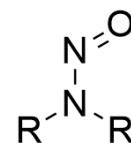


for Pharmaceutical, Food, and Water Environment Analysis Analytical Standards of Nitrosamines

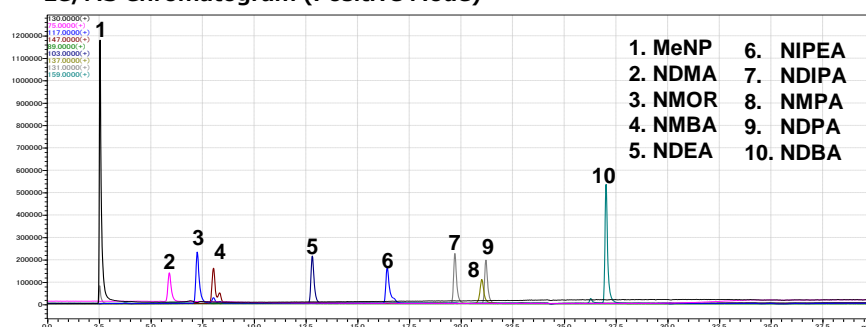
Nitrosamines are compounds of the chemical structure where hydrogen of the amine nitrogen is substituted with a nitroso group. These compounds are widely used industrially in plasticizers, additives, etc., but at least some of them are known to be carcinogenic. Nitrosamine are often detected as impurities during the manufacturing process of a drug product. Recently, nitrosamines were detected in some sartan and ranitidine products, and these products were recalled. In response to this event, in September 2019, the EMA requested the marketing authorization holders to evaluate the risk of the presence of nitrosamine impurities in their drugs and take appropriate risk mitigation measures. FUJIFILM Wako offers a wide range of analytical standards of nitrosamines.



Mixture Standard Solution

✓ Mixture standard solution of 10 nitrosamines regulated by USP, Ph. Eur., And EMA!

LC/MS Chromatogram (Positive Mode)



[Internal Standard]

N-Nitrosomethylethylamine Standard

[HPLC]

Column: Wakopak® Ultra C18-3 4.6 × 150 mm

Column temperature: 40°C

Eluent: A) 0.1 vol% HCOOH in H₂O

B) 0.1 vol% HCOOH in CH₃OH

Gradient:

Time (min.)	B conc. (%)
0-30	10-95
30-40	95

Flow rate: 0.5 mL/min.

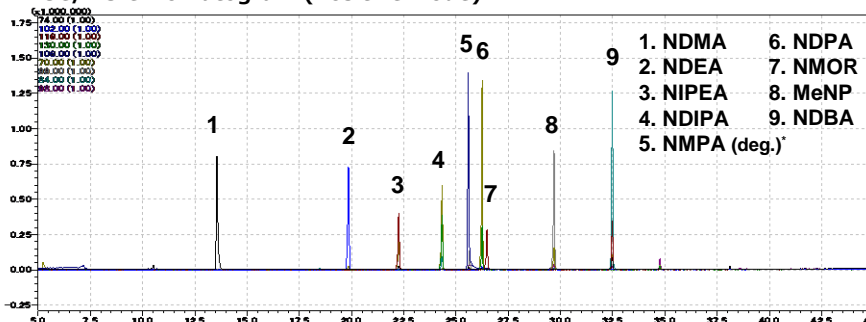
[MS]

Ionization: ESI

Mode: SIM

	Monitoring ion (m/z)	Mode		Monitoring ion (m/z)	Mode		Monitoring ion (m/z)	Mode		Monitoring ion (m/z)	Mode
MeNP	130	+	NMBA	147	+	NDIPA	131	+	NDPA	131	+
NDMA	75	+	NDEA	103	+	NMPA	137	+	NDBA	159	+
NMOR	117	+	NIPEA	117	+						

GC/MS Chromatogram (Positive Mode)



[Internal Standard]

N-Nitrosomethylethylamine Standard

[GC]

Column: DB-624UI 0.14 μm, 0.25 mm × 30 m

Column temperature: 40°C (5 min.)→5°C/min.

→260°C (11 min.)

Injection temperature: 260°C

Carrier gas: He 1.3 mL/min.

Splitless: 1 min.

[MS]

Ionization: EI

Interface temperature: 250°C

* Since NMPA is easily decomposed under thermal conditions¹⁾, it is detected as a decomposition peak under this conditions.

1) Mutsuga, M. *et al.*: *Am. J. Anal. Chem.*, **4**, 277 (2013).

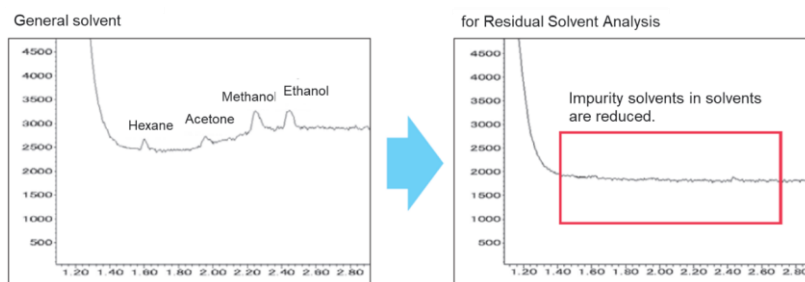
* NMBA is rarely detected in GC/MS.

* This product is not USP/Ph. Eur. reference standard.

Code No.	Product Name	Grade	Volume
145-10051	10 Nitrosamines Mixture Standard Solution (each 2μg/mL Methanol Solution)	for Chromatography	1 mL×5A

Solvent for Residual Solvent (ICH Q3C) Analysis

- ✓ Impurity/residual solvents (low-boiling compounds) in solvents are reduced!



- ✓ **59 types of residual solvents listed in ICH Q3C Classes 1 to 3 are guaranteed!**
The following solvents listed in ICH Q3C Classes 1 to 3 are guaranteed.

Class 1 (max. 1 ppm)

Carbon Tetrachloride	1,2-Dichloroethane	1,1-Dichloroethene	1,1,1-Trichloroethane	Benzene
----------------------	--------------------	--------------------	-----------------------	---------

Class 2 (max. 10 ppm)*1

Acetonitrile	Ethylbenzene	2-Ethoxyethanol	<i>o</i> -, <i>m</i> -, <i>p</i> -Xylene	Chlorobenzene
Cumene*2	Chloroform	Cyclohexane	1,2-Dichloroethene	1,4-Dioxane
Dichloromethane	<i>N,N</i> -Dimethylacetamide	<i>N,N</i> -Dimethylformamide	1,2-Dimethoxyethane	Sulfolane
Tetrahydrofuran*2	Tetralin	Toluene	1,1,2-Trichloroethene	Nitromethane
Pyridine	Hexane	Methanol	Methyl isobutyl ketone*2	Methylcyclohexane
<i>N</i> -Methylpyrrolidone	Methylbutyl ketone	2-Methoxyethanol		

*1 Ethylene glycol and formamide are not guaranteed.

*2 Guaranteed at max. 50 ppm

Class 3 (max. 50 ppm)*

Acetone	Anisole	Ethanol	Ethyl formate	Acetic acid
Isobutyl acetate	Isopropyl acetate	Ethyl acetate	<i>n</i> -Butyl acetate	Propyl acetate
Methyl acetate	Diethyl ether	Dimethylsulfoxide	1-Butanol	2-Butanol
<i>t</i> -Butylmethyl ether	1-Propanol	2-Propanol	Heptane	1-Pentanol
Pentane	Methyl ethyl ketone	3-Methyl-1-butanol	2-Methyl-1-propanol	

* Formic acid and triethylamine are not guaranteed.

Code No.	Product Name	Grade	Volume
049-34725	1,3-Dimethyl-2-imidazolidinone for ICH Q3C	for Residual Solvents Analysis	500 mL

Listed products are intended for laboratory research use only, and not to be used for drug, food or human use. / Please visit FUJIFILM Wako Laboratory Chemicals site: <https://labchem-wako.fujifilm.com/> / This leaflet may contain products that cannot be exported to your country due to regulations. / Bulk quote requests for some products are welcomed. Please contact us.

FUJIFILM Wako Laboratory Chemicals site
<https://labchem-wako.fujifilm.com>



FUJIFILM Wako Pure Chemical Corporation
1-2, Doshomachi 3-Chome, Chuo-ku, Osaka 540-8605, Japan
Tel: +81 6 6203 3741 Fax: +81 6 6203 1999
ffwk-cservise@fujifilm.com

FUJIFILM Wako Chemicals U.S.A. Corporation
1600 Bellwood Road, Richmond, VA 23237, U.S.A.
Toll-Free (U.S. only): +1 877 714 1920
Tel: +1 804 271 7677 Fax: +1 804 271 7791
wkuslabchem@fujifilm.com

FUJIFILM Wako Chemicals Europe GmbH
Fuggerstr 12, 41468 Neuss, Germany
Tel: +49 2131 311 0 Fax: +49 2131 311 100
labchem_wkeu@fujifilm.com

FUJIFILM Wako Chemicals (Hong Kong) Limited
Room 1111, 11/F, International Trade Centre, 11-19 Sha Tsui Road,
Tsuen Wan, N.T., Hong Kong
Tel: +852-2799-9019 Fax: +852-2799-9808
wkhk.info@fujifilm.com

FUJIFILM Wako (Guangzhou) Trading Corporation
Room 3003, 30/F., Dong Shan Plaza 69, Xian Lie Zhong Road,
Guangzhou, 510095, China
Tel: +86-20-8732-6381(Guangzhou) Tel: +86-21-6288-4751(Shanghai)
Tel: +86-10-6413-6388(Beijing)
wkgz.info@fujifilm.com