FT-BQ0420

GelRed™ Nucleic Acid Gel Stain

Simply the best nucleic acid gel stain.

Product Description

Product name cat.number	Packaging interest	Storage
GelRed™ Nucleic Acid Gel Stain 10 000X in water BY1740, 500 µl BT174E, 0.1ml trial size BY1741, 10 ml	- better safety (water) - flexible use(concentrated)	RT (1 year) 2-8°C
GelRed™ Nucleic Acid Gel Stain 10 000X in DMSO BY1770, 500 µl BY1772, 10 ml	- flexible use(concentrated)	RT (1 year) 2-8°C
GelRed™ Nucleic Acid Gel Stain 3X in water BQ0420, 4 L	- better safety (water) - can be directly used for post gel staining	RT (1 year) 2-8°C
PAGE GelRed Nucleic Acid Gel Stain 10 000X in water 1E0160, 4 L 1E016E, 0.1ml trial size		
Gelred Prestain Loading 6x Buffer With Blue Tracking Dyes 1C3260, 1mL		
Gelred Prestain Loading 6x Buffer With Orange Tracking Dye 1C3270, 1mL		

Storage: Room temperature or around 4 °C. Protect from light.

Introduction

GelRed™ is a sensitive, stable and relatively safe fluorescent nucleic acid dye designed to replace the highly toxic ethidium bromide (EB) for staining dsDNA, ssDNA or RNA in agarose gels or polyacrylamide gels. GelRed™ is far more sensitive than EB without requiring a destaining step. GelRed™ and EB have virtually the same spectra (**Figure 2**), so you can directly replace EB with GelRed™ without changing your existing imaging system.

Technical information

● Toxicity – mutagenicity - disposal

GelRed™ was subjected to a series of tests by three independent testing services to assess the dye's safety for routine handling and disposal. Test results confirm that the dye is impenetrable to both latex gloves and cell membranes. The dye is noncytotoxic and nonmutagenic at concentrations well above the working concentrations used in gel staining. GelRed™ successfully passed environmental safety tests in compliance with CCR Title 22 Hazardous Waste

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Characterization, under which GelRed™ is not classified as hazardous waste. A complete safety report is available on demand.

While GelRed™ has undergone extensive safety testing, it is recommended following universal safety precautions when working in the laboratory.

● Pre- and post-staining

GelRed™ can be used for either pre-cast agarose gel staining or post agarose gel staining. In general, post gel staining gives better sensitivity than precast gel staining, and eliminates any possibility of dye interference with DNA migration. Post staining with GelRed™ is simple, requiring no destaining and no special buffer. Simply dilute the concentrated dye in 0.1 M NaCl and incubate the gel in the diluted dye solution for 30 minutes, followed by viewing the gel. The staining solution is perfectly stable at room temperature (**Figure 1**), permitting it to be used multiple times. On the other hand, precast gel staining is both simpler and more economical than post gel staining because it does not need an extra staining step and uses less dye. Precast agarose gel staining using GelRed™ is substantially more sensitive than that using EB. GelRed™ typically has minimal effect on DNA migration. However, in some rare cases, some DNA samples derived from plasmid DNA digestion by certain restriction enzymes may experience somewhat more migration retardation orcompromised resolution. Thus, we highly recommend that you try both pre-cast and post gel staining procedures to determine which one may better meet your needs.

One vial (0.5 mL) of 10 000X solution can be used to prepare at least 100 precast minigels or post-stain at least 100 minigels.

Directions for use

Handling and Storage

GelRed is a very stable dye. We recommend that you store the 10 000X solution in water at room temperature. The solution may also be stored at a lower temperature such as 4°C. Dye precipitation may occur during prolonged low temperature storage. When this occurs, heat up the solution in a hot water bath at 45°C to 50°C for two minutes and/or vortex the solution. The 1X and 3X working solutions of the dye may also be stored at room temperature in a dark place for at least one year. Exposure to light should be avoided during long-term storage. However, the dye can be handled under ambient light without any problem during staining experiment.

Protocol 1- Staining DNA by Post Gel Staining

1- Run gels as usual according to your standard protocol.

2- Dilute the GelRed™ 10 000X stock reagent ~3,300 fold to make a 3X staining solution in H_2O. Generally 50 mL staining solution is an adequate volume for one minigel.

Note: including 0.1 M NaCl in the staining solution enhances sensitivity, but may promote dye precipitation if the gel stain is reused.

3- Place the gel in a suitable container such as a polypropylene container tray. Add a sufficient amount of the 3X staining solution to submerge the gel.

4- Agitate the gel gently at room temperature for ~30 minutes. Optimal staining time may vary somewhat depending on the thickness of the gel and the percentage of agarose. For polyacrylamide gels containing 3.5-10% acrylamide, typical staining time is 30 min to 1 hour with gels of higher acrylamide content requiring longer staining time.

5- Destaining is not required, but the gel can be washed in water to reduce background if necessary.

6- View the stained gel with a standard transilluminator (302 nm or 312 nm) and photograph the gel using Polaroid 667 films and an ethidium bromide filter. Similarly, a SYBR® or GelStar™ filter may also be used for photographing with equally good results.

7- Staining solution can be reused at least 2-3 times. Store staining solution at room temperature protected from light.

Protocol 2- Staining DNA by Precasting GelRed™ gels

1- Prepare agarose gel solution using your standard protocol.

Note: the precast protocol is not recommended for polyacrylamide gels. Polyacrylamide gels can be stained using the post-stain protocol.

2- Dilute the GelRed™ 10 000X stock reagent into the agarose gel solution at 1:10 000 (e.g., 5 µL of the GelRed™ 10 000X stock reagent added to 50 mL of the gel solution) and mix thoroughly. GelRed™ can be added while the gel solution is still hot

3- Cast the gels and allow it to solidify.

4- Load samples and run the gels using your standard protocol.

Note: Orange G tracking dye is not compatible with GelRed™ in precast gels.

5- View the stained gel using a standard transilluminator (302 or 312 nm) and image the gel using an ethidium bromide filter. SYBR® or GelStar™ filter can also be used for imaging with equally good results (See figure 2 for GelRed™ excitation and emission spectra).

6- Unused agarose containing GelRed™ can be remelted to cast more gels, but it may be necessary to add more dye for optimal signal. We do not recommend storing agarose containing GelRed™ in molten form (i.e., at 50°C) for more than a few days. Precast gels containing GelRed™ can be stored at 4°C for future use.

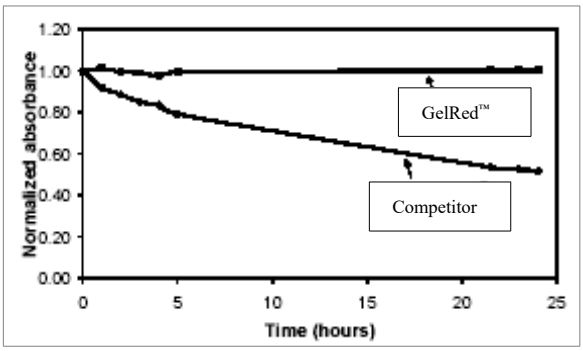
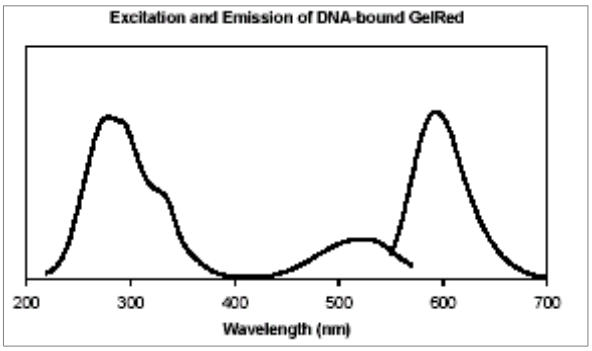


Fig1 : Stability comparison between GelRed™ and competitor. Normalized absorbencies of GelRed™ and competitor 1X TBE gel-staining solution at 500 and 488 nm respectively overtime at room temperature.
The starting absorbance values for GelRed™ and competitor were 0.029 and 0.051, respectively.

Fig2 : Excitation (left) and emission (right) spectra of GelRed™ bound to dsDNA in TBE



Troubleshooting

Problem	Suggestion
Smeared DNA bands in precast gel	1. Reduce the amount of DNA loaded by one-half to one-third. GelRed is much more sensitive than EtBr. Blown out or smeared bands can be caused by overloading. This is frequently observed with DNA ladders. We offer a 1 kb ladder that has been optimized for use with GelRed. 2. Perform post-staining instead of pre-casting. 3. Pour a lower percentage agarose gel for better resolution of large fragments. 4. Change the running buffer. TBE buffer has a higher buffering capacity than TAE.
Discrepant DNA migration in pre-cast gel	GelRed is designed to be larger than other dyes to prevent it from entering cells, thus rendering the dye safer. The migration of DNA may be affected depending on the dye:DNA ratio. 1. Reduce the amount of DNA loaded by one-half to one-third. 2. Reduce the amount of dye used, i.e. use 0.5X in precast gels. 3. Post-stain gel in 3X GelRed to avoid any interference the dye may have on migration during electrophoresis. 4. GelRed™ is not compatible with Orange G tracking dye when used in precast gels.
Weak fluorescence, decreased dye performance over time, or film of dye remains on gel after post-staining	The dye may have precipitated out of solution. 1. Heat GelRed solution to 45-50°C for two minutes and vortex to redissolve. 2. Store dye at room temperature to avoid precipitation

Frequently Asked Questions

Question	Question
Can GelRed be used to stain ssDNA or RNA?	GelRed can be used to stain ssDNA and RNA, but it is twice as sensitive for dsDNA than for ssDNA or RNA.

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Is GelRed compatible with downstream applications such as cloning, ligation and sequencing?	Yes. We recommend Qiagen or Zymoclean gel extraction kits, Exo-Sap protocol, or phenol-chloroform extraction to remove the dye from DNA. Some users have reported performing PCR on GelRed-stained DNA in molten agarose with no additional purification steps.
Can GelRed be used in formaldehyde gels?	Yes
Can GelRed be used for polyacrylamide, DGGE, EMSA or PFGE (pulse-field) gels?	Yes. Use the post-staining protocol.
Can GelRed be used for COMET assay?	Yes, GelRed can be used for COMET assay by post-staining.
Can GelRed be used in cesium chloride gradients?	Yes. Chloroform is recommended to remove GelRed from DNA after cesium banding.
Is GelRed compatible with Southern or northern blotting?	GelRed™ has not been tested in blotting applications.
What emission filters are suitable for use with GelRed?	Use the ethidium bromide filter for GelRed. SYBR or GelStar filters also can be used for gel imaging with equally good results. Please review the emission spectra for GelRed for specific wavelengths.
Can I reuse a GelRed precast gel after electrophoresis?	We do not recommend reusing GelRed precast gels as signal decreases with subsequent electrophoresis.
How should I dispose of GelRed?	GelRed has passed the EPA regulated Title 22 test. Some facilities have approved the disposal of GelRed directly down the drain. However, because regulations vary, please contact your safety office for local disposal guidelines.
What is the lower detection limit of GelRed?	Some users have reported being able to detect less than 0.1 ng. However, the sensitivity of the staining will depend on instrument capability and exposure settings
What is the binding mechanism of GelRed?	GelRed most likely binds by a combination of intercalation and electrostatic interaction.
What is the chemical structure of GelRed?	The chemical structure of GelRed is proprietary.
Does GelRed migrate during electrophoresis?	GelRed does not migrate through the gel as easily as EtBr. It is not necessary to add dye to the running buffer, and the gel will be stained more homogeneously with GelRed than with EtBr.
Does GelRed need to be used in the dark?	GelRed is very stable. You can use the dye in room light, however we recommend storing the dye in the dark.
I accidentally left my GelRed in the light. Will it still work?	While we recommend that you protect the dye from light during long term storage, we have had a customer report using GelRed with success after accidentally leaving it in ambient light for one month.
Is there a difference between 10,000X GelRed in DMSO and water?	The GelRed stock in water is a newer and improved product compared to the stock in DMSO. We recommend using GelRed in water to avoid the potential hazards of handling DMSO, a solvent that can be absorbed through the skin. We continue to offer GelRed in DMSO because some users do not wish to alter their established laboratory protocols.

TOXICITY:
GelRed was subjected to a series of tests both by us and by three independent testing services to assess the dye's safety for routine handling and disposal. These tests include: 1) glove penetration test; 2) cell membrane permeability and cytotoxicity test; 3) Ames test; and 4) environmental safety tests. Test results confirm that the dye is impenetrable to both latex gloves and cell membranes. The dye is noncytotoxic and nonmutagenic at concentrations well above the working concentrations used in gel staining. GelRed appears to be completely cell membraneimpermeable, which may be a key factor responsible for the observed low toxicity. However, since these tests were not performed on human, we still advise that researchers exercise precautions when handling the dye or any other DNA-binding molecules by wearing protective gears.. For more information on the Ames test result, you may download the report NT-BQ041T.

DISPOSAL : GelRed has successfully passed environmental safety tests in compliance with CCR Title 22 Hazardous Waste Characterization. As a result, GelRed is not classified as hazardous waste, thus can be safely disposed of down the drain or as regular trash, providing convenience and reducing cost in waste disposal.

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FIRST AID: Potentially harmful. Avoid prolonged or repeated exposure. Avoid getting in eyes, on skin, or on clothing. Wash thoroughly after handling. If eye or skin contact occurs, wash affected areas with plenty of water for 15 minutes and seek medical advice. In case of inhaling or swallowing, move individual to fresh air and seek medical advice

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Related products

- Agarose regular uses, Molecular Biol. grade, 31272L
- 1 kb DNA ladder (100ng/µl), S54807
- Ready-to-use 1kb DNA ladder, S54808
- DM-Kplus DNA Ladder 100bp-10Kb, XZ2280
- GelGreen™ Nucleic Acid Stain, BY1750
- Fast EvaGreen™ master mix for qPCR and HRM, DV7220
- AccuBlue dsDNA Quantification Kit, EV4080, EV4100
- UptiTherm™ DNA Polymerase, UPS53921
- dNTP set, UP968640
- One-Step RT-PCR PreMix Kit (cDNA synthesis and PCR), CD9800

Ordering information

Catalog size quantities and prices may be found at http://www.interchim.com/.Please inquire for higher quantities (availability, shipment conditions).

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