitable for electrophoretic staining of DNA/RNA fragments of various sizes. Compared with SYBR Green I, it causes less interference with nucleic acid migration.
- High stability: Compatible with agarose gel preparation using microwaves or other heating methods. It remains highly stable in both acidic and basic buffers at room temperature and exhibits excellent photostability.
- High signal-to-noise ratio: Produces strong fluorescence signals from nucleic acids with minimal background fluorescence.
- User-friendly: Like EtBr, **Major Red Plus Stain** is stable during gel casting and electrophoresis. Post-electrophoresis staining requires only 30 minutes, with no need for destaining or rinsing. DNA/RNA bands can be directly visualized with a standard UV transilluminator.

- Wide applicability: Suitable for both pre-electrophoresis (gel casting method) and post-electrophoresis (soaking method) staining. Compatible with agarose and polyacrylamide gels and effective for dsDNA, ssDNA, and RNA.
- Compatible with SG(SYBR) filter sets: Exhibits excitation/emission spectra similar to SYBR. Works with standard SG or EB filter sets and UV transilluminators, with optimal excitation at ~300nm.

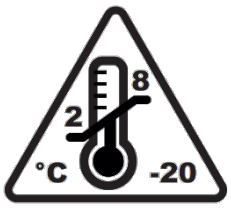
1.3 Excitation / Emission Spectrum



Excitation at 280nm and 502nm, and an emission at 530nm.

Section 2 Product Specifications

Model	Major Red Plus stain
Cat. Number	MRP-500
Unit size	500μL
Vial	Light-protected brown cryogenic vial
Detection method	Fluorescence
Fluorescence	Green
Excitation	~280nm and ~502nm
Emission	~530nm
Presentation	Liquid
Application Notes	Nucleic acid detection
Concentration	10,000X solution in dimethyl sulfoxide (DMSO)
Storage	12 months at 2~8°C; 18~24 months at –20°C Protected from light
Shipping	Shipped with dry ice



NOTE:

***Thaw completely and mix gently before use.**

***Because the solvent of the Major Red Plus Stain is DMSO (dimethyl sulfoxide), it may freeze or become partially frozen at 4 °C. Before use, please ensure that the Major Red Plus Stain is completely thawed and fully returned to a homogeneous liquid state. Incomplete thawing may result in inaccurate concentration and subsequently affect staining performance.**

Section 3 Installation Instructions

Major Red Plus Stain is a DNA/RNA staining dye intended for laboratory use. Before use, ensure that the reagent is fully thawed after removal from the freezer to maintain the correct concentration. Always wear gloves, a lab coat, and protective eyewear when handling the reagent. Avoid ingestion, inhalation, and direct contact with skin or eyes.

Section 4 Operation Instructions

4.1 Start the operation

A. Gel Casting Method – In-Gel Staining **(Recommended)**

1. Add Major Red Plus to molten agarose before casting the gel.
2. Example: Add 2μL of Major Red Plus (10,000× concentrate) to 20mL of agarose solution.
3. Perform electrophoresis as usual.
4. Observation after electrophoresis:
   a. Use a UV light or blue light transilluminator for visual observation, and always apply the appropriate and safety filter.
   b. For gel documentation, use UV light or blue light as the source, and always apply the appropriate and safety filter.

Notes:

- This method is cost-effective: 500μL of Major Red Plus can prepare ~250 gels (20mL per each).
- Due to its thermal stability, Major Red Plus can be added directly to hot agarose without cooling. Mix thoroughly by swirling, vortexing, or inverting. Alternatively, add dye to agarose powder and buffer before heating.
- Dye-containing agarose can be prepared in bulk and stored until use.

- Not suitable for precast polyacrylamide gels and use the soaking method instead.

B. Soaking Method

1. Perform electrophoresis as usual.
2. Prepare a 3× staining solution by diluting the 10,000× Major Red Plus stock ~3,300× in 0.1M NaCl.
3. Example: Mix 15μL Major Red Plus, 5mL 1M NaCl, and 45mL distilled water.
4. Place the gel in a suitable container (e.g., polypropylene). Add enough 3× staining solution to fully cover the gel. Stain with gentle agitation at room temperature for ~30 minutes. Adjust the staining time depending on the gel thickness and agarose concentration.
5. For polyacrylamide gels (3.5~10% acrylamide): stain 30 minutes to 1 hour.
6. Observation after electrophoresis:
   a. Use a UV light or blue light transilluminator for visual observation, and always apply the appropriate and safety filter.
   b. For gel documentation, use UV light or blue light as the source, and always apply the appropriate and safety filter.

Notes:
- This method consumes more dye, but the solution can be reused up to 3 times.
- 3× staining solution can be prepared in bulk and stored at room temperature, protected from light.
- Higher acrylamide concentrations may require longer staining time.

C. Sample Mixing Method

1. Perform electrophoresis as usual.
2. Dilute Major Red Plus stock to 60×, then mix 1:1 with loading buffer to prepare a 30× mixture.

3. Load samples so that the final Major Red Plus concentration in each lane is 5× (sample diluted six-fold with the mix).
4. Perform electrophoresis as usual.
5. Observation after electrophoresis:
   a. Use a UV light or blue light transilluminator for visual observation, and always apply the appropriate and safety filter.
   b. For gel documentation, use UV light or blue light as the source, and always apply the appropriate and safety filter.

Notes:

- If band smearing or poor resolution occurs, test the soaking method to determine whether the dye is the cause. If problems persist, optimize agarose concentration, using longer gels, extending run time, or improving loading technique.

Section 5 Troubleshooting Guide

Many operating problems may be solved by carefully reading and following the instructions in this manual accordingly. Some suggestions for troubleshooting are given below. Should these suggestions not resolve the problem, please contact our SERVICE DEPARTMENT or a distributor in your region for assistance. If troubleshooting service is required, please include a full description of the problem.

Problem	Possible Cause	Recommendations
No DNA bands visible	Dye not mixed thoroughly with sample.	Ensure DNA sample is mixed well with Major Red Plus 6X Loading Buffer.
	Insufficient DNA concentration.	Increase DNA sample amount.
	Incorrect gel concentration or running conditions.	Check gel concentration and electrophoresis settings.
	Blue light/UV source not functioning properly.	Verify light source performance.
Weak or faint bands	Low DNA concentration.	Load more DNA.
	Incomplete melting of dye after storage.	Confirm dye is fully thawed and mixed before use.
	Gel too thick or overexposed to light.	Use appropriate gel thickness (3~5 mm).
		Minimize light exposure during handling.
Uneven or smeared bands	Overloading of DNA.	Reduce DNA sample amount.
	Salt contamination in DNA samples.	Purify DNA to remove salts.
	Gel running too hot or too fast.	Use appropriate voltage and running buffer.
Background fluorescence in gel	Excessive dye used.	Use the recommended amount of dye only.

	Gel not prepared or handled properly.	Prepare gel with fresh buffer and handle under low light conditions.

Section 6 Ordering Information

Cat. No.	Description
MRP-500	Major Red Plus, safety nucleic acid gel stain, light-protected brown cryogenic vial, 500μL/vial.
MRP-500-2V	Bundle of Major Red Plus 500μl, 2 vials/set.
MRP-500-5V	Bundle of Major Red Plus 500μl, 5 vials/set.
MRP-500-10V	Bundle of Major Red Plus 500μl, 10 vials/set.

Section 7 Declaration of Research Use Only

Intended Use and Legal Disclaimer

The declaration serves as a formal statement from the manufacturer that the product is intended **solely for research and development purposes** and **is not approved for clinical diagnostic applications**.

Product Label:

"**For Research Use Only**. **Not for use in diagnostic procedures**."

Intended Use:

This product is intended **solely for laboratory research applications**. It is **not designed or validated for use in human or animal therapeutic or diagnostic procedures**.

User Responsibility:

The end user is responsible for ensuring that this product is used **in compliance with all applicable laws, regulations, and institutional policies** governing research practices.

Limitation of Liability:

major science and its affiliates shall **not be held liable** for any loss, damage, or claim resulting from **misuse of this product** or its use **beyond the stated intended purpose**.

Section 8 Warranty

major science warrants apparatus of its manufacture against defects in materials and workmanship, under normal service, for ***one year from the shipping date to purchaser***. This warranty excludes damages resulting from shipping, misuse, carelessness, or neglect. major science's liability under the warranty is limited to the receipt of reasonable proof by the customer that the defect is embraced within the terms of the warranty. All claims made under this warranty must be presented to major science within one year following the date of delivery of the product to the customer.

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