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Phthalates

Pronounced THAL-ates, these chemicals, which are linked to endocrine disruption, developmental and reproductive toxicity, and cancer, have been banned from cosmetics in the European Union, but still remain prevalent in U.S. products.



WHAT ARE PHTHALATES?

Phthalates share a similar chemical structure and are widely used in consumer products.

Two are widely used in personal care products: 1) dibutyl phthalate (DBP) is used in nail polish, and is listed by the EU as an endocrine-disrupting compound of high concern.^[3] Some companies have phased DBP out of nail products.^[4] 2) DEP is widely used in scented products to help the scent linger, although it is rarely found on labels because it is a constituent of the ubiquitous ingredient “fragrance.” A third phthalate, Di-2-ethylhexylphthalate (DEHP) is found in eyelash glue, and is widely used in other consumer products.

A significant loophole in federal law allows phthalates (and other chemicals) to be added to fragrances without disclosure to consumers. In field research, the Campaign for Safe Cosmetics only found phthalates listed as an ingredient in nail polish,^[5] but our 2002 report, *Not Too Pretty*, detected phthalates in nearly three-fourths of tested products. None of the 72 products tested had phthalates listed on the labels.^[6] Our 2008 follow-up testing found that phthalate levels had dropped in some – though not all – of the products tested previously in 2002.^[7]

Phthalates are commonly found in human urine samples. An analysis of the 1999–2000 data from the CDC’s National Biomonitoring Program found metabolites of DEP in all 2,540 samples and metabolites of DBP in 99% of samples.^[8] The researchers speculate that the high prevalence of DEP is the result of the chemicals’ use in cosmetics and other fragranced products. Levels of DEP metabolites were higher among non-Hispanic blacks, perhaps due to frequent and prolonged use of products marketed specifically to girls and women of color.^[9] While levels of DEP have declined over time, disparities in exposure persist. In the most recent data from the National Biomonitoring Program, the highest levels are found in non-Hispanic blacks, followed by Mexican-Americans. Non-hispanic whites have the lowest levels.^[10]

Found In

- Color cosmetics
- Fragranced lotions
- Body washes and hair care products
- Nail polish and treatment

What to look for on the label

- Phthalate
- DEP
- DBP
- DEHP
- Fragrance

Health Concerns

Endocrine disruption: The European commission has determined that there is sufficient evidence that DBP and DEHP leads to endocrine disruption in living organism.^[11] In addition, the Endocrine Disruption Exchange (TEDX) includes DEP,^[12] DEHP,^[13] and DBP^[14] as endocrine disruptors. Two decades of research suggest that phthalates disrupt hormones, which can lead to harm during critical periods of development. Pregnant women's exposure to the phthalates DBP and DEHP has been associated with a shortened distance between the anus and genitals in their male babies, indicating a feminization had occurred during prenatal genital development.^{[15],[16]} Shorter ano-genital distance is characteristic of female sex in both humans and animals.^[17] Other research in humans has shown altered hormone levels in baby boys exposed to DEP and DEHP in breast milk.^[18]

Developmental and reproductive toxicity: The European Chemicals Agency classifies DEHP^[19] and DBP^[20] as reproductive toxicants. Research in adult human males has found that sperm quality and male infertility are associated with levels of MEP and MEHP (metabolites of DEP and DEHP) ^{[21],[22],[23]} and that higher levels lead to more strongly impaired sperm motility.^[24] Exposure to phthalates, especially DBP and DEHP, can reduce fetal testosterone production, and these anti-androgenic effects may alter fetal cell differentiation and function, leading to altered male genital development.^{[25],[26],[27]}

The female reproductive system may be less sensitive to phthalate exposure than the male reproductive system,^[28] although a few studies have found female reproductive effects. Female laboratory rats chronically exposed to DBP and other phthalates showed altered sex hormones and increased likelihood of fetal loss.^[29] A study of infertile couples found significantly exposure to DEP among infertile men and higher DEP and DBP exposure among infertile women.^[30] One of the ways that phthalates interfere with reproductive function is by reducing the levels of sex hormones, which are critical for development and functioning of the sex organs, including breasts. ^{[31],[32],[33]}

Cancer: The National Toxicology Program and U.S. Environmental Protection Agency report that DEHP is reasonably to be anticipated to be a human carcinogen based on sufficient evidence of carcinogenicity of animal studies.^{[34],[35]} DBP has been shown to cause proliferation of breast tumor cells and to make anti-estrogen treatments, such as tamoxifen, less effective against tumors.^{[36],[37]} Both DEHP and DBP appear to have weak estrogenic effects.^{[38],[39]} The National Institute of Occupational Safety and Health demonstrates that DEHP can cause liver tumors in animals.^[40]

Vulnerable Populations

[Pregnant Women \(https://www.safecosmetics.org/population/pregnant-women/\)](https://www.safecosmetics.org/population/pregnant-women/),
[Teenagers \(https://www.safecosmetics.org/population/teenagers/\)](https://www.safecosmetics.org/population/teenagers/), [Women of Color \(https://www.safecosmetics.org/population/women-of-color/\)](https://www.safecosmetics.org/population/women-of-color/), [Workers \(https://www.safecosmetics.org/population/workers/\)](https://www.safecosmetics.org/population/workers/)

Regulations

DBP^[1] and DEHP^[2] are banned in cosmetics sold in the EU.

How to Avoid?

Read the labels on nail products, and choose options that do not contain DBP. Some nail product labels indicate they are “phthalate-free.” Products that list “fragrance” on the label should be avoided to prevent possible exposure to phthalates.

Explore other Chemicals

[Preservatives \(https://www.safecosmetics.org/chemicals/preservatives/\)](https://www.safecosmetics.org/chemicals/preservatives/)

[P-Phenylenediamine \(https://www.safecosmetics.org/chemicals/p-phenylenediamine/\)](https://www.safecosmetics.org/chemicals/p-phenylenediamine/)

[Toluene \(https://www.safecosmetics.org/chemicals/toluene/\)](https://www.safecosmetics.org/chemicals/toluene/)

[Ethoxylated Ingredients \(https://www.safecosmetics.org/chemicals/ethoxylated-ingredients/\)](https://www.safecosmetics.org/chemicals/ethoxylated-ingredients/)

[Resorcinol \(https://www.safecosmetics.org/chemicals/resorcinol/\)](https://www.safecosmetics.org/chemicals/resorcinol/)

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References

- [1] European Chemicals Agency (ECHA). Dibutyl phthalates. Available online: <https://echa.europa.eu/substance-information/-/substanceinfo/100.001.416> (<https://echa.europa.eu/substance-information/-/substanceinfo/100.001.416>). Accessed April 21, 2022.
- [2] European Chemicals Agency (ECHA). Bis(2-ethylhexyl) phthalate. Available online: <https://echa.europa.eu/substance-information/-/substanceinfo/100.003.829> (<https://echa.europa.eu/substance-information/-/substanceinfo/100.003.829>). Accessed April 21, 2022.
- [3] European Chemicals Agency (ECHA). Dibutyl phthalates. Available online: <https://echa.europa.eu/substance-information/-/substanceinfo/100.001.416> (<https://echa.europa.eu/substance-information/-/substanceinfo/100.001.416>). Accessed April 21, 2022.
- [4] Byrdie. 14 '5 free' nail polish brands. Available online: <https://www.byrdie.com/free-nail-polish-14-brands-worth-your-money-346730> (<https://www.byrdie.com/free-nail-polish-14-brands-worth-your-money-346730>). Accessed April 21, 2022.
- [5] Malkan, S. Not Just a Pretty Face: The Ugly Side of the Beauty Industry. Gabriola, BC, Canada: New Society Publishers, pp. 18-19. 2007.
- [6] Houlihan J, Brody C, Schwan B (2002). Not Too Pretty: Phthalates, Beauty Products and the FDA. Available online: https://static.ewg.org/reports/2002/NotTooPretty.pdf?_ga=2.79541012.1878150350.1597799880-1583975922.1597799880 (https://static.ewg.org/reports/2002/NotTooPretty.pdf?_ga=2.79541012.1878150350.1597799880-1583975922.1597799880). Accessed April 21, 2022.
- [7] Archer L, Brody C, Malkan S, Sarantis H (2008). A Little Prettier. Available online: <http://www.safecosmetics.org/wp-content/uploads/2015/02/A-Little-Prettier.pdf> (<http://www.safecosmetics.org/wp-content/uploads/2015/02/A-Little-Prettier.pdf>). Accessed April 21, 2022.
- [8] Manori JS, et al., Urinary levels of seven phthalate metabolites in a human reference population. Environmental Health Perspectives, vol. 112, no. 3, pp 331-338, 2002. Available online: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1241863/pdf/ehp0112-000331.pdf> (<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1241863/pdf/ehp0112-000331.pdf>). Accessed April 21, 2022.
- [9] Manori JS, et al., Urinary levels of seven phthalate metabolites in a human reference population. Environmental Health Perspectives, vol. 112, no. 3, pp 331-338, 2002. Available online: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1241863/pdf/ehp0112-000331.pdf> (<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1241863/pdf/ehp0112-000331.pdf>). Accessed April 21, 2022.
- [10] Centers for Disease Control and Prevention (CDC). Fourth national report on human exposure to environmental chemicals, 2013. https://www.cdc.gov/exposurereport/pdf/FourthReport_UpdatedTables_Sep2013.pdf (https://www.cdc.gov/exposurereport/pdf/FourthReport_UpdatedTables_Sep2013.pdf). Accessed April 21, 2022.
- [11] European Commission. List of 146 substances with endocrine disruption classifications prepared in the expert meeting. Available online: http://ec.europa.eu/environment/archives/docum/pdf/bkh_annex_13.pdf (http://ec.europa.eu/environment/archives/docum/pdf/bkh_annex_13.pdf). Accessed April 21, 2022.
- [12] The Endocrine Disruption Exchange (TEDX). Diethyl phthalate. Available online: <http://endocrinedisruption.org/popup-chemical-details?chemid=527> (<http://endocrinedisruption.org/popup-chemical-details?chemid=527>). Accessed April 21, 2022.

- [13] The Endocrine Disruption Exchange (TEDX). Di(2-ethylhexyl) phthalate. Available online: <http://endocrinedisruption.org/popup-chemical-details?chemid=505> (<http://endocrinedisruption.org/popup-chemical-details?chemid=505>). Accessed April 21, 2022.
- [14] The Endocrine Disruption Exchange (TEDX). Dibutyl phthalate. Available online: <http://endocrinedisruption.org/popup-chemical-details?chemid=510> (<http://endocrinedisruption.org/popup-chemical-details?chemid=510>). Accessed April 21, 2022.
- [15] Swan SH, et al., Decrease in Anogenital Distance among Male Infants with Prenatal Phthalate Exposure. *Environmental Health Perspectives*, vol. 113, pp 1056-1061, 2005. Available online: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1280349/pdf/ehp0113-001056.pdf> (<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1280349/pdf/ehp0113-001056.pdf>). Accessed April 21, 2022.
- [16] Breast Cancer Prevention Partners Glossary of Exposures: <https://www.bcpp.org/resource/phthalates/> (<https://www.bcpp.org/resource/phthalates/>). Accessed April 21, 2022.
- [17] Swan SH, et al., Decrease in Anogenital Distance among Male Infants with Prenatal Phthalate Exposure. *Environmental Health Perspectives*, vol. 113, pp 1056-1061, 2005. Available online: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1280349/pdf/ehp0113-001056.pdf> (<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1280349/pdf/ehp0113-001056.pdf>). Accessed April 21, 2022.
- [18] Main KM, et al., Human breast milk contamination with phthalates and alterations of endogenous reproductive hormones in infants three months of age. *Environmental Health Perspectives*, vol. 114, pp 270-276, 2006. Available online: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1367843/pdf/ehp0114-000270.pdf> (<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1367843/pdf/ehp0114-000270.pdf>). Accessed April 21, 2022.
- [19] European Chemicals Agency (ECHA). Candidate list of substances of very high concern for authorization: DEHP. Available online: <http://echa.europa.eu/web/guest/candidate-list-table> (<http://echa.europa.eu/web/guest/candidate-list-table>). Accessed April 21, 2022.
- [20] European Chemicals Agency (ECHA). Candidate list of substances of very high concern for authorization: DBP. Available online: <http://echa.europa.eu/web/guest/candidate-list-table> (<http://echa.europa.eu/web/guest/candidate-list-table>). Accessed April 21, 2022.
- [21] Hauser R, et al., DNA damage in human sperm is related to urinary levels of phthalate monoester and oxidative metabolites. *Human Reproduction*, vol. 22, pp 688-695, 2007. Available online: <http://humrep.oxfordjournals.org/content/22/3/688.full.pdf+html> (<http://humrep.oxfordjournals.org/content/22/3/688.full.pdf+html>). Accessed April 21, 2022.
- [22] Jurewicz J. & Hanke W., Exposure to phthalates: reproductive outcome and children health. A review of epidemiological studies. *International Journal of Occupational Medicine and Environmental Health*, vol. 24, no. 2, pp 115-41, 2011. Available online: <http://www.ncbi.nlm.nih.gov/pubmed/21594692> (<http://www.ncbi.nlm.nih.gov/pubmed/21594692>). Accessed April 21, 2022.
- [23] Kamrin MA., Phthalate risks, phthalate regulation, and public health: a review. *Journal of Toxicology and Environmental Health, Part B: Critical Reviews*, vol. 12, pp 157-74, 2009. Abstract online: <http://www.ncbi.nlm.nih.gov/pubmed/19235623> (<http://www.ncbi.nlm.nih.gov/pubmed/19235623>). Accessed April 21, 2022.
- [24] Pant N., et al., Environmental and experimental exposure of phthalate esters: The toxicological consequence on human sperm. *Human and Experimental Toxicology*, vol. 30, no. 6, pp 507-14, 2010. Abstract Available Online: <http://www.ncbi.nlm.nih.gov/pubmed/20551087> (<http://www.ncbi.nlm.nih.gov/pubmed/20551087>). Accessed April 21, 2022.

- [25] Swan SH, et al., Decrease in Anogenital Distance among Male Infants with Prenatal Phthalate Exposure. *Environmental Health Perspectives*, vol. 113, pp 1056–1061, 2005. Available online: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1280349/> (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1280349/>). Accessed April 21, 2022.
- [26] Main KM, et al., Human breast milk contamination with phthalates and alterations of endogenous reproductive hormones in infants three months of age. *Environmental Health Perspectives*, vol. 114, pp 270–276, 2006. Available online: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1367843/pdf/ehp0114-000270.pdf> (<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1367843/pdf/ehp0114-000270.pdf>). Accessed April 21, 2022.
- [27] Swan SH., Environmental phthalate exposure in relation to reproductive outcomes and other health endpoints in human. *Environmental Research*, vol. 108, pp 177–84, 2008. Available online: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1280349/pdf/ehp0113-001056.pdf> (<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1280349/pdf/ehp0113-001056.pdf>). Accessed April 21, 2022.
- [28] Gray LE, et al., Chronic di-n-butyl phthalate exposure in rats reduces fertility and alters ovarian function during pregnancy in female Long Evans hooded rats. *Toxicological Science*, vol. 93, no. 1, pp 189–95, 2006. Available online: <http://toxsci.oxfordjournals.org/content/93/1/189.full.pdf+html> (<http://toxsci.oxfordjournals.org/content/93/1/189.full.pdf+html>). Accessed April 21, 2022.
- [29] Gray LE, et al., Chronic di-n-butyl phthalate exposure in reats reduces fertility and alters ovarian function during pregnancy in female Long Evans hooded rats. *Toxicological Science*, vol. 93, no. 1, pp 189–95, 2006. Available online: <http://toxsci.oxfordjournals.org/content/93/1/189.full.pdf+html> (<http://toxsci.oxfordjournals.org/content/93/1/189.full.pdf+html>). Accessed April 21, 2022.
- [30] Tranfo G., et al., Urinary phthalate monoesters concentration in couples with infertility problems. *Toxicology Letters*, vol. 213, pp 15–20, 2012. Abstract Available online: <http://www.ncbi.nlm.nih.gov/pubmed/22197707> (<http://www.ncbi.nlm.nih.gov/pubmed/22197707>). Accessed April 21, 2022.
- [31] Jurewicz J. & Hanke W., Exposure to phthalates: reproductive outcome and children health. A review of epidemiological studies. *International Journal of Occupational Medicine and Environmental Health*, vol. 24, no. 2, pp 115–41, 2011. Available online: <http://www.ncbi.nlm.nih.gov/pubmed/21594692> (<http://www.ncbi.nlm.nih.gov/pubmed/21594692>). Accessed April 21, 2022.
- [32] Borch J, et al., Mechanisms underlying the anti-androgenic effects of diethylhexyl phthalate in fetal rat testis. *Toxicology*, vol. 223, pp 144–155, 2006. Abstract Available online: <http://www.ncbi.nlm.nih.gov/pubmed/16690193> (<http://www.ncbi.nlm.nih.gov/pubmed/16690193>). Accessed April 21, 2022.
- [33] Kang SC. & Lee BM., DNA methylation of estrogen receptor alpha gene by phthalates. *Journal of Toxicology and Environmental Health Part A*, vol. 68, pp 1995–2003, 2005. Abstract Available online: <http://www.ncbi.nlm.nih.gov/pubmed/16326419> (<http://www.ncbi.nlm.nih.gov/pubmed/16326419>). Accessed April 21, 2022.
- [34] National Toxicology Program. Reports on Carcinogens, twelfth edition, 2011: Di(2-ethylhexyl) phthalate Available online: <http://ntp.niehs.nih.gov/ntp/roc/twelfth/roc12.pdf> (<http://ntp.niehs.nih.gov/ntp/roc/twelfth/roc12.pdf>). Accessed April 21, 2022.
- [35] U.S. Environmental Protection Agency. IRIS: Di(e-ethylhexyl) phthalate (DEHP). Available online: https://cfpub.epa.gov/ncea/iris2/chemicalLanding.cfm?substance_nmbr=14 (https://cfpub.epa.gov/ncea/iris2/chemicalLanding.cfm?substance_nmbr=14). Accessed April 21, 2022.
- [36] Kim IY, Han SY, Moon A. Phthalates inhibit tamoxifen-induced apoptosis in MCF-7 human breast cancer cells. *Journal of Toxicology and Environmental Health*, vol. 67, pp 2025–2035, 2004. Abstract Available online: <http://www.ncbi.nlm.nih.gov/pubmed/15513900> (<http://www.ncbi.nlm.nih.gov/pubmed/15513900>). Accessed April 21, 2022.

[37] Alam MS., et al., Induction of spermatogenic cell apoptosis in prepubertal rat testes irrespective of testicular steroidogenesis: a possible estrogenic effect of di(n-butyl) phthalate. Society of Reproduction and Fertility, vol. 139, pp 427-37, 2010. Available online: <http://www.reproduction-online.org/content/139/2/427.full.pdf+html> (<http://www.reproduction-online.org/content/139/2/427.full.pdf+html>). Accessed April 21, 2022.

[38] Jobling S, Reynolds T, White R, Parker MG, Sumpter JP (1995). A variety of environmentally persistent chemicals, including some phthalate plasticizers, are weakly estrogenic. Environmental Health Perspectives 103(6):582-7. Available online: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1519124/pdf/envhper00355-0058.pdf> (<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1519124/pdf/envhper00355-0058.pdf>). Accessed April 21, 2022.

[39] Chen FP. & Chien MH., Lower concentrations of phthalates induce proliferation in human breast cancer cells. Climacteric, vol. 17, no. 4, pp 377-84, 2014. <https://pubmed.ncbi.nlm.nih.gov/24228746/> (<https://pubmed.ncbi.nlm.nih.gov/24228746/>). Accessed April 21, 2022.

[40] Centers for Disease Control and Prevention. NIOSH pocket guide to chemical hazards: naphtha (coal tar). Available online: <https://www.cdc.gov/niosh/npg/npgd0438.html>. (<https://www.cdc.gov/niosh/npg/npgd0438.html>). Accessed April 21, 2022.

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