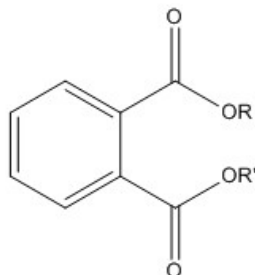


Potential Priority Chemicals:

ortho-Phthalates (1,2-Benzenedicarboxylic acid esters)



November 18, 2015
Meeting of the Scientific Guidance Panel
Biomonitoring California¹

At the July 16, 2015 meeting of the Scientific Guidance Panel (SGP), the Panel recommended including the class “*ortho*-phthalates” as designated chemicals for Biomonitoring California. *ortho*-Phthalates are esters of 1,2-benzenedicarboxylic acid, with the general structure shown above.

The class *ortho*-phthalates is now under consideration by the SGP as potential priority chemicals. The criteria for recommending priority chemicals as specified in the enabling legislation (SB 1379²) are:

- The degree of potential exposure to the public or specific subgroups, including, but not limited to, occupational.
- The likelihood of a chemical being a carcinogen or toxicant based on peer-reviewed health data, the chemical structure, or the toxicology of chemically related compounds.
- The limits of laboratory detection for the chemical, including the ability to detect the chemical at low enough levels that could be expected in the general population.
- Other criteria that the panel may agree to.

The tables on the following pages summarize some information relevant to the criteria for priority chemicals. For more detailed information on *ortho*-phthalates, including a

¹ California Environmental Contaminant Biomonitoring Program (also known as Biomonitoring California), codified at Health and Safety Code section 105440 et seq.

² SB 1379, Perata and Ortiz, Chapter 599, Statutes of 2006, available at: http://www.oehha.ca.gov/multimedia/biomon/pdf/sb_1379_bill_20060929.pdf

description of the toxicity of this class of chemicals, refer to OEHHA (2015) and the additional references listed at the end of this document.

Table 1 shows those *ortho*-phthalates that currently are on the list of priority chemicals. The Table specifies the metabolites currently measured in urine by the Environmental Health Laboratory (EHL)³, and notes two additional metabolites planned for inclusion in an expanded analytical method. Biomonitoring California results for *ortho*-phthalates available so far can be accessed here: <http://biomonitoring.ca.gov/results/chemical/284>.

Table 2 shows examples of additional *ortho*-phthalates that would be included as priority chemicals if the Panel recommends the entire class be listed. The Table notes selected metabolites that have been detected in human urine and detections of the parent *ortho*-phthalates in dust. For more information on these *ortho*-phthalates, see OEHHA (2015).

Californians are widely exposed to *ortho*-phthalates and ongoing market shifts are expected to change exposure patterns. A recommendation to add this class to the priority list would emphasize the importance of tracking exposures to known and emerging *ortho*-phthalates in California residents over time.

³ The Environmental Health Laboratory is in the California Department of Public Health.

Table 1: *ortho*-Phthalates currently on the list of priority chemicals for Biomonitoring California

| <i>ortho</i> -Phthalates currently on priority list | Selected metabolites | Included in Biomonitoring California analytical method |
|---|--|--|
| Benzyl butyl phthalate | Mono-benzyl phthalate | ✓ |
| | Mono- <i>n</i> -butyl phthalate | ✓ |
| Di- <i>n</i> -butyl phthalate | Mono- <i>n</i> -butyl phthalate | ✓ |
| Di-isobutyl phthalate | Mono-isobutyl phthalate | ✓ |
| Dicyclohexyl phthalate | Mono-cyclohexyl phthalate ^a | ✓ |
| Diethyl phthalate | Mono-ethyl phthalate | ✓ |
| Di-2-ethylhexyl phthalate | Mono-(2-ethyl-5-carboxypentyl) phthalate | ✓ |
| | Mono-2-ethylhexyl phthalate | ✓ |
| | Mono-(2-ethyl-5-hydroxyhexyl) phthalate | ✓ |
| | Mono-(2-ethyl-5-oxohexyl) phthalate | ✓ |
| Di-isodecyl phthalate | Mono-(carboxynonyl) phthalate | Planned for inclusion |
| Di-isononyl phthalate | Mono-(carboxyoctyl) phthalate | Planned for inclusion |
| | Mono-(hydroxyisononyl) phthalate | -- ^b |
| | Mono-isononyl phthalate | -- |
| | Mono-(oxoisononyl) phthalate | -- |
| Dimethyl phthalate | Mono-methyl phthalate | -- |
| Di- <i>n</i> -octyl phthalate | Mono-(3-carboxypropyl) phthalate | ✓ |
| | Mono- <i>n</i> -octyl phthalate ^a | -- |

^a Results for these phthalate metabolites were no longer reported by the Centers for Disease Control and Prevention (CDC) after the 2009-2010 cycle of the National Health and Nutrition Examination Survey (NHANES) because their concentrations were largely undetectable in previous survey periods (CDC, 2015).

^b Not currently included in the method and not currently planned for inclusion.

Table 2: Examples of additional *ortho*-phthalates that will be included as priority chemicals if the entire chemical class is listed

| Additional <i>ortho</i> -phthalates ^a (examples) | Selected metabolites identified in human urine | Detections of parent <i>ortho</i> -phthalate in dust |
|--|---|---|
| Diallyl phthalate | -- ^{b,c} | -- |
| Di- <i>n</i> -hexyl phthalate | -- | ✓ |
| Di- <i>n</i> -pentyl phthalate | Mono-(4-hydroxypentyl) phthalate | ✓ |
| | Mono- <i>n</i> -pentyl phthalate | |
| Dipropyl phthalate | -- | ✓ |
| Di- <i>n</i> -heptyl phthalate | -- | ✓ |
| Di-isoheptyl phthalate | -- | ✓ |
| Di-2-propylheptyl phthalate | Mono-2-(propyl-6-hydroxyheptyl) phthalate | -- |
| | Mono-2-(propyl-6-oxoheptyl) phthalate | |
| Didodecyl phthalate | -- | ✓ |
| Diundecyl phthalate | -- | ✓ |

^a These are example *ortho*-phthalates. If the SGP recommends inclusion of the class as priority chemicals, the Program would determine which *ortho*-phthalates to focus on and the appropriate target metabolites for measurement.

^b No studies located.

^c Diallyl phthalate (parent compound) has been detected in breast milk.

References

Potential designated chemical document on ortho-phthalates:

Office of Environmental Health Hazard Assessment (OEHHA, 2015). Potential Designated Chemicals: *ortho*-Phthalates (1,2-Benzenedicarboxylic acid esters). Materials for Biomonitoring California Scientific Guidance Panel Meeting. July 16, 2015. Available at:
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