# MBISafe Dye™ Nucleic Acid Staining Solution (20,000 x)

**Cat. No. MBISAFE1ML 1 ml**

## DESCRIPTION

MBISafe Dye™ Nucleic Acid Staining Solution (20,000x ) is a new and safe nucleic acid stain, an alternative to the traditional ethidium bromide(EtBr) stain for detecting nucleic acid in agarose gels. It emits green fluorescence when bound to DNA or RNA. This new stain has two fluorescence excitation maxima when bound to nucleic acid, one centered at 309 nm and another at 419 nm. In addition, it has one visible excitation at 514 nm. The fluorescence emission of MBISafe Dye™ bound to DNA is centered at 537 nm. MBISafe Dye™ Nucleic Acid Staining Solution (20,000x ) is as sensitive as EtBr. The staining protocol for MBISafe Dye™ Nucleic Acid Staining Solution (20,000x) is similar to that for EtBr. Compared to EtBr, known as a strong mutagen, MBISafe Dye™ Nucleic Acid Staining Solution (20,000x) causes much fewer mutations in the Ames test. In addition, MBISafe Dye™ Nucleic Acid Staining Solution (20,000x) has a negative result in mouse marrow chromophilous erythrocyte micronucleus test and mouse spermary spermatocyte chromosomal aberration test. So it is wise to choose MBISafe Dye™ Nucleic acid Stainig Solution (20,000x) instead of EtBr for detecting nucleic acid in agarose gels.

## CHARACTERISTICS

- Used for detecting double-strand DNA and single-stranded RNA
- Alternative to the ethidium bromide staining
- As sensitive as EtBr or more sensitive than that
- Non-toxic, non-mutagenic and non-carcinogenic
- No hazard waste

## CONTENTS

- MBISafe Dye™ Nucleic Acid Staining Solution (20,000x) 1 ml

## STORAGE CONDITION

- Store at room temperature and stable for more than 12 months. For more stable use, should be store at 4℃ (Stable for more than 24 months).

## APPLICATION

- Visualization of DNA and RNA bands as they separate during agarose gel electrophoresis
- Isolation of DNA fragments for subcloning without introducing mutations normally caused by EtBr.

## CONSIDERATION BEFORE USE

- MBISafe Dye™ Nucleic Acid Staing Solution (20,000x) is non-carcinogenic but may cause skin and eye irritations. Please wear gloves when working with the product.

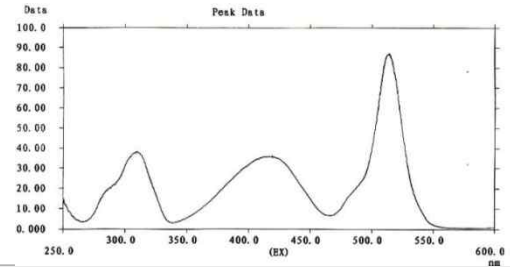
## PROTOCOL

1. Prepare a 100 ml of agarose gel solution (concentration from 0.8~3 %) in a 250 ml flask and mix it thoroughly. Place the flask in the microwave, heat it until the solution is completely clear and no small floating particles are visible (about 2~3 minutes).
   **Note :** The thickness of gel should be less than 0.5 cm since thick gels may decrease sensitivity.
2. Add 5 ㎕ of MBISafe Dye™ Nucleic Acid Staining Solution (20,000x) to the agarose solution. Swirl the flask gently to mix the solution and avoid forming bubbles.
3. While the agarose solution cools, pour it into the gel tray until the comb teeth are immersed about 1/4~1/2 into the agarose.
   **Note :** Repeated melting of gels containing MBISafe Dye™ Nucleic Acid Staining Solution (20,000x )may result in low sensitivity.
4. Allow the agarose gel to cool until solidified. Load samples on the gel and perform electrphoresis.
5. Detect the bands under UV illumination.
   **Note :** MBISafe Dye™ Nucleic Acid Staining Solution (20,000x) allows visualization of DNA(>50 ng) in the agarose gel under visible light. This eliminates the need for exposure to UV light, which may nick and damage DNA. The intact DNA fragments purified from agarose gel can increase the efficiency of subsequent molecular biology manipulations such as cloning, transformation and transcription.

# EXPERIMENTAL INFORMATION

## • Spectrum

### 1. Excitation wavelength (EX)



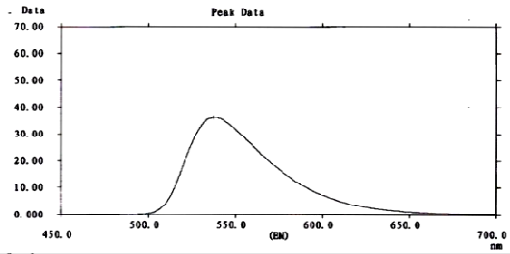

EM : 540.0 nm
Data Mode : Fluorescence
Scan Speed : 2400 nm / min — Slit (EX/EM) : 5.0 nm / 5.0 nm
PMT Voltage : 400 V — Response : Auto

| NO | Wavelength (nm) | Peak |
|---|---|---|
| 1 | 308.8 | 38.17 |
| 2 | 419.2 | 35.93 |
| 3 | 513.8 | 87.06 |

**Fig. 1. Measurement of fluorescence excitation wavelength**

MBISafe Dye™ Nucleic Acid Staining Solution (20,000x) has two fluorescence excitation maxima, one centered at 309 nm and another at 419 nm. In addition, it has one visible excitation at 514 nm.

### 2.Emission wavelength (EM)




EX : 416.0 nm
Data Mode : Fluorescence
Scan Speed : 2400 nm/min — Slit (EX/EM) : 5.0 nm / 5.0 nm
PMT Voltage : 400 V — Response : Auto

| NO | Wavelength (nm) | Peak |
|---|---|---|
| 1 | 537.2 | 36.26 |

**Fig. 2. Measurement of fluorescence emission wavelength**

The fluorescence emission of MBISafe Dye™ Nucleic Acid Staining Solution (20,000x) bound to DNA is centered at 537 nm.

## • Sensitivity

### 1. DNA

Sensitivity of DNA detection of MBISafe Dye™ Nucleic Acid Staining Solution (20,000x) under UV transmission

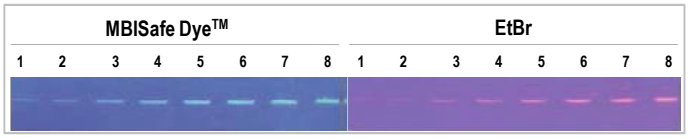



**Fig. 3. Gel analysis of serial diluted genomic DNA using MBISafe Dye™ Nucleic Acid Staining Solution (20,000x) and EtBr**

**Lane 1**, 5 ng of gDNA; **lane 2**, 10 ng of gDNA; **lane 3**, 20 ng of gDNA; **lane 4**, 30 ng of gDNA; **lane 5**, 40 ng of gDNA; **lane 6**, 50 ng of gDNA; **lane 7**, 60 ng of gDNA; **lane 8,** 70 ng of gDNA

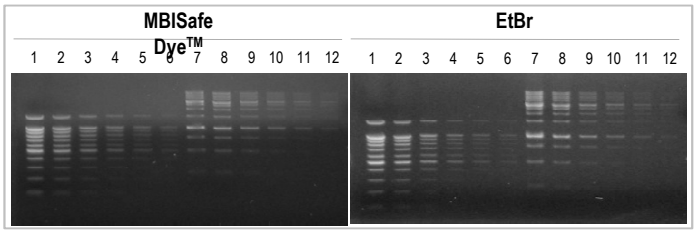



**Fig. 4. Gel analysis of serial diluted 100bp Ladder Molecular Weight DNA Marker and 1kb Ladder Molecular Weight DNA Marker using MBISafe Dye™ Nucleic Acid Staining Solution (20,000x) and EtBr.**

100bp Ladder DNA marker and 1kb ladder DNA marker were serial diluted from $2^0$ to $2^{-5}$. **Lane 1**, 800 ng of 100bp ladder DNA marker; **lane 2**, 400 ng of 100bp ladder DNA marker; **lane 3**, 200 ng of 100bp ladder DNA marker; **lane 4**, 100 ng of 100bp ladder DNA marker; **lane 5**, 50 ng of 100bp ladder DNA marker; **lane 6**, 25 ng of 100bp ladder DNA marker; **lane 7**, 800 ng of 1kb ladder DNA marker; **lane 8**, 400 ng of 1kb ladder DNA marker; **lane 9**, 200 ng of 1kb ladder DNA marker; **lane 10**, 100 ng of 1kb DNA marker; **lane 11,** 50 ng of 1kb ladder DNA marker; **lane 12**, 25 ng of 1kb ladder DNA marker

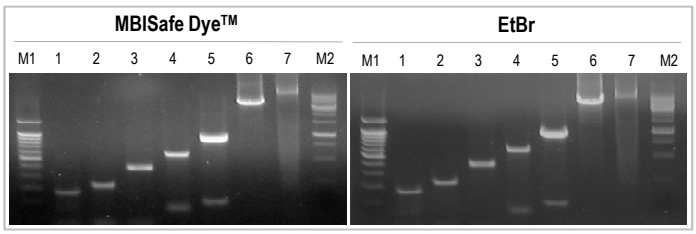



**Fig. 5. Gel analysis of different size of PCR products using MBISafe Dye™ Nucleic Acid Staining Solutin (20,000x) and EtBr**

**Lane M1**, 100bp ladder DNA marker; **lane 1**, 161bp size of dsDNA; **lane 2**, 218bp size of dsDNA; **lane 3**, 375bp size of dsDNA; **lane 4**, 575bp size of dsDNA; **lane 5**, 1kb size of dsDNA; **lane 6**, 4.5kb size of dsDNA; **lane 7**, 9kb size of dsDNA**; lane M2,** 1kb ladder DNA marker

### 2. RNA

Sensitivity of RNA detection of MBISafe Dye™ Nucleic Acid Staining Solution (20,000x) under UV transmission

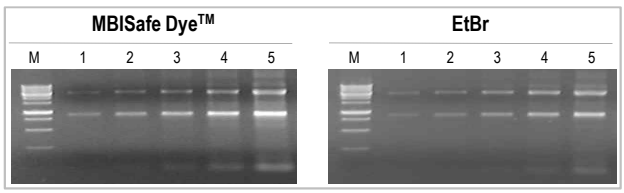



**Fig. 6. Gel analysis of serial diluted RNA using MBISafe Dye™ Nucleic Acid Staining Solutin (20,000x) and EtBr**

**Lane M**, 1kb ladder DNA marker; **lane 1**, 25 ng of RNA; **lane 2**, 50 ng of RNA; **lane 3**, 100 ng of RNA; **lane 4**, 200 ng of RNA; **lane 5**, 400 ng of RNA