**MbOCA**

***Who is this guidance for?***

This guidance is primarily aimed at employers or individuals with delegated responsibility for managing workplace exposure to substances. Whilst it is not exhaustive, the information presented is intended to demonstrate how biomonitoring can help with this duty. Some simple advice is presented to help non-specialist users to get the most out of biomonitoring covering (1) when to take a sample to ensure reliable and comparable results over time; (2) putting the result into context with respect to background (environmental) levels or what can reasonably be achieved with good exposure control; and (3) some basic technical data that can help to evaluate an analytical service provider. For further information you should consult your chosen analytical service provider who should be happy to discuss your specific requirements and find solutions.

**MbOCA (2,2-Dichloro-4,4 methylene dianiline)**

Monitored by analysis of MbOCA analyte in urine

**BMGV**: 15µmol MbOCA/mol creatinine

**Hazardous Substances:**

2,2-Dichloro-4,4 methylene dianiline: CAS number: 101-14-4

**Alternative name:** Methylene bis(2-chloroaniline) (MbOCA)

**Workplace Exposure Limits:**

8-hour TWA: 0.005mg/m3 total -NCO

Skin notation

MbOCA is a suspected human carcinogen.

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

15µmol MbOCA/mol creatinine.

***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.

Limit of Quantitation: 5nmol/L (5 x detection limit, approx. 0.5 µmol/mol creatinine)

Calibration range: Typically 0-140 nmol/L

Precision:

- within day <7% RSD at 150µmol/L

- day to day <10% RSD at 150µmol/L

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

Analytical Interferences: None known

Quality assurance: G-EQUAS (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.

For MbOCA, a study showed a peak of urinary excretion 4 hours after exposure, and the elimination rate in urine has an approximate half-life of 24 hours, so urine samples should be collected towards the end of the shift.

**Other Information**

***Confounding factors: e.g. sources of contamination; other exposure sources***

None known.

***Unexposed level***

None detected.

**Creatinine correction is advised.**

***Interpretation***

Urinary MbOCA results reflect systematic exposure to MbOCA 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. An elevated result should be re-tested as soon as possible to help establish whether it represents ongoing workplace exposure or a ‘one-off’ event. If necessary, 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)

Cocker, J., Nutley, B.P. and Wilson, H.K., 1996. Methylene bis (2-chloroaniline)(MbOCA): towards a

biological monitoring guidance value.Biomarkers, 1(3), pp.185-189.

For further advice, please contact us:

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**Biological Monitoring at HSE**

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