SYBR Safe DNA Gel Stain

Introduction

We are committed to designing our products with the environment in mind. This fact sheet provides the rationale behind the environmental claims that this product is less hazardous than the traditional method of DNA staining and typically generates no hazardous waste. Invitrogen™ SYBR™ Safe DNA Gel Stain was developed specifically to be less hazardous than ethidium bromide for staining DNA in agarose and acrylamide gels.

Product description

SYBR Safe DNA Gel Stain is offered as either a concentrate or a ready-to-use solution. The detection sensitivity of SYBR Safe DNA Gel Stain is comparable to that obtained with ethidium bromide. DNA bands stained with SYBR Safe DNA Gel Stain can be detected using a standard UV transilluminator, an Invitrogen™ Safe Imager™ Blue-Light Transilluminator, or a laser-based scanner. The stain is also suitable for staining RNA in gels. Find out more at thermofisher.com/sybrsafe.

Green features

Less hazardous

Ethidium bromide has been commonly used as a DNA stain for many years. However, ethidium bromide is harmful if swallowed, and is very toxic if inhaled. In powder form, it is considered an irritant to the eyes and upper respiratory tract. Ethidium bromide has been shown to be mutagenic in various *in vitro* assays and is an aquatic toxin.

SYBR Safe DNA Gel Stain was evaluated in a battery of toxicity and mutagenicity tests and found to be a safer alternative to ethidium bromide. SYBR Safe DNA Gel Stain in 0.5X TBE buffer did not show any toxicity or mortality in an acute oral toxicity study: the rat LD_{50} was >5,000 mg per kilogram of body weight (mg/kg) (US EPA OPPTS 870.1100 method). A single-dose oral administration of SYBR Safe DNA Gel Stain in 0.5X TBE buffer, at a limit dose of 5,000 mg/kg to rats, produced no mortalities or toxic signs. In aquatic toxicity tests with fathead minnows (California Code of Regulation (CCR), Title 22, acute screening methodology), SYBR Safe DNA Gel Stain in 0.5X TBE was not toxic (LC_{50} >750 mg/L). SYBR Safe DNA Gel Stain was weakly mutagenic only with S9 metabolic activation in the standard Ames bacterial mutation assay. Compared to ethidium bromide, SYBR Safe DNA Gel Stain caused fewer mutations, as measured in several different strains of *Salmonella typhimurium.*

In addition, SYBR Safe DNA Gel Stain did not cause mutations in mouse lymphoma cells at the thymidine kinase (TK) locus and did not induce chromosomal aberrations in cultured human peripheral blood lymphocytes with or without S9 metabolic activation. Furthermore, it did not induce transformations in primary cultures of Syrian hamster embryo (SHE) cells.

Less waste

SYBR Safe DNA Gel Stain does not typically require special disposal measures.* This means less hazardous waste to manage in the lab, lowering disposal costs and freeing up time.

Per US EPA and CCR, Title 22 regulations, SYBR Safe DNA Gel Stain in 0.5X TBE buffer was evaluated in various hazardous waste testing and was found to be noncorrosive (pH = 8.25; US EPA 150.1 method), nonreactive (no reactivity detected; US EPA 9010B/9030A method), and nonignitable (not ignitable <212°F; US EPA 1010), and is not classified as hazardous waste in California. Furthermore, SYBR Safe DNA Gel Stain complies with the US Clean Water Act and the National Pollutant Discharge Elimination System Regulations, as it does not contain cyanide, phenolics, priority pollutant metals, organochlorine pesticides, polychlorinated biphenyls, or semi-volatile organic compounds.

For further information on the product safety testing, read the white paper on **SYBR Safe DNA Gel Stain**.

* Please consult with your federal, state, and/or local regulatory agency to ensure sanitary sewer disposal is an option for your facility.

Find out more at **thermofisher.com/sybrsafe**