

| Jahr der Auswahl | Stoffname (CAS-Nr.)                                                                                | Biomarker                                                                                   | Methode; Bestimmungsgrenze (BG)                                                          | Proben-volumen                                                       |
|------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
| 2010             | <b>DINCH</b><br>Di-iso-nonylcyclohexan-1,2-dicarbonsäureester<br>(166412-78-8)<br>Isomerengemisch) | <b>OH-MINCH</b><br><b>cx-MINCH</b>                                                          | Online-SPE-LC-MS/MS<br>BG: jeweils 0,05 µg/l                                             | 0,3 mL<br>Urin                                                       |
|                  | <b>DPHP</b><br>Di(2-propylheptyl)phthalat<br>(53306-54-0)                                          | <b>oxo-MPHP</b><br><b>OH-MPHP</b><br><b>cx-MPHxP</b>                                        | GC/HRMS<br>BG: 0,25 µg/L;<br>BG: 0,3 µg/L;<br>BG: 0,15 µg/L                              | 1,0 mL Urin                                                          |
|                  | <b>HBCDD</b><br>Hexabromcyclododecan<br>(25637-99-4)                                               | <b>α-HBCD</b><br><b>β-HBCD</b><br><b>γ-HBCD</b>                                             | UPLC-MS/MS<br>BG:<br>jeweils 0,03 µg/L                                                   | 1,0 mL Plasma                                                        |
|                  | <b>4-Nonylphenol</b> , verzweigt<br>(84852-15-3)                                                   | <b>OH-Nonylphenol</b><br><b>Oxo-Nonylphenol</b>                                             | Online-SPE-LC-MS/MS<br>(aktualisierte Methode von 2021)<br>BG: 0,5 µg/L<br>BG: 0,25 µg/L | 0,3 mL Urin                                                          |
|                  | <b>4-tert-Octylphenol</b><br>(140-66-9)                                                            | <b>4-tert-Octylphenol</b><br><br>Gemeinsame Bestimmung mit <b>4-Nonylphenol</b> , verzweigt | UPLC-MS/MS<br>BG: jeweils 1,0 µg/L                                                       | 0,5 mL Urin<br>(Gleichzeitige Bestimmung von Nonyl- und Octylphenol) |

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|------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|-----------------------------------------------------------------------------------|
| 2011             | <b>4-MBC</b><br>3-(4-Methylbenzyliden) –<br>campher<br>(36861-47-9)     | <b>MBC-cx</b> (=3-4CBC)<br>3-(4-Carboxy-<br>benzyliden)<br>campher<br><b>MBC-OH</b><br>(=3-4CBHC)<br>3-(4-Carboxy-<br>benzyliden)-6-<br>hydroxy-campher | UPLC-MS/MS<br>BG: 0,15 µg/l<br><br>BG: 0,3 µg/l                 | 0,5 mL<br>Urin                                                                    |
|                  | <b>MDI</b><br>Methyldiphenyldiisocyanat<br>(101-68-8 und<br>26447-40-5) | <b>MDA-Val-Hyd</b><br>5-Isopropyl-3[4-(4-<br>amino-benzyl)<br>phenyl] hydantoin<br>(Häm. Addukt)                                                        | GC-HRMS-NCI<br>BG:<br>0,05 ng <b>MDA-Val-<br/>Hyd</b> /g Globin | 5 mL<br>EDTA-<br>stabili-<br>siertes<br>Blut                                      |
|                  | <b>2-MBT</b><br>2-Mercaptobenzothiazol<br>(149-30-4)                    | <b>MBT</b>                                                                                                                                              | UPLC-MS/MS<br>BG: 1,0 µg/L                                      | 0,5 mL<br>Urin                                                                    |
|                  | <b>NMP</b><br>N-methyl-2-pyrrolidon<br>(872-50-4)                       | <b>5-HNMP</b><br>(5-Hydroxy- <i>N</i> -<br>methyl-2-<br>pyrrolidon)<br><b>2-HMSI</b><br>(2-Hydroxy- <i>N</i> -<br>methyl-succinimid)                    | GC-EI-MS/MS<br>BG: jeweils 2,5 µg/L                             | 1,0 mL<br>Urin<br><br>Gleich-<br>zeitige<br>Bestim-<br>mung von<br>NMP und<br>NEP |
|                  | <b>NEP</b><br>N-ethyl-2-pyrrolidon<br>(2687-91-4)                       | <b>5-HNEP</b><br>(5-Hydroxy- <i>N</i> -<br>ethylpyrrolidon)<br><b>2-HESI</b><br>(2-Hydroxy- <i>N</i> -<br>ethylsuccinimid)                              | GC-EI-MS/MS<br>BG: jeweils 2,5 µg/L                             |                                                                                   |

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|------------------|----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| 2012             | <b>C(M)IT/MIT (3:1)</b><br>5-Chloro-2-methyl-3-isothiazolinon<br>/ 2-Methylisothiazol-3(2H)-on<br>(55965-84-9) | <b>NMMA</b><br>(N-Methylmalonamsäure (3-methylamino-3-oxopropionsäure))<br><br><b>M-12</b><br>(Mercaptursäure-metabolit: ((Acetylamino)((3-(Methylamino)-1-(methylthio)-3-oxopropyl)thio)-Essigsäure)                                                                                                                                                                                                          | GC-EL-MS/MS<br>BG: 0,5 µg/L<br><br>LC-MS/MS<br>BG: 0,2 µg/L                                                                                                                    | 0,1 mL<br>Urin<br><br>0,5 mL<br>Urin |
|                  | <b>Geraniol</b><br>(106-24-1)                                                                                  | <b>8-Carboxygeraniol</b><br><b>Hildebrandtsäure</b><br><b>3-Hydroxy-citronellsäure</b><br><b>Geransäure</b>                                                                                                                                                                                                                                                                                                    | UPLC-MS/MS<br>BG: 1,50 µg/L<br>BG: 2,65 µg/L<br>BG: 2,66 µg/L<br>BG: 1,80 µg/L                                                                                                 | 1,0 mL<br>Urin                       |
| 2013             | <b>TOTM, TEHTM</b><br>Tri(2-ethylhexyl) trimellitat<br>(3319-31-1)                                             | <b>1-MEHTM</b><br>(1-mono-(2-ethylhexyl) trimellitat)<br><b>2-MEHTM</b><br>(2-mono-(2-ethylhexyl) trimellitat)<br><b>5OH-1-MEHTM</b><br>(1-mono-(2-ethyl-5-hydroxyhexyl) trimellitat)<br><b>5OH-2-MEHTM</b><br>(2-mono-(2-ethyl-5-hydroxyhexyl) trimellitat)<br><b>5cx-1-MEPTM</b><br>(1-mono-(2-ethyl-5-Carboxy-pentyl) trimellitat)<br><b>5cx-2-MEPTM</b><br>(2-mono-(2-ethyl-5-Carboxy-pentyl) trimellitat) | UPLC-MS/MS<br>(aktualisierte Methode von 2021)<br>BG: 0,036 µg/L<br><br>BG: 0,074 µg/L<br><br>BG: 0,067 µg/L<br><br>BG: 0,116 µg/L<br><br>BG: 0,049 µg/L<br><br>BG: 0,038 µg/L | 1,0 mL<br>Urin                       |
|                  | <b>DEHTP</b><br>(od. DEHT, DOTP)<br>Diethylhexyl-terephthalat<br>(6422-86-2)                                   | <b>5cx-MEPTP</b><br><b>5OH-MEHTP</b><br><b>2cx-MMHTP</b><br><b>5oxo-MEHTP</b>                                                                                                                                                                                                                                                                                                                                  | Online-SPE-LC-MS/MS<br>BG: 0,2 µL<br>BG: 0,3 µL<br>BG: 0,4 µL<br>BG: 0,2 µL                                                                                                    | 0,3 mL<br>Urin                       |
|                  | <b>BHT</b><br>2,6 Di-tert-butyl-p-kresol<br>(Butylated Hydroxy-Toluene)<br>(128-37-0)                          | <b>BHT-Säure</b>                                                                                                                                                                                                                                                                                                                                                                                               | LC-MS/MS<br>BG: 0,2 µL                                                                                                                                                         | 0,5 mL<br>Urin                       |

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|------------------|------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|----------------|
| 2014             | <b>DINA</b><br>Diisononyladipat<br>(33703-08-1)                                          | <b>OH-MINA</b> (Mono(hydroxy-isononyl)adipat)<br><b>oxo-MINA</b><br>(Mono(oxo-isononyl)adipat)<br><b>cx-MIOA</b><br>(Mono(carboxy-isooctyl)adipat)                                                  | Online-SPE-LC-MS/MS<br>BG: 0,3 µg/L<br><br>BG: 0,3 µg/L<br><br>BG: 0,6 µg/L      | 0,3 mL<br>Urin |
|                  | <b>DEHA</b><br>Di-(2-ethylhexyl)adipat<br>103-23-1                                       | <b>5OH-MEHA</b><br>(mono-2-ethyl-5-hydroxyhexyl adipat)<br><b>5oxo-MEHA</b><br>(mono-2-ethyl-5-oxohexyl adipat),<br><b>5cx-MEPA</b><br>(mono-5-carboxy-2-ethylpentyl adipat)                        | Online-SPE-HPLC-MS/MS<br>BG: 0,05 µg/L<br><br>BG: 0,1 µg/L<br><br>BG: 0,05 µg/L  | 0,3 mL<br>Urin |
|                  | <b>OC</b><br>Octocrylen,<br>2-Ethylhexyl 2-cyano-3,3-diphenyl-2-propenoat<br>(6197-30-4) | <b>CPAA</b><br>(2-cyano-3,3-diphenyl-Acrylsäure)<br><b>DOCCA</b><br>(2-(carboxymethyl) butyl 2-cyano-3,3-diphenyl Acrylat<br><b>5OH-OC</b><br>(2-ethyl-5-hydroxyhexyl 2-cyano-3,3-diphenyl Acrylat) | Online-SPE-LC-MS/MS<br>BG: 0,5 µg/L<br><br>BG: 0,05 µg/L<br><br>BG: 0,015 µg/L   | 0,3 mL<br>Urin |
|                  | <b>Lysmeral</b><br>2-(4-tert-Butylbenzyl)propionaldehyd<br>(80-54-6)                     | <b>TBBA</b><br>(Tert-Butylbenzoic Acid)<br><b>Lysmerylsäure</b><br><b>Lysmerol</b><br><b>OH-Lysmerylsäure</b>                                                                                       | LC-MS/MS<br>BG: 0,42 µg/L<br><br>BG: 0,36 µg/L<br>BG: 0,10 µg/L<br>BG: 0,45 µg/L | 1,0 mL<br>Urin |

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|------------------|-----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|--------------------|
| 2015             | <b>EHS</b><br>Ethylhexylsalicylat<br>(Octisalate)<br>(118-60-5)                                           | <b>5OH-EHS</b><br>(2-ethyl-5-hydroxyhexyl<br>2-hydroxybenzoate)<br><b>5oxo-EHS</b> (2-ethyl-5-oxo-<br>hexyl-2-hydroxy-benzoate)<br><b>5cx-EHS</b><br>(5-(((2-hydroxybenzoyl)oxy)methyl)-<br>heptanoic acid) | online-SPE-HPLC-<br>MS/MS<br>BG: 0,05 µg/L<br><br>BG: 0,15 µg/L<br><br>BG: 0,01 µg/L                                     | 0,3 mL<br>Urin     |
|                  | <b>Climbazol</b><br>1-(4-Chlorophenoxy)-1-<br>(imidazol-1-yl)-3,3-<br>dimethylbutan-2-on)<br>(38083-17-9) | <b>Cx-OH-Clim</b> (Carboxy-<br>Hydroxy-Climbazol)<br><b>(OH)<sub>2</sub>-Clim</b><br>(Dihydroxy-<br>Climbazol)<br>→jeweils Diastereomeren-<br>gemische (1:1)                                                | UHPLC-MS/MS<br>NWG: 0,5 µg/L<br>BG: 1,5 µg/L<br><br>NWG: 0,5 µg/L<br>BG: 1,5 µg/L                                        | 0,5 mL<br>Urin     |
|                  | <b>UV 328, Tinuvin 328</b><br>2-(2H-Benzotriazol-2-yl)-<br>4,6-di-tert-pentylphenol<br>(25973-55-1)       | <b>UV 328</b><br><b>UV 328-4/3-CO</b><br><b>UV 328-6/3-CO</b><br><b>UV 328-4/3-OH</b><br><b>UV 328-6/3-OH</b><br><b>UV 328- BT-OH</b><br><b>UV 328-4/3-CO-6/3-OH</b>                                        | GC-MS/MS<br>BG: 0,3 µg/L<br>BG: 0,4 µg/L<br>BG: 0,5 µg/L<br>BG: 0,3 µg/L<br>BG: 0,4 µg/L<br>BG: 0,4 µg/L<br>BG: 0,3 µg/L | 1,0 mL<br>Urin     |
|                  |                                                                                                           | <b>UV 328</b><br><b>UV 328-4/3-CO</b><br><b>UV 328-6/3-CO</b><br><b>UV 328-4/3-OH</b><br><b>UV 328-6/3-OH</b><br><b>UV 328- BT-OH</b><br><b>UV 328-4/3-CO-6/3-OH</b>                                        | GC-MS/MS<br>BG: 0,4 µg/L<br>BG: 0,2 µg/L<br>BG: 0,4 µg/L<br>BG: 0,3 µg/L<br>BG: 0,3 µg/L<br>BG: 0,4 µg/L<br>BG: 0,3 µg/L | 1,0 mL<br>Vollblut |
|                  | <b>7-Hydroxycitronellal</b><br>(107-75-5)                                                                 | 7-Hydroxy-citronellylsäure                                                                                                                                                                                  | UPLC-MS/MS<br>BG: 0,5 µL                                                                                                 | 1,0 mL<br>Urin     |

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|------------------|------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|
| 2016             | <b>TDCPP</b><br>Tris(2-chlor-1-(chlormethyl)ethyl)phosphat<br>(13674-87-8)                           | <b>BDCPP</b><br>(Bis(1,3-dichloropropyl)phosphat)                                                                                                                                             | LC-MS/MS<br>BG: 0,2 µg/L                                                                                                                         | 5,0 mL<br>Urin                                        |
|                  | <b>DnBA</b><br>Di-n-butyladipat<br>(105-99-7)                                                        | <b>MnBA</b><br>(Mono-n-butyladipat),<br><b>3OH-MnBA</b><br>(3-Hydroxy-mono-n-butyladipat)<br><b>3cx-MnPrA</b><br>(3-Carboxy-mono-n-propyladipat)                                              | HPLC-ESI-QqQ-MS/MS<br>BG: 0,05 µg/L<br><br>BG: 0,1 µg/L<br><br>BG: 0,5 µg/L                                                                      | 0,3 mL<br>Urin                                        |
|                  | <b>DHHB</b><br>Uvinul A Plus<br>Diethylamino-hydroxybenzoyl-hexylbenzoat<br>(302776-68-7)            | <b>AHB</b><br>(Amino-hydroxybenzoylbenzoesäure)<br><b>EHB</b><br>(Ethylamino-hydroxybenzoyl-hexylbenzoesäure)<br><b>DHB</b><br>(Diethylaminohydroxybenzoylbenzoesäure)                        | LC-MS/MS<br>BG: 0,1 µg/L<br><br>BG: 0,1 µg/L<br><br>BG: 0,05 µg/L                                                                                | 1,0 mL<br>Urin                                        |
| 2017             | <b>Ethoxyquin</b><br>1,2-Dihydro-6-ethoxy-2,2,4-trimethylchinolin<br>(91-53-2)                       | <b>EQI</b><br>2,2,4-trimethyl-6(2H)-chinolin                                                                                                                                                  | UHPLC-MS/MS<br>BG: 0,03 µg/L                                                                                                                     | 3,0 mL<br>Urin                                        |
|                  | <b>UV 327</b> , Tinuvin 327<br>2,4-di-tert-butyl-6-(5-chloro-benzotriazol-2-yl)phenol<br>(3864-99-1) | <b>UV 327</b><br><b>UV 327-6-mcx</b><br><b>UV 327-6-mOH</b><br><b>UV 327-4-mcx</b><br><b>UV 327-4-mOH</b><br><b>UV 327-4-mOH-6-mcx</b><br><b>UV 327-4+6-diOH</b><br><b>UV 327-4-mcx-6-mOH</b> | GC-MS/MS<br>BG: 0,17 µg/L<br>BG: 0,16 µg/L<br>BG: 0,15 µg/L<br>BG: 0,17 µg/L<br>BG: 0,16 µg/L<br>BG: 0,31 µg/L<br>BG: 0,21 µg/L<br>BG: 0,15 µg/L | 2,0 mL<br>Urin<br><br>(Methode für Blut in Entwickl.) |

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|------------------|-----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| 2018             | <b>2-Phenoxyethanol</b><br>(122-99-6)                                                         | <b>PhAA</b><br>(Phenoxyessigsäure)<br><b>4-OH-PhAA</b><br>(4-Hydroxyphenoxyessigsäure)                                                                                                                                                                                                                                                                                                     | LC-MS/MS<br>BG: 10 µg/L<br><br>BG: 20 µg/L<br><br>LC-MS/MS<br>BG: 10 µg/L<br>BG: 20 µg/L                | 0,02 mL<br>Urin<br><br><br><br>0,2 mL<br>Blut |
|                  | <b>Homosalat</b><br>2-Hydroxybenzoesäure-<br>3,3,5-<br>trimethylcyclohexylester<br>(118-56-9) | <b>hHMS-CA</b><br>( <i>trans</i> -5-((2-Hydroxybenzoyl)oxy)-3,3-dimethylcyclohexan-1-carbonsäure)<br><b>cHMS-CA</b><br>( <i>cis</i> -5-((2-Hydroxybenzoyl)oxy)-3,3-dimethylcyclohexan-1-carbonsäure)<br><b>3OH-hHMS</b><br>(3-Hydroxy- <i>trans</i> -3,5,5-trimethylcyclohexyl-2-hydroxybenzoat)<br><b>3OH-cHMS</b><br>(3-Hydroxy- <i>cis</i> -3,5,5-trimethylcyclohexyl-2-hydroxybenzoat) | Online-SPE-LC-MS/MS<br>BG: 0,03 µg/L<br><br><br>BG: 0,02 µg/L<br><br>BG: 0,02 µg/L<br><br>BG: 0,04 µg/L | 0,3 mL<br>Urin                                |
| 2019             | <b>2,4-DTBP, Arvin 4</b><br>2,4-Di- <i>tert</i> -butylphenol<br>(96-76-4)                     | <b>DTBP</b><br><b>DTBP-OH</b><br>(2- <i>tert</i> -Butyl-4-(1,1-dimethyl-2-hydroxyethyl)phenol)                                                                                                                                                                                                                                                                                             | LC-MS/MS<br>BG: jeweils<br>1,0 µg/L                                                                     | 0,5 mL<br>Urin                                |
| 2020             | <b>TMDD</b><br>2,4,7,9-Tetramethyl-5-decin-4,7-diol<br>(126-86-3)                             | <b>1-OH-TMDD</b><br>(2,4,7,9-Tetramethyl-5-decin-1,4,7-triol)                                                                                                                                                                                                                                                                                                                              | UPLC-MS/MS<br>BG: 0,05 µg/L                                                                             | 1,0 mL<br>Urin                                |