



## TECHNICAL DATASHEET

# Analysis of N-Nitrosodimethylamine (NDMA) in Water

## Overview

ALS Environmental can provide analytical testing for N-nitrosodimethylamine (NDMA) in water to reporting limits of 0.5ng/L. NDMA is a semi-volatile organic chemical that has been shown to possess toxic and carcinogenic properties and has been detected in drinking water supplies in the low parts-per-trillion (ng/L) range. In response to this issue ALS Environmental have developed a method capable of analysing for this compound at ultra-trace levels using state of the art instrumentation.

## NDMA Background

NDMA is a yellow liquid that has no discernible odour and is highly soluble in water. It has been previously used in the manufacture of rocket fuel but this practice was stopped after high levels of the chemical were found in samples of air, soil and water taken in the vicinity of manufacturing plants and it is now only used for research purposes. Unfortunately however, NDMA is unintentionally formed during various industrial processes often as a result of chemical reactions involving other chemicals called alkylamines and it has also been detected in various food products such as cured meats, fish, milk and alcoholic beverages.

NDMA is highly toxic and has been shown to cause tumours in laboratory animals at very low doses and has consequently been classified as a probable human carcinogen by the International Agency for Research on Cancer (IARC) and other agencies.

Several studies have found NDMA in drinking water supplies at concentrations up to 100ng/L usually at treatment plants where chloramination is used as the means of disinfection and NDMA is usually therefore considered a disinfection byproduct (DBP). In 2008 however, a UK government report also detected NDMA in several finished drinking water samples and concluded that the contamination of certain treatment chemicals by NDMA may have been responsible.

The contamination of drinking water by NDMA is of particular concern due to the minute concentrations at which it may be harmful, the difficulty in detecting it at these concentrations and to the difficulty in removing it from drinking water – a result of its high solubility.

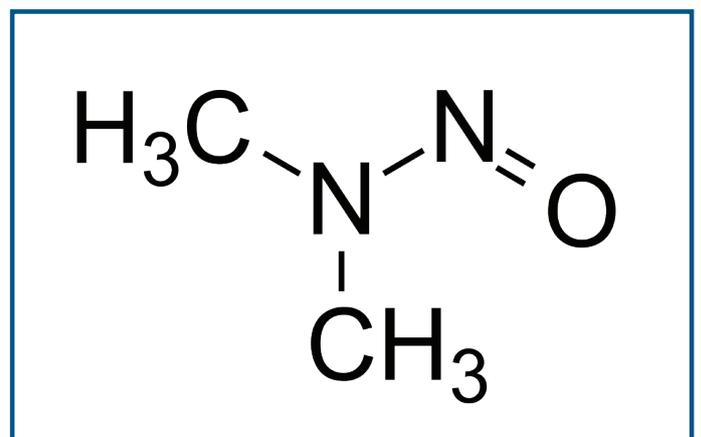
## NDMA Regulatory Guidelines

As a result of these concerns the US EPA has established a clean-up level of 0.7ng/L in groundwater based on a 1 in a million lifetime excess cancer risk in drinking water. The EPA has also calculated 0.42ng/L as the non-enforceable screening level for NDMA in tap water, again based on a 1 in a million lifetime excess cancer risk.

In the UK there is currently no specific regulatory standard for the concentration of NDMA in drinking water however the Health Protection Agency (HPA) advises that it should be regarded as a genotoxic carcinogen with no identifiable threshold for adverse effects and for which exposure should be kept as low as reasonably practicable.

The Drinking Water Inspectorate (DWI) has therefore issued guidance giving 1ng/L as the trigger limit for the continued monitoring of NDMA in water supplies with further action to be taken should levels breach a second trigger limit at 10ng/L - the point at which drinking water may be considered unwholesome.

Figure One: Structure of NDMA





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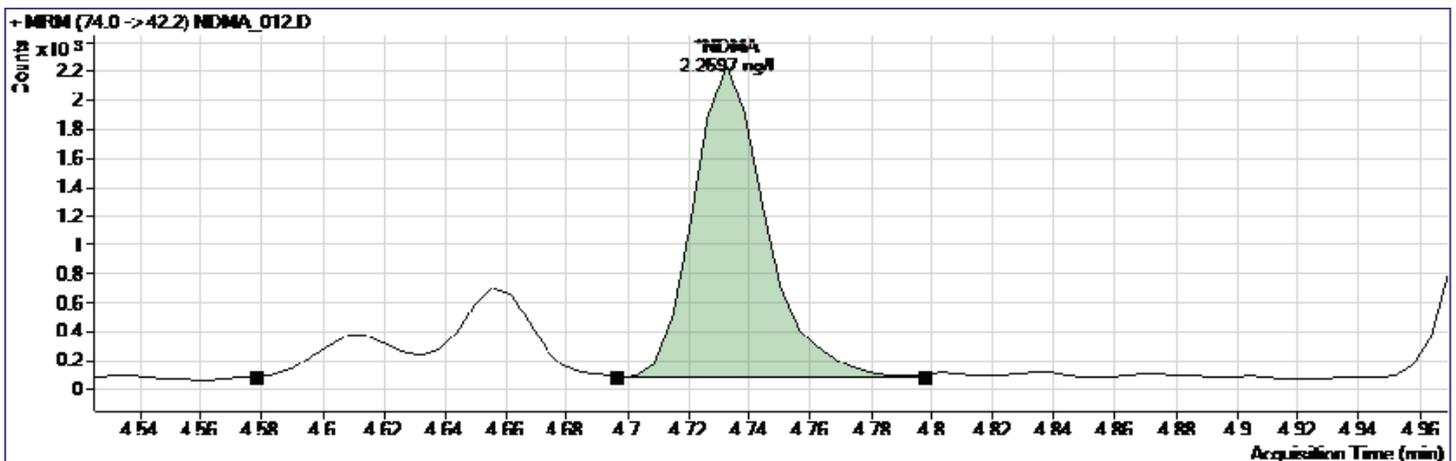
## Analysis Of NDMA

In order to meet these challenging requirements ALS have adopted methodology that is based upon USEPA Method 521, however, ALS substitutes the more sensitive tandem GC-MS-MS in place of the GC-CI-MS used in the original method. Use of this sensitive and selective instrumentation enable ALS to achieve a detection limit (LOD) of less than 0.5ng/L for NDMA in drinking water.

Table One: NDMA Performance Summary for ALS Method GE058

Compound	CAS Number	Recovery from Water at 4ng/L	Limit of Detection (LOD)	Minimum Reporting Level (MRL)
N-Nitrosodimethylamine (NDMA)	62-75-9	101.3%	0.43ng/L	0.50ng/L

Figure Two: Chromatogram of NDMA detected in a tap water sample at 2.3ng/L.



## General Sampling & Preservation Requirements

- Bottle: 1L PET bottle preserved with Ascorbic Acid
- Storage: Stored at 5°C
- Holding Time: Samples are stable for 21 days under these storage conditions

For further information please contact the Coventry ALS Environmental laboratory on 02476 42 12 13 or speak to your dedicated customer service advisor.