PRODUCT INFORMATION

Trimethylamine N-oxide

Item No. 17354

CAS Registry No.:	1184-78-7
Formal Name:	N,N-dimethyl-methanamine, N-oxide
Synonyms:	NSC 408426, TMAO
MF:	C_3H_9NO
FW:	75.1
Purity:	≥95%
Supplied as:	A crystalline solid
Storage:	-20°C
Stability:	≥4 years

Information represents the product specifications. Batch specific analytical results are provided on each certificate of analysis.

Laboratory Procedures

Trimethylamine N-oxide (TMAO) is supplied as a crystalline solid. A stock solution may be made by dissolving the TMAO in the solvent of choice, which should be purged with an inert gas. TMAO is soluble in organic solvents such as ethanol, DMSO, and dimethyl formamide (DMF). The solubility of TMAO in ethanol is approximately 25 mg/ml and approximately 1 mg/ml in DMSO and DMF.

Further dilutions of the stock solution into aqueous buffers or isotonic saline should be made prior to performing biological experiments. Ensure that the residual amount of organic solvent is insignificant, since organic solvents may have physiological effects at low concentrations. Organic solvent-free aqueous solutions of TMAO can be prepared by directly dissolving the crystalline solid in aqueous buffers. The solubility of TMAO in PBS (pH 7.2) is approximately 10 mg/ml. We do not recommend storing the aqueous solution for more than one day.

Description

Trimethylamine N-oxide (TMAO) is a metabolite of choline, phosphatidylcholine, and L-carnitine (Item No. 21489).[1] It is formed by gut microbiota-mediated metabolism of choline, phosphatidylcholine, and L-carnitine to TMA followed by oxidation of TMA by flavin-containing monooxygenase 3 (FMO3) in the liver.[1-3] Dietary administration of TMAO (0.12% w/w) increases renal tubulointerstitial fibrosis, collagen deposition, and Smad3 phosphorylation in mice and increases aortic lesion area in atherosclerosis-prone *ApoE*$^{-/-}$ mice.[1,4] Plasma levels of TMAO are elevated in patients with chronic kidney disease and decreased in patients with active, compared with inactive, ulcerative colitis.[1,2] Elevated plasma levels of TMAO are associated with increased risk of cardiovascular disease.[4]

References

1. Tang, W.H.W., Wang, Z., Kennedy, D.J., *et al.* Gut microbiota-dependent trimethylamine *N*-oxide (TMAO) pathway contributes to both development of renal insufficiency and mortality risk in chronic kidney disease. *Circ. Res.* **116(3)**, 448-455 (2015).
2. Wilson, A., Teft, W.A., Morse, B.L., *et al.* Trimethylamine-*N*-oxide: A novel biomarker for the identification of inflammatory bowel disease. *Dig. Dis. Sci.* **60(12)**, 3620-3630 (2015).
3. Zhang, L.S. and Davies, S.S. Microbial metabolism of dietary components to bioactive metabolites: Opportunities for new therapeutic interventions. *Genome Med.* **8(1)**, 46 (2016).
4. Wang, Z., Klipfell, E., Bennett, B.J., *et al.* Gut flora metabolism of phosphatidylcholine promotes cardiovascular disease. *Nature* **472(7341)**, 57-63 (2011).

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