



Product Information

Thiazolyl Blue Tetrazolium Bromide

Product Number **M 2128**
Storage Temperature 2-8 °C

Product Description

Molecular Formula: $C_{18}H_{16}BrN_5S$
Molecular Weight: 414.3
CAS Number: 298-93-1
Melting Point: 195 °C (with decomposition)¹
209-210 °C (with decomposition)²
 λ_{max} : 378 nm (methanol); 243 nm and 380 nm (water).¹
Extinction coefficient: $E^{mM} = 20.7$ (243 nm, water);
7.25 (380 nm, water).²
Extinction coefficient (formazan end product):
 $E^{mM} = 13$ (578 nm).³
Synonyms: MTT; 3-(4,5-dimethylthiazolyl-2)-2,
5-diphenyltetrazoliumbromide; thiazolyl blue;
methylthiazolyl-diphenyl-tetrazolium bromide

Thiazolyl Blue Tetrazolium Blue (MTT) may be used in measurement of cell proliferation in studies that traditionally use incorporation of radioisotopes as a measurement of cell division.⁴ MTT is a yellowish solution and is converted to water-insoluble MTT-formazan of dark blue color by mitochondrial dehydrogenases of living cells. The blue crystals are solubilized with acidified isopropanol and the intensity is measured colorimetrically at a wavelength of 570 nm. Variations of this procedure have been published by other researchers.⁵⁻⁸

MTT has been used as a histochemical/cytochemical reagent.⁹ MTT is rapidly reduced to the formazan, which chelates with nickel, copper, and cobalt. The cobalt chelate is used in oxidative systems.¹⁰ MTT has been used for detection of NAD.¹¹ NADP-linked enzyme systems in tissue cannot be detected with MTT, due to binding of the cation by the cyanide trap used.¹² MTT, like other tetrazolium salts, has been replaced largely by nitro blue tetrazolium chloride (NBT).¹³

Precautions and Disclaimer

For Laboratory Use Only. Not for drug, household or other uses.

Preparation Instructions

It is soluble in water (10 mg/ml), ethanol (20 mg/ml) and 2-methoxyethanol (20 mg/ml).¹ It is also soluble in buffered salt solutions and culture media (5 mg/ml).

Storage/Stability

MTT is light sensitive.
Reconstituted MTT solution is stable for at least 6 months when stored frozen (-0 °C). Storage of a reconstituted MTT solution at 2 - 8 °C for more than 2 weeks may cause decomposition and yield erroneous results.

References

1. The Sigma-Aldrich Handbook of Stains, Dyes & Indicators, Green, F.J., Ed., Aldrich Chemical Co. (Milwaukee, WI: 1990), p. 488.
2. Altman, F.P., Tetrazolium salts: a consumer's guide. *Histochem. J.*, **8**, 471-485 (1976).
3. *Methods of Enzymatic Analysis*, 3rd Ed., Vol. I, Bergmeyer, H.U., Ed., Verlag Chemie GmbH (New York, NY: 1983), p. 210-220.
4. Mosmann, T., Rapid colorimetric assay for cellular growth and survival: application to proliferation and cytotoxicity assays. *J. Immunol. Methods.*, **65**, 55-63 (1983).
5. Rastinejad, F., et al., Tumor suppression by RNA from the 3' untranslated region of alpha-tropomyosin., **75**, 1107-1117 (1993).
6. Denizot, F., and Lang, R., Rapid colorimetric assay for cell growth and survival. Modifications to the tetrazolium dye procedure giving improved sensitivity and reliability. *J. Immunol. Methods*, **89**, 271-277 (1986).
7. Carmichael, J., et al., Evaluation of a tetrazolium-based semiautomated colorimetric assay: assessment of chemosensitivity testing. *Cancer Res.*, **47**, 936-942 (1987).
8. *Antimicrob. Agents Chemother.*, **3**, 418 (1973).

9. Pearse, A.G.E., and Hess, R., Substantivity and other factors responsible for formazan patterns in dehydrogenase histochemistry. *Experientia*, **17**, 136 (1961).
10. *J. Histochem. Cytochem.*, **5**, 515 (1957).
11. Bernofsky, C., and Swan, M., An improved cycling assay for nicotinamide adenine dinucleotide. *Anal. Biochem.*, **53**, 452-458 (1973).
12. *Nature*, **181**, 1531 (1958).
13. *Principles and Techniques of Histochemistry*, Troyer, H., Little, Brown (Boston, MA: 1980), p. 378.

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