**4,4’Methylenedianiline (MDA)**

**Hazardous Substances:**

4, 4’ Methylenedianiline (MDA)

CAS number: 101-77-9

Alternative name

Diaminodiphenylmethane

**Workplace Exposure Limits:**

0.01ppm, 0.08mg/m3 (skin notation); MDA is a suspect human carcinogen

**4,4’ Methylenedianiline (MDA) in urine**

Monitored by analysis of total MDA in urine after hydrolysis of conjugates

**BMGV**: 50 µmol MDA/mol creatinine

***Biological Monitoring Guidance Value (BMGV)***

50 µmol /mol creatinine

Conversion: 1μmol/mol = 1.751 μg/g

***Other Guidance Values***

None

***Sample Collection***

Urine samples should be collected at the end of shift into polystyrene universal containers (30mL).

***Sample Transport to Laboratory***

Send samples to the laboratory by first class post (or equivalent) to arrive within 48 hours of collection. If any delay is anticipated, store samples chilled – ideally frozen if suitable facilities are available. Packaging must comply with relevant postal regulations for biological samples (UN3373).

**Suggested Method and Analytical Evaluation**

Analytical technique: Gas chromatography with mass spectrometry detection.

Detection limit: 10 nmol/L (3 x background)

Calibration range: Typically 0-1000 µmol/L

Precision:

- within day <3% RSD at 375 nmol/L

- day to day 8% RSD at 375 nmol/L

Sample stability: 2 days at ambient temperature, >3 months at 20°C

Analytical Interferences: None known

Quality assurance: GEQAS (www.g-equas.de).

***When to take a sample***

Elimination half-life is a measure of the rate of removal of a substance that has been taken into the body. It helps to identify when it is best to take a sample following potential exposure and indicates the potential ‘exposure window’ that will be reflected by a result.

Human metabolism of MDA is not fully characterised, but its major metabolites are N-acetyl conjugates. The available data indicate a half-life of over 7 hours for inhalation exposure. If there is significant skin absorption, this will delay excretion. Inhalation exposure can be monitored in a post-shift urine sample, whereas a pre-shift next day sample will better reflect skin absorption

**Other Information**

***Confounding factors***

Co-Exposure to methylene diphenyl isocyanate

***Unexposed level***

Below the quantitation limit.

**Creatinine correction is advised**

***Interpretation***

Urinary MDA results reflect systematic exposure to MDA that may have entered the body by

inhalation or more likely, through the skin. If biological monitoring results are greater than the

guidance value it does not necessarily mean that ill health will occur, but it does mean that exposure

is not being adequately controlled. Under these circumstances employers will need to look at

current work practices to see how they can be improved to reduce exposure.

***Further information***

EH40 List of Approved Workplace Exposure Limits <http://www.hse.gov.uk/pubns/books/eh40.htm>

Biological Monitoring: A tool for helping to assess workplace exposure (August 2021). Published by British Occupational Hygiene Society (www.bohs.org). [BOHS-Biological-Monitoring-A-tool-for-helping-to-assess-workplace-exposure-rebranded.pdf](https://www.bohs.org/app/uploads/2021/08/BOHS-Biological-Monitoring-A-tool-for-helping-to-assess-workplace-exposure-rebranded.pdf)

For further advice, please contact us:

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0203 028 3383

**Biological Monitoring at HSE**

<https://www.hsl.gov.uk/online-ordering/analytical-services-and-assays/biological-monitoring>