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AqT®-Trolox: The Ultimate Water-Soluble Antioxidant

Supplied as lyophilized powder in vials containing **5 mg** or **25 mg Trolox Equivalents (TE)**, as determined by the **ABTS** assay. For bulk orders, please contact us for a quotation.

Product Numbers:
CM81000-5MG
CM81000-25MG

Please consult the Certificate of Analysis (COA) for the lot-specific gravimetric amount of AqT-Trolox supplied per vial, which is higher than 5 mg and 25 mg.

Product Description

Introducing **AqT-Trolox**, engineered with CellMosaic's **AqueaTether**. This highly purified, completely water-soluble Vitamin E derivative is designed for seamless use in aqueous research. It eliminates the need for organic solvents and simplifies complex assays.

As a potent radical scavenger, AqT-Trolox provides strong protection against oxidative stress. It can be used for cell viability studies, neuroprotection research, and antioxidant capacity measurements (TEAC/ORAC assays).

With outstanding solubility (>45 mg/mL in water) and excellent stability, AqT-Trolox enables faster preparation and reliable results. It supports reproducible data in biological systems, from cell culture to *in vivo* models, without solvent-related toxicity or assay interference.

Key Features

- Truly Water-Soluble: Dissolves instantly in just water or any aqueous buffers (for example PBS, cell media) for direct application. No DMSO or ethanol required to obtain high concentration stock solution.
- Accurate amount (Trolox Equivalent) per vial: AqT-Trolox amount per vial is determined by $ABTS^{\bullet+}$ (2,2'-azinobis-(3-ethylbenzothiazoline-6-sulfonic acid)) radical cation quenching assay.

Usage

To prepare a 1 mM AqT-Trolox solution, dissolve the contents of the 5 mg (TE) vial in 20 mL of water and dissolve the contents of the 25 mg (TE) vial in 100 mL of water. This will yield a final concentration of 1 mM AqT-Trolox (TE) in each solution. Since the phenolic group in Trolox is unstable under basic conditions, it is recommended that the pH of the dissolution buffer be maintained between 3 to 7.5.

AqT-Trolox is for Research Use Only (RUO) and must not be used for human consumption. CellMosaic assumes no responsibility for any use of this product outside of its recommended applications.

Applications

- **Antioxidant Capacity Assays**
  Used as a reference standard in assays such as **ABTS, DPPH, ORAC, and FRAP**, with results commonly expressed as **Trolox Equivalents (TE)**.

- **Oxidative Stress Research**
  Applied to study **reactive oxygen species (ROS) scavenging**, lipid peroxidation, and redox balance in cell-free and cellular systems.
- **Cell Culture & *In Vitro* Studies**
  Used to reduce oxidative damage in cultured cells, particularly in studies involving **mitochondrial dysfunction, hypoxia/reoxygenation, and oxidative injury models**.
- **Biochemistry & Enzyme Protection**
  Protects oxidation-sensitive enzymes, metabolites, and cofactors during **in vitro biochemical assays**.
- **Neuroscience, Aging & Disease Models**
  Utilized in research related to **neurodegeneration, cardiovascular disease, cancer, and aging**, where oxidative stress plays a central role.
- **Food, Nutrition & Cosmetic Research**
  Serves as a benchmark antioxidant for evaluating the antioxidant capacity of **foods, dietary supplements, and cosmetic formulations** (research use only).

Storage and Solution Stability

- Recommended storage of the product is below −20 °C as solid in dark.
- A 1 mM stock solution prepared in water (pH 6.1) is stable at −20 °C in dark for at least 24 hours, with no loss of activity as determined by the ABTS assay.

Key References

Antioxidant Capacity Assays (ABTS/TEAC, ORAC, FRAP):

1. Miller NJ, Rice-Evans CA, Davies MJ, Gopinathan V, Milner A. Antioxidant activity applying an improved ABTS radical cation decolorization assay. Free Radic Biol Med. 1999;26(9-10):1231-1237.
Highlight: Landmark paper establishing the widely used ABTS/TEAC assay, using Trolox as the standard for expressing antioxidant capacity as Trolox Equivalents (TE).

2. Benzie IFF, Strain JJ. The ferric reducing ability of plasma (FRAP) as a measure of "antioxidant power": The FRAP assay. Anal Biochem. 1996;239(1):70-76.
Highlight: Foundational work introducing the FRAP assay, a core antioxidant method frequently calibrated with Trolox standards.

3. Huang D, Ou B, Prior RL. The chemistry behind antioxidant capacity assays. J Agric Food Chem. 2005;53(6):1841-1856.
Highlight: Highly cited review explaining the chemistry and interpretation of antioxidant assays (ABTS, DPPH, ORAC, FRAP), reinforcing Trolox as the most common reference antioxidant.

Oxidative Stress Research & ROS Protection:

4. Aktan F. Oxidative stress-induced apoptosis prevented by Trolox. Life Sci. 1994;55(4):249-254.
Highlight: Demonstrates Trolox protection against oxidative stress–induced apoptosis, supporting its use in ROS scavenging and oxidative injury models.

5. Milatovic D, Dettbarn WD, Gupta RC. Trolox protects against manganese-induced oxidative stress in neuronal cells. Toxicol In Vitro. 2011;25(1):200-206.
Highlight: Shows Trolox reduces oxidative damage in neuronal cell models, supporting its relevance in neurotoxicity and oxidative stress research.

Cell Culture & In Vitro Oxidative Injury Models:

6. Santos MM, et al. Trolox and ascorbic acid reduce oxidative stress in small intestinal epithelial cells. PLoS One. 2015;10(5):e0127810.
Highlight: Confirms Trolox efficacy in reducing oxidative stress markers in cultured epithelial cells, supporting use in cell-based antioxidant protection studies.

7. Lionetto MG, et al. Concentration dependence of the antioxidant and prooxidant activity of Trolox in HeLa cells: involvement in apoptotic volume decrease. Antioxidants (Basel). 2020;9(11):1058.
Highlight: Important study showing Trolox effects are dose-dependent, including both antioxidant and potential prooxidant activity at certain conditions.

Food, Nutrition, and Natural Product Benchmarking (RUO):
8. Re R, Pellegrini N, Proteggente A, Pannala A, Yang M, Rice-Evans C. Antioxidant activity applying an improved ABTS radical cation decolorization assay. Free Radic Biol Med. 1999;26(9-10):1231-1237.
Highlight: Widely cited reference supporting Trolox-based antioxidant capacity reporting in food chemistry and plant extract studies (Trolox Equivalents standardization).

Important Notes

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