

Supplementary materials to

**Phthalates in animal husbandry – a narrative review**

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Table S1 Commonly Used Industrial Phthalates and Their Primary Metabolites

| Phthalates<br>(Acronym)                 | Molecular<br>Formula                           | R1                                                                | R2                                                                | Metabolites<br>(Acronym)                                                                                                                                                                                   |
|-----------------------------------------|------------------------------------------------|-------------------------------------------------------------------|-------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SHORT ALKYL CHAIN PHTHALATES            |                                                |                                                                   |                                                                   |                                                                                                                                                                                                            |
| Dimethyl phthalate<br>(DMP)             | C <sub>10</sub> H <sub>10</sub> O <sub>4</sub> | CH <sub>3</sub>                                                   | CH <sub>3</sub>                                                   | Monomethyl phthalate<br>(MMP)                                                                                                                                                                              |
| Diethyl phthalate<br>(DEP)              | C <sub>12</sub> H <sub>14</sub> O <sub>4</sub> | CH <sub>2</sub> CH <sub>3</sub>                                   | CH <sub>2</sub> CH <sub>3</sub>                                   | Monoethyl phthalate<br>(MEP)                                                                                                                                                                               |
| Diisobutyl phthalate<br>(DiBP)          | C <sub>16</sub> H <sub>22</sub> O <sub>4</sub> | CH <sub>2</sub> CH(CH <sub>3</sub> ) <sub>2</sub>                 | CH <sub>2</sub> CH(CH <sub>3</sub> ) <sub>2</sub>                 | Monoisobutyl phthalate<br>(MiBP)                                                                                                                                                                           |
| Dibutyl phthalate<br>(DBP)              | C <sub>16</sub> H <sub>22</sub> O <sub>4</sub> | CH <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> CH <sub>3</sub>   | CH <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> CH <sub>3</sub>   | Mono(n-butyl) phthalate<br>(MBP)                                                                                                                                                                           |
| Bis(2-methoxyethyl)<br>phthalate (DMEP) | C <sub>14</sub> H <sub>18</sub> O <sub>6</sub> | CH <sub>2</sub> CH <sub>2</sub> OCH <sub>3</sub>                  | CH <sub>2</sub> CH <sub>2</sub> OCH <sub>3</sub>                  | Mono(2-methoxyethyl)<br>phthalate<br>(MMEP)                                                                                                                                                                |
| Dicyclohexyl phthalate<br>(DCHP)        | C <sub>20</sub> H <sub>26</sub> O <sub>4</sub> | C <sub>6</sub> H <sub>11</sub>                                    | C <sub>6</sub> H <sub>11</sub>                                    | Monocyclohexyl phthalate<br>(MCHP)                                                                                                                                                                         |
| Di(n-pentyl) phthalate<br>(DnPeP)       | C <sub>18</sub> H <sub>26</sub> O <sub>4</sub> | CH <sub>2</sub> (CH <sub>2</sub> ) <sub>3</sub> CH <sub>3</sub>   | CH <sub>2</sub> (CH <sub>2</sub> ) <sub>3</sub> CH <sub>3</sub>   | Mono(n-pentyl) phthalate<br>(MnPeP)                                                                                                                                                                        |
| Diallyl phthalate<br>(DAP)              | C <sub>14</sub> H <sub>14</sub> O <sub>4</sub> | C <sub>3</sub> H <sub>5</sub>                                     | C <sub>3</sub> H <sub>5</sub>                                     | Monoallyl phthalate<br>(MAP)                                                                                                                                                                               |
| Di(n-propyl) phthalate<br>(DPP)         | C <sub>14</sub> H <sub>18</sub> O <sub>4</sub> | C <sub>3</sub> H <sub>7</sub>                                     | C <sub>3</sub> H <sub>7</sub>                                     | Mono(n-propyl) phthalate<br>(MnPP)                                                                                                                                                                         |
| LONG ALKYL CHAIN PHTHALATES             |                                                |                                                                   |                                                                   |                                                                                                                                                                                                            |
| Benzyl butyl phthalate<br>(BBP)         | C <sub>19</sub> H <sub>20</sub> O <sub>4</sub> | CH <sub>2</sub> C <sub>6</sub> H <sub>5</sub>                     | C <sub>4</sub> H <sub>9</sub>                                     | Monobenzyl phthalate<br>(MBzP)                                                                                                                                                                             |
| Diphenyl phthalate<br>(DPhP)            | C <sub>20</sub> H <sub>14</sub> O <sub>4</sub> | C <sub>6</sub> H <sub>5</sub>                                     | C <sub>6</sub> H <sub>5</sub>                                     | Monophenyl phthalate<br>(MPhP)                                                                                                                                                                             |
| Di(2-ethylhexyl) phthalate<br>(DEHP)    | C <sub>24</sub> H <sub>38</sub> O <sub>4</sub> | CH(CH <sub>2</sub> ) <sub>5</sub> (CH <sub>3</sub> ) <sub>2</sub> | CH(CH <sub>2</sub> ) <sub>5</sub> (CH <sub>3</sub> ) <sub>2</sub> | Mono(2-ethylhexyl)<br>phthalate (MEHP)<br>Mono(2-ethyl-5-<br>hydroxyhexyl) phthalate<br>(MEHHP)<br>Mono(2-ethyl-5-oxohexyl)<br>phthalate (MEOHP)<br>Mono(2-ethyl-5-<br>carboxypentyl) phthalate<br>(MECPP) |
| Di(n-octyl) phthalate<br>(DNOP)         | C <sub>24</sub> H <sub>38</sub> O <sub>4</sub> | (CH <sub>2</sub> ) <sub>7</sub> CH <sub>3</sub>                   | (CH <sub>2</sub> ) <sub>7</sub> CH <sub>3</sub>                   | Mono(n-octyl) phthalate<br>(MNOP)<br>Mono(3-carboxypropyl)<br>phthalate<br>(MCP)                                                                                                                           |
| Diisononyl phthalate<br>(DiNP)          | C <sub>26</sub> H <sub>42</sub> O <sub>4</sub> | CH(CH <sub>2</sub> ) <sub>6</sub> (CH <sub>3</sub> ) <sub>2</sub> | CH(CH <sub>2</sub> ) <sub>6</sub> (CH <sub>3</sub> ) <sub>2</sub> | Monoisononyl phthalate<br>(MiNP)                                                                                                                                                                           |
| Di(n-nonyl) phthalate<br>(DnNP)         | C <sub>26</sub> H <sub>42</sub> O <sub>4</sub> | (CH <sub>2</sub> ) <sub>8</sub> CH <sub>3</sub>                   | (CH <sub>2</sub> ) <sub>8</sub> CH <sub>3</sub>                   | Mono(n-nonyl) phthalate<br>(MnNP)                                                                                                                                                                          |

Figure S1 Phthalate metabolism

