



for a toxics-free future



COUNTRY SITUATION REPORT: PHTHALATES AND BISPHENOLS IN MALAYSIA

Prepared by

Consumers' Association of Penang

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COUNTRY SITUATION REPORT:
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1.0 Background

The Consumers' Association of Penang (CAP) is a grassroots non-profit, civil society organisation based in Malaysia established in 1970 to promote critical awareness and action among consumers in order to uphold their rights and interests. CAP is dedicated to helping people become more responsible consumers and to protecting them from abuse and malpractices in the market place – exposing unethical business behaviour, such as hazards in products and food and pharmaceuticals. We focus on encouraging sustainable and ethical consumption and challenge lifestyles and practices that are unsustainable, unethical, inequitable and environmentally destructive.

The issue on phthalates and bisphenols, both groups are known endocrine disruptors, was undertaken by CAP in 1998 when we first conducted our campaign on Endocrine Disrupting Chemicals (EDCs). Output of the campaign included a booklet on EDCs and its effects on humans and animals.

Since the 1930s, Bisphenol A (BPA) was shown to affect hormonal balance and have been linked to problems with reproduction, cancer, obesity and behavioural changes. However almost a hundred years later, there are no global controls which means that production and use continue to increase. Similarly, phthalates are associated with a wide range of health consequences including impacts on reproduction, obesity, and disturbances of testosterone and estrogen levels.

Bisphenols and phthalates are not considered persistent organic pollutants (POPs) and are also not regulated globally and continues to be produced in large volumes annually. Therefore, bisphenols and phthalates are now found everywhere, including in rainwater, in blood and in breastmilk.

Over the years, through the efforts of the International Pollutants Elimination Network (IPEN) and its participating organisations, CAP has been able to test products such as toys, baby feeding bottles, water bottles, erasers, thermal papers, cosmetics and personal care products for the presence and the amount of phthalates and bisphenols in these products. These findings were used for policy advocacy and awareness raising.

While there are no global regulations for bisphenols and phthalates, there are some national and regional controls such as in Malaysia. Often these regulations are, however, limited to one or a few of the chemicals within the group, which means that other chemicals in the same chemical group are used instead. The regulations in Malaysia are also limited to a small range of applications or products. Moreover, there is little to no transparency of where they are used so consumers have no way of avoiding these toxic groups of chemicals.

In summary, Malaysia has formulated and implemented regulations to curb the use of phthalates and bisphenols in certain products, but enforcement and compliance are ongoing challenges.

2.0 Research methodology

The research methodology was largely secondary research. It involved reviewing existing publicly available data such as academic articles, government reports, synopsis of market studies and other online resources. We prioritized government reports, peer-reviewed journals, our past research on the issue and joint research projects with IPEN and Wonjin Institute for Occupational and Environmental Health of South Korea.

3.0 Plastic production and use in Malaysia

The plastic industry in Malaysia is a key manufacturing sector that supports domestic needs and export markets. The plastics industry is a source of parts and components for Malaysia's downstream manufacturing sectors such as electrical and electronics, automotive, and food packaging. Malaysia has a large and growing plastic recycling industry¹, driven by its significant plastic manufacturing sector and a surge in imported plastic waste following China's ban from January 2018.

From January to November 2018, Malaysia was the number one destination for plastic waste, receiving 15.7% of the total plastic exports from the top exporting countries. The United States of America, followed by Japan and the United Kingdom were the top exporters² of plastic waste to Malaysia in 2018.

In 2023, the plastics manufacturing industry recorded³ a turnover of USD13.1 billion, of which USD3.4 billion was for direct export. The four largest market segments² served by this industry are packaging (45%), electrical and electronics (28%), automotive (12%), and construction (6%). Malaysia produces² a wide range of plastic packaging products, ranging from rigid (e.g., bottles, containers, etc.) to flexible (e.g., plastic bags, shrink wrap, etc.) for both commercial and industrial use.⁴

Malaysia's imports of plastics and related products in 2023 reached USD8.479 billion⁵. China was a major source, with Malaysia importing USD2.189 billion worth of plastics from China, accounting for 25.81% of the total imports for the year. In 2023, Malaysia's exports of plastics and related products amounted to USD9.032 billion. China, Singapore, and Indonesia were the main

¹ Malaysian Investment Development Authority. *Plastic Recycling: Malaysia's Perspective*
<https://www.mida.gov.my/de/plastic-recycling-malaysias-perspective/>

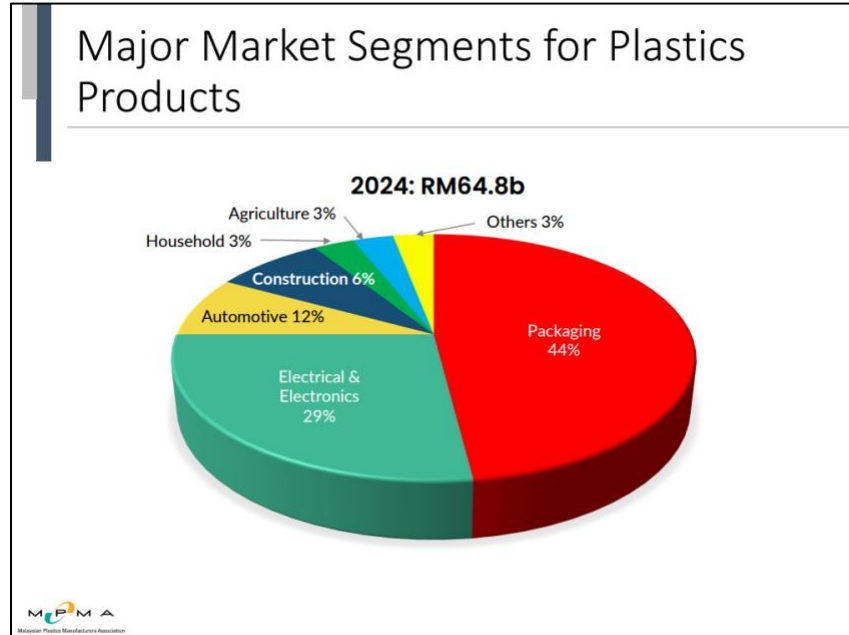
² Greenpeace Malaysia. (2018). *The Recycling Myth: Malaysia and the broken global recycling system*. Greenpeace Malaysia. https://www.greenpeace.de/publikationen/2018_1127_Greenpeace_Report-the_recycling_myth-malaysia.pdf

³ International Trade Administration. (2024, March 25). *Malaysia plastics industry*. U.S. Department of Commerce. <https://www.trade.gov/market-intelligence/malaysia-plastics-industry>

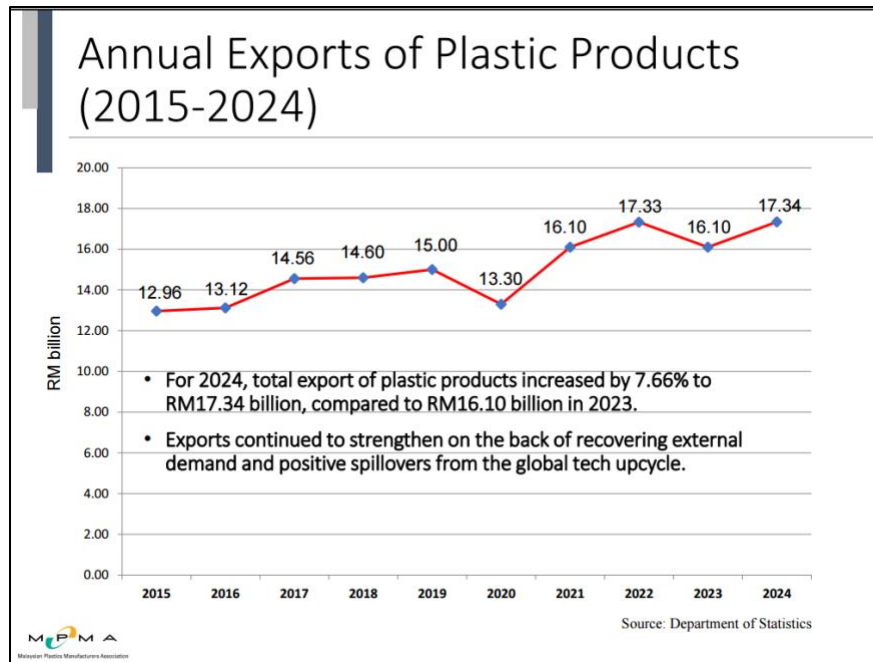
⁴ March 2024. Malaysia Plastics Industry. <https://www.trade.gov/market-intelligence/malaysia-plastics-industry>. International Trade Administration. Accessed on 25 October 2025.

⁵ China Research & Intelligence. (2024). Malaysia plastic industry research report 2024–2033 (Report No. 5983631). Research and Markets. <https://www.researchandmarkets.com/reports/5983631/malaysia-plastic-industry-research-report>

export markets, with exports to China reaching USD2.168 billion, representing about 24% of the total.⁶



Major Market Segments for Plastic Products in Malaysia for 2024
Source: Malaysian Plastic Manufacturers Association



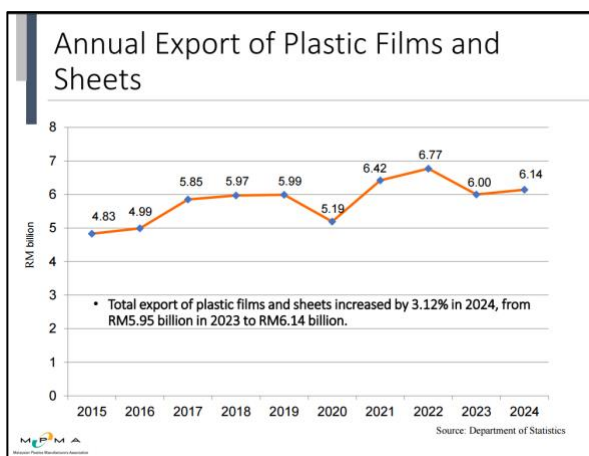
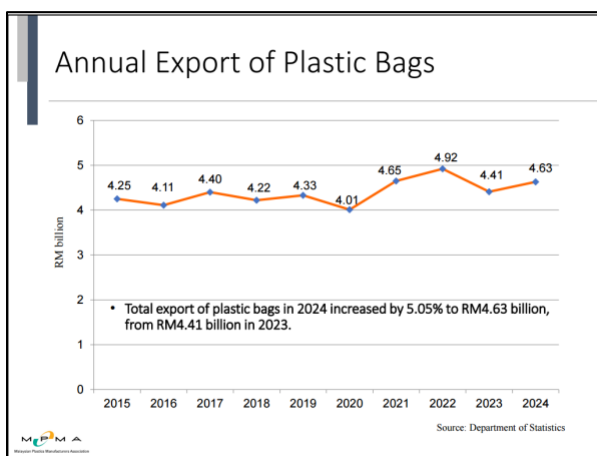
Annual Export of Plastic Products from Malaysia (2015-2024)
Source: Department of Statistics, Malaysia

⁶ July 2024. Malaysia Plastic Industry Research Report 2024-2033. <https://www.researchandmarkets.com/reports/5983631/malaysia-plastic-industry-research-report>. China Research & Intelligence. Accessed on 25 October 2025.

Established producers of plastic resins in Malaysia include LOTTE Chemical Titan, PETRONAS Chemicals Group (PCG), Kaneka, and Toray. These companies focus largely on commodity plastics (around 4 million tonnes per annum) such as polypropylene and polyethylene, as well as certain niche products within engineering plastics such as acrylonitrile butadiene styrene (ABS) and high-performance plastics such as polyphenylene sulfide (PPS).⁷

The Malaysian Plastic Manufacturers Association (MPMA) reported that overall, Malaysia's plastics industry performed well in 2024. The plastics industry⁸ experienced a 5.4% increase in sales turnover, from RM61.4 billion in 2023 to RM64.8 billion in 2024, and an 8% rise in exports, reaching RM17.34 billion, supported by demand from electronics, automotive, and packaging sectors. Among the key challenges impacting the industry are cheap plastic imports from China, anticipated increase in operating costs and global uncertainty.⁹

Sustainability challenges⁷ cited by the MPMA comprise of regulations and enforcement measures by the Malaysian government which includes possible bans of single-use plastics; restrictions and bans on importation of plastic scraps for the recycling sector, e.g., the EU Waste Shipments Regulation; uncertainties surrounding Global Plastic Treaty negotiation, e.g., plastic production cut, phase out and elimination of chemicals of concern and problematic and unnecessary plastic products, compliance to standards, etc.; the upcoming Extended Producer Responsibility (EPR) law and the Plastic Act.



*Annual export of plastic bags, plastic films and sheets from Malaysia (2015 – 2024)
Source: Department of Statistics, Malaysia cited by MPMA*

⁷ April 2024. Malaysia Petrochemical Country Report 2023. <https://mpa.org.my/images/MPA-APIC-2024-Country-Rpt-rev-final-May.pdf>. Malaysian Petrochemicals Association. Accessed on 25 October 2025.

⁸ Malaysian Plastics Manufacturers Association. (2025). *Outlook of the Malaysian plastics industry: MPMA Roadshow 2025* (Roadshow Report). https://mpma.org.my/upload/2025/Roadshow_2025.pdf

⁹ 2025. Outlook of the Malaysian Plastic Industry. https://mpma.org.my/upload/2025/Roadshow_2025.pdf Malaysian Plastic Manufacturers Association. Accessed on 25 October 2025.

3.1 Phthalates and bisphenols production and trade in Malaysia

Phthalates and bisphenols are two large groups of plastic chemicals. There are several types of phthalates on the market. Some phthalates are used in non-plastic applications such as personal care products, others are mainly used as plasticizers to produce PVC-plastics, or in inks and adhesives. Bisphenols are used in a wide range of plastics including polycarbonate, epoxy, PVC and PET and is found in baby bottles, food packaging, medical equipment, toys and many other products.

It was not possible to obtain data for the amount of phthalates and bisphenols produced in Malaysia, imported and exported as the figures available from the *Malaysia Plastics Market Report*, has to be purchased at a high price. The trade data is available in UN Comtrade Database but has to be purchased for the specific chemicals. One market report¹⁰ states that the market size for phthalates and bisphenol A in Malaysia for 2024 was USD 23.5 billion and it is forecasted to increase to USD 35.2 billion in 2033. The trade data is available in UN Comtrade Database but has to be purchased for the specific chemicals.

Di(2-ethylhexyl) Phthalate (DEHP) dominates the market due to its widespread use in the production of flexible PVC products such as cables, flooring, and medical devices. Diisononyl Phthalate (DINP) is largely used for automotive parts and flooring whilst Diisodecyl Phthalate (DIDP) is used in the manufacturing of synthetic leather and. Di-n-butyl Phthalate (DBP) is often found in products like adhesives and coatings.¹¹ The other phthalates reported¹⁰ to be seen in Malaysian market include Di(2-Propylheptyl) Phthalate (DPHP), Di-isobutyl phthalate (DIUP), and Ditridecyl phthalate (DTDP).

4.0 Regulatory controls on phthalates and bisphenols in Malaysia

Malaysia has implemented regulations to curb the use of phthalates and bisphenols in certain products, but enforcement and ensuring compliance are ongoing challenges.

4.1 Toys

Malaysia amended its consumer protection law on toys which came into effect in 2018, to incorporate 13 international safety standards. The Consumer Protection (Safety Standards for Toys) (Amendment) Regulations 2016¹² lists ISO 8124-6 Safety of toys – Part 6: Certain phthalate esters in toys and children’s product to be complied with. The ISO 8124-6¹³ specifies the method for the determination of specific phthalates (DIBP, DBP, BBP, DEHP, DNOP, DINP, and DIDP) in various materials in toys and children's products.

¹⁰ Verified Market Reports (2025, November 24). *Malaysia phthalates and bisphenol A market size 2026 | AI trends, growth drivers & players 2033*. LinkedIn. <https://www.linkedin.com/pulse/malaysia-phthalates-bisphenol-market-size-2026-ai-xotlc/>

¹¹ Malaysia High Phthalate Plasticizers Market By Type | Trends, Size and Forecast 2033. <https://www.marketsizeand trends.com/report/high-phthalate-plasticizers-market/>

¹² Malaysia. (2016). *Consumer Protection (Safety Standards for Toys) (Amendment) Regulations 2016* [P.U. (A) 257]. Attorney General’s Chambers. <https://tinyurl.com/2n6u9xuf>

¹³ International Organization for Standardization. (2023). *ISO 8124-6:2023: Safety of toys — Part 6: Certain phthalate esters*. <https://www.iso.org/standard/79700.html>

All toys in the Malaysian market will need to be tested for the presence of selected chemicals including phthalate and heavy metals, especially involving oral contact toys. Along with this, a Mark of Conformity (MC) for toys labeling scheme was introduced through the Consumer Protection (Certificate of Conformance and Conformity Mark of Safety Standards) Regulations 2010¹⁴ and subsequent amendments¹⁵, which requires all plastic toys to be affixed with an MC mark, manufacturer name, address, and name of distributor to indicate that the purchased toys conformed to prescribed safety standards. However, we face inadequate enforcement. Despite these regulations, there is a lack of awareness among consumers, and findings¹⁶ by researchers of non-compliant toys in the market indicate the need for more stringent monitoring and enforcement.

4.2 Cosmetics

Phthalates have been a concern in cosmetic products globally. In Malaysia, the Guidelines¹⁷ for Control of Cosmetic Products, which content is adapted from the ASEAN Cosmetic Directive (ACD) prohibits several phthalates. There are three phthalates, diisobutyl phthalate (DBP), benzyl butyl phthalate (BBP), and diethylhexyl phthalate (DEHP) which are prohibited¹⁸ for use in cosmetic products in ASEAN. Other phthalates listed in Annex II (list of substances which must not form part of the composition of cosmetic products) of the ACD are bis(2-Ethylhexyl) phthalate, bis(2-Methoxyethyl) phthalate, n-Pentyl-isopentylphthalate [2], di-n-Pentyl phthalate [3], Diisopentylphthalate [4], Dihexyl phthalate, and Dicyclohexyl phthalate.

The National Pharmaceutical Regulatory Agency (NPR A)¹⁹ regulates cosmetic products under the Control of Drugs and Cosmetic Regulations 1984²⁰. Diethyl phthalate (DEP) and dimethyl phthalate (DMP) that are most commonly used in cosmetic products like fragrances and nail polish are permitted¹⁷ in Malaysia as per the Asean Cosmetic Directive.

¹⁴ Malaysia. (n.d.). *Consumer Protection (Certificate of Conformance and Conformity Mark of Safety Standards) Regulations [P.U. (A) 253]*. Attorney General's Chambers. <https://mysafe.kpdn.gov.my/img/portal/consumer-safety/P.U253BI.pdf>

¹⁵ Malaysia. (2016). *Consumer Protection (Certificate of Conformance and Conformity Mark of Safety Standards) (Amendment) Regulations 2016 [P.U. (A) 252]*. Attorney General's Chambers. [https://mysafe.kpdn.gov.my/img/portal/consumer-safety/P_U_%20\(A\)%20252%20-%20Consumer%20Protection%20\(Certificate%20of%20Conformance%20and%20Conformity%20Mark%20of%20Safety%20Standards\)%20\(Amendment\)%20Regulations%202016.pdf](https://mysafe.kpdn.gov.my/img/portal/consumer-safety/P_U_%20(A)%20252%20-%20Consumer%20Protection%20(Certificate%20of%20Conformance%20and%20Conformity%20Mark%20of%20Safety%20Standards)%20(Amendment)%20Regulations%202016.pdf)

¹⁶ Praveena, S. M., Chin, S. F., & Amaruddin, A. F. (2021). *Phthalates in children toys available in Malaysian market: Quantification and potential human health risk*. *Journal of Steroid Biochemistry and Molecular Biology*, 213, Article 105955. <https://doi.org/10.1016/j.jsbmb.2021.105955>

¹⁷ Malaysia. (2022). *Guidelines for control of cosmetic products in Malaysia* (Second Edition, August 1, 2022). National Pharmaceutical Regulatory Agency, Ministry of Health Malaysia.

https://www.npra.gov.my/images/Guidelines_Central/Guidelines_on_Cosmetic/GUIDELINES_FOR_CONTROL_OF_COSMETIC_PRODUCTS_IN_MALAYSIA.pdf

¹⁸ Association of Southeast Asian Nations. (2014). *ASEAN consumer information handbook on cosmetic products*. ASEAN Secretariat. <https://asean.org/wp-content/uploads/2021/01/ASEAN-Consumer-Information-Handbook-on-Cosmetic-Products-1.pdf>

¹⁹ National Pharmaceutical Regulatory Agency. (n.d.). *NPR A official website*. Ministry of Health Malaysia. <https://www.npra.gov.my/index.php/en/>

²⁰ Malaysia. (1984). *Control of Drugs and Cosmetics Regulations 1984 [P.U. (A) 223/1984]*. Ministry of Health Malaysia. <https://pharmacy.moh.gov.my/sites/default/files/document-upload/control-drugs-and-cosmetics-regulation-1984.pdf>

4.3 Excipients in human medicinal products

In accordance with the *Guidelines on the use of phthalates as excipients in human medicinal products* issued by the European Medicines Agency on 20 November 2014, the National Pharmaceutical Regulatory Bureau decided on maximum limit of daily exposures. The Drug Registration Guidance Document²¹ issued²² by the Director of Pharmaceutical Services, Ministry of Health Malaysia imposes maximum limit of daily exposure (mg/kg body weight/day) of 0.01 mg/kg/day Dibutyl Phthalate (DBP), 4 mg/kg/day Diethyl Phthalate (DEP) and 2 mg/kg/day Polyvinyl Acetate Phthalate (PVAP), as described in the Table below.

8.2.2 List of restricted excipients

Excipient	Restriction	
(a) Phthalates	Variant	Maximum Limit of Daily Exposures (mg/kg body weight/day)
	Dibutyl Phthalate (DBP)	0.01mg/kg/day
	Diethyl Phthalate (DEP)	4mg/kg/day
	Polyvinyl Acetate Phthalate (PVAP)	2mg/kg/day

Source: National Pharmaceutical Regulatory Division, Ministry of Health Malaysia. Second Edition, September 2016. Revised July 2018

4.4 Food packaging

According to Section 27 of the Food Regulation 1985²³ it is stated that “No person shall import, manufacture, advertise for sale or sell, or use or cause or permit to be used in the preparation, packaging, storage, delivery or exposure of food for sale, any package, appliance, container or vessel which yields or could yield to its contents, any toxic, injurious or tainting substance.” While regulations prohibit harmful packaging, concerns remain about phthalates entering the food chain, as phthalates can leach into food from plastics used in packaging.

4.5 Prohibition of BPA in feeding bottles

According to Section 27A²² of the Food Regulation 1985 it stated that “No person shall import, manufacture or advertise for sale or sell any feeding bottles containing Bisphenol A (BPA). The

²¹ Malaysia. (2025). *Drug Registration Guidance Document (DRGD), Third Edition, Tenth Revision (July 2025)*. National Pharmaceutical Regulatory Agency, Ministry of Health Malaysia. <https://www.npra.gov.my/easyarticles/images/users/1153/DRGD%20July%202025/Complete-Drug-Registration-Guidance-Docment-DRGD-3rd-Edition-10th-Revision-July-2025.pdf>

²² National Pharmaceutical Regulatory Agency. (n.d.). *Drug Registration Guidance Document (DRGD)*. Ministry of Health Malaysia. <https://www.npra.gov.my/index.php/en/component/sppagebuilder/925-drug-registration-guidance-document-drgd.html>

²³ Malaysia. (2014). *Food Regulations 1985* [P.U. (A) 437/85] (updated as at 01 January 2014). Federal Government Gazette. https://importlicensing.wto.org/sites/default/files/members/91/Regulation%20No.437%20-%20Food%201985_01.01.2014.pdf

words —BPA free may be labelled on the feeding bottles or on the packages of the feeding bottles which do not contain Bisphenol A (BPA).” This prohibition came into force in March 2012.

4.6 Prohibition of BPA in cosmetics

Annex II²⁴ of the Asean Cosmetics Directive, which Malaysia is aligned with, lists Bisphenol A (4,4'-Isopropylidenediphenol) as substance which must not form part of the composition of cosmetic products.

5.0 **Transparency and traceability of chemicals in plastics**

Malaysia does not have regulations for chemical transparency and traceability in plastics. The government is considering developing a National Priority Chemical List. The Department of Environment has established Malaysia Environmentally Hazardous Substances (MyEHS)²⁵ System. However as of now phthalates and bisphenols are not in the list of chemicals registered.

The objectives of the MyEHS System are to ensure importers and manufactures notify the manufacturing and importation of EHS; to provide the necessary information on EHS; and to manage EHS in a safe and sound manner to protect human health and the environment. Based on the information submitted by industry, the DOE will establish the Malaysian EHS Reference List, which contains information about the identity of substances that have been notified to DOE, their uses in Malaysia, their hazard classification and the accumulated amounts placed on the market in Malaysia. The information in this system will be available to the public.

6.0 **Studies on phthalates and bisphenols in Malaysia**

There have been several studies on phthalates and bisphenols in Malaysia. Following are findings of the studies.

- (i) A study aimed to assess the levels of phthalates (bis-[2-ethylhexyl] phthalate [DEHP], diethyl phthalate [DEP], diisobutyl phthalate [DiBP] and dibutyl phthalate [DBP]) in inexpensive toys sold at local markets in Kuala Lumpur by researchers from University Putra Malaysia found all 30 toys analysed exceeded the European Union limit (0.1 % by mass) indicating that the phthalate used as plasticizers is still prominent in toys. Bis-[2-ethylhexyl] phthalate (DEHP) was the highest detected phthalate in toy sample which was manufactured in Malaysia and sold without Malaysian Conformity Mark.²⁶

²⁴ Association of Southeast Asian Nations. (2022). *Annexes of the ASEAN Cosmetic Directive* (Version No. 2022-1, 22 June 2022). Health Sciences Authority (HSA) Singapore. [https://www.hsa.gov.sg/docs/default-source/hprg-cosmetics/annexes-of-the-asean-cosmetic-directive-\(updated-jun22\).pdf](https://www.hsa.gov.sg/docs/default-source/hprg-cosmetics/annexes-of-the-asean-cosmetic-directive-(updated-jun22).pdf)

²⁵ Malaysia Department of Environment. (n.d.). *MyEHS: Malaysia Environmentally Hazardous Substances System*. Ministry of Natural Resources, Environment and Climate Change. <https://myehs.doe.gov.my/>

²⁶ Sarva Mangala Praveena, Chin Siok Fong, Amira Farhana Amaruddin. Phthalates in children toys available in Malaysian market: Quantification and potential human health risk. *The Journal of Steroid Biochemistry and Molecular Biology*. Volume 213, 2021. <https://doi.org/10.1016/j.jsbmb.2021.105955>. (<https://www.sciencedirect.com/science/article/pii/S0960076021001485>)

- (ii) In 2021, a study carried out by CAP in collaboration with the International Pollutants Elimination Network (IPEN, detected Bisphenol A in all nine Malaysian samples of polycarbonate bottles tested. The amount of BPA detected in the Malaysian samples ranged from 0.3 - 5.8 ppb (parts per billion). One baby feeding bottle made in China and purchased in Malaysia, violated existing Malaysian legislation. According to the provision 27A of the Food Regulations 1985 such product shall not be imported to Malaysia or advertised for sale as it contained 2.6 ppb BPA. The bottle also had a misleading “BPA-free” label.²⁷
- (iii) CAP conducted a study with the assistance of the Wonjin Institute for Occupational and Environmental Health, with support from the Financial Industry Public Interest Foundation of South Korea, to test presence of bisphenols in thermal paper and phthalates in erasers. Out of 44 samples of thermal papers bought in Malaysia, 27 were found to contain Bisphenol A (BPA) and 13 samples contained Bisphenol S (BPS). In the study on erasers, out of 40 samples that were tested, phthalates were detected in 26 of them.²⁸
- (iv) In a study with IPEN, an analysis of recycled High-Density Polyethylene plastic pellets collected from a recycling plant in Penang found Bisphenol A (BPA), besides benzotriazole UV-stabilizers and brominated flame retardants. The presence of BPA indicates that polycarbonate plastics were probably used in the recycling process.²⁹
- (v) In a study to detect endocrine disrupting chemicals (EDCs) in Malaysia, liquid chromatography mass tandem spectrometry (LC-MS/MS) was utilised to analyse 18 EDCs from different food categories. Bisphenol was the most abundant EDC found, followed by PFAS and paraben. Bisphenol levels in canned foods, dairy products, canned drinks, fruits, and vegetables ranged from 1.16 to 183 ng/g. PFOS, PFBA, PFHQA and bisphenol A all had hazard quotients (HQ) above 1, indicating that they can pose a risk to human health.³⁰
- (vi) In a study for a dissertation, seven samples of loom bands were obtained from markets in Kepala Batas, Pulau Pinang to test for phthalates. Three out of seven samples were found to contain an acceptable level of benzyl butyl phthalate (BBP) and diethylhexyl phthalate (DEHP) at a percentage of 0.02 %. The concentration of BBP and DEHP were in the range of 0.15 - 0.2 µg/mL. An organic species, butylated hydroxytoluene, was detected in the sample. The presence of phthalate inside the samples with a low percentage was suspected due to the contamination process.³¹

²⁷ Straková, J., Grechko, V., Brosché, S., Karlsson, T., Buonsante, V. A call to action: free children from BPA’s toxic legacy. International Pollutants Elimination Network (IPEN), February 2022.

²⁸ CAP: Endocrine Disrupting Chemicals found in erasers and thermal papers. 26 April 2022.

<https://consumer.org.my/cap-endocrine-disrupting-chemicals-found-in-erasers-and-thermal-papers/>

²⁹ CAP: Toxic chemicals found in plastic pellets used for recycled plastics. 13 January 2022.

<https://consumer.org.my/cap-toxic-chemicals-found-in-plastic-pellets-used-for-recycled-plastics/>

³⁰ Mohamad Haron DE, Yoneda M, Ahmad ED, Aziz MY. PFAS, bisphenol, and paraben in Malaysian food and estimated dietary intake. *Food Addit Contam Part B Surveill.* 2023 Jun;16(2):161-175. doi: 10.1080/19393210.2023.2188611. Epub 2023 Mar 23. PMID: 36959529.

³¹ Nurul Hidayah Mat Duwi. Determination Of Phthalates In Selected Loom Bands Marketed In Kepala Batas. 2015-08. Universiti Sains Malaysia. <https://erepo.usm.my/items/c6566411-8294-4bb9-8647-f0a913dbf869>

- (vii) In Malaysia, rivers supply about 98% of the country's potable water. Most of these rivers receive industrial and urban wastewater or treated effluent. Several reports have stated that numerous organic pollutants such as BPA and pharmaceuticals aren't removed completely throughout the treatment process. Bisphenol A was investigated in both colloidal and soluble phases in the Bentong River water in Pahang. BPA concentrations ranged between 1.13 and 5.52 ng L⁻¹ in the soluble phase and n.d-2.06 ng L⁻¹ in the colloidal phase, respectively. BPA was dominant in the soluble phase; however, the colloidal contribution ranged between 0 and 24% which implied that colloids can play a significant role in controlling BPA's transportation in water. Urban and industrial areas were the main sources of BPA while forest areas displayed lower levels outside the populated domains.³²
- (viii) A study was conducted to investigate effects of storage conditions on release of Bisphenol A (BPA) from polycarbonate and polyethylene terephthalate (PET) bottled water. Results showed that BPA migrated from PC and PET water bottles at concentrations ranging from 9.13 to 257.67 ng/L and 11.53 ng/L to 269.87 ng/L respectively, below the limit set by EC Directive (600 ng/g). Concentrations of BPA were higher in PET bottled water compared to PC bottled water across all storage conditions. Higher storage temperature and longer storage duration increased BPA concentrations in PC and PET bottled water. Concentrations of BPA in bottled water which were kept in a car and were exposed to sunlight were higher than control samples which were stored indoor at room temperature.³³
- (ix) A study was conducted to assess ambient bisphenol A (BPA) levels in workplaces and urine levels of workers with the aim to establish a BPA database for different populations in Malaysia. BPA was detected in the median range of 8–28.3 ng/m³ and 2.4–3.59 ng/m³ for the five sampling points in the plastic molding factory and in the ambient air respectively. The median urinary BPA concentration was significantly higher in the workers (3.81 ng/ml) than in control subjects (0.73 ng/ml). The urinary BPA concentration was significantly associated with airborne BPA levels. The findings provide the first evidence that workers in a molding factory in Malaysia are occupationally exposed to BPA.³⁴
- (x) A study to systematically review the impact of BPA exposure from dental materials on human health was conducted through extracting data from PubMed, ScienceDirect, and Scopus databases. About fifty-eight studies related to BPA usage in dental treatment, short- and long-term exposure of BPA, and health risk exposure to BPA were shortlisted. Almost all studies reported that BPA exposure from dental material showed negligible dosage that

³² Shehab, Z.N., Jamil, N.R. & Aris, A.Z. Occurrence, environmental implications and risk assessment of Bisphenol A in association with colloidal particles in an urban tropical river in Malaysia. *Sci Rep* **10**, 20360 (2020). <https://doi.org/10.1038/s41598-020-77454-8>

³³ Wen Min Yun, Yu Bin Ho, Eugenie Sin Sing Tan, Vivien How. Release of Bisphenol A From Polycarbonate and Polyethylene Terephthalate Drinking Water Bottles Under Different Storage Conditions and Its Associated Health Risk. *Mal J Med Health Sci* 14(SP2): 18-26, Nov 2018. https://medic.upm.edu.my/upload/dokumen/2018120408461003_MJMHS_SP_Nov_2018.pdf

³⁴ Wided Kouidhi, Letchumi Thannimalay, Chen Sau Soon, Mustafa Ali Mohd. Occupational Exposure To Bisphenol A (BPA) In A Plastic Injection Molding Factory in Malaysia. *International Journal of Occupational Medicine and Environmental Health* 2017;30(5):743–750. <https://doi.org/10.13075/ijomeh.1896.00917>

may not harm human health. However, there is a clear indication showing a small amount of BPA leaching from dental materials in the short term after application.³⁵

7.0 Specific groups of people or places in Malaysia where exposure to phthalates and bisphenols is especially high

Infants and children are particularly vulnerable due to exposure from consumer products designed for them. A study³⁶ conducted by IPEN with CAP in Malaysia have found BPA in polycarbonate baby feeding bottles and water bottles including those labeled "BPA-free". Phthalates were found¹⁵ to exceed EU limits in children's toys, posing potential developmental risks through ingestion of contaminated dust or direct contact.

A study³³ on workers in a plastic injection molding factory found higher urinary BPA concentrations compared to the general population due to exposure in the work area. Exposure to certain phthalates, such as diethyl phthalate (DEP), has been associated with the use of cosmetics and personal care products like perfumes. The National Poison Centre has stated³⁷ that prolonged exposure has been linked to fertility issues, liver and kidney damage, and negative effects on fetal development. Sensitive individuals may also experience allergic reactions such as skin rashes, breathing difficulties, and migraines.

A study³⁸ on EDCs in the spatial distribution and mean concentrations of EDCs in the Klang Valley region revealed that Hulu Langat, Petaling Jaya, and Putrajaya exhibited higher levels of bisphenol A (BPA). The increasing presence of EDCs in tap water³⁷ is a cause for concern as these substances can have adverse health consequences. Exposure to phthalates and bisphenols in Malaysia is particularly high in highly urbanized and industrialized regions, specifically in the state of Selangor and industrial areas in Johor such as Pasir Gudang³⁹.

³⁵ Nur Amirah Syafiqah Shamsudin, Nur 'Aina Rozainis, Zatilfaridah Rasdi. Investigation on the Impact of Bisphenol A Exposure from Dental Materials: A Systematic Review. *Compendium of Oral Science* 11(2) 2024, 96 – 112.

<https://doi.org/10.24191/cos.v11i2.27506>

³⁶ Straková, J., Grechko, V., Brosché, S., Karlsson, T., & Buonsante, V. (2022). *A call to action: Free children from BPA's toxic legacy*. International Pollutants Elimination Network (IPEN). <https://ipen.org/documents/call-action-free-children-bpas-toxic-legacy>

³⁷ New Straits Times. (2025, April 13). *Beware of toxic chemicals in cheap perfumes, warns pharmacist*.

<https://www.nst.com.my/news/nation/2025/04/1201206/beware-toxic-chemicals-cheap-perfumes-warns-pharmacist>

³⁸ Mohamad Haron, D. E., Yoneda, M., Hod, R., Ramli, M. R., & Aziz, M. Y. (2023). *Assessment of 18 endocrine disrupting chemicals in tap water samples from Klang Valley, Malaysia*. *Environmental Science and Pollution Research*, 30(111062–111075). <https://doi.org/10.1007/s11356-023-30022-9>

³⁹ Syed Ismail, S. N., Zainal Abidin, E., & Rasdi, I. (2020). *A case study of Pasir Gudang chemical toxic pollution: A review on health symptoms, psychological manifestation and biomarker assessment*. *Malaysian Journal of Medicine and Health Sciences*, 16(SUPP11), 175–184.

https://medic.upm.edu.my/upload/dokumen/2020112512422223_2020_0379.pdf

8.0 National endeavours to phase out bisphenols and phthalates

Civil society organization such as CAP have been advocating for phase-out of phthalates and bisphenols, and these are supported by results of analysis of content of these chemicals in certain products. These findings were shared with the relevant authorities and public awareness was raised through media and social media platforms, including articles on CAP website⁴⁰ and a special issue on plastics in CAP newsletter *Utusan Konsumer*⁴¹.

9.0 Recommendations and project ideas to support national regulation of phthalates and bisphenols

As many of the Malaysian samples were found to contain toxic chemicals, there is an urgent need to call on the government to come out with comprehensive regulatory measures and public protection from harmful plastic additives such as phthalates/bisphenols through raising public awareness of health risks, mobilising public and professional support; advocating for bans on phthalates and bisphenols in consumer products. To support national regulation of phthalates and bisphenols, we need to combine scientific evidence and public health framing to push for binding laws that restrict use in consumer products, including highlighting child health risks.

In Malaysia, we need to advocate and make sure that all bisphenols and phthalates, and their chemical derivatives are banned as a group to avoid regrettable substitutions of one toxic chemical with another. Industry substitution loopholes are anticipated; hence we need to be prepared. Investing in safer alternatives will ensure that segments of the population most susceptible to vulnerable situations, including children, women, and disadvantaged communities are protected from toxic exposure to these chemicals.

⁴⁰ Consumers Association of Penang. (n.d.). *Why you should be worried about BPA*. <https://consumer.org.my/why-you-should-be-worried-about-bpa/>

⁴¹ Consumers Association of Penang. (2024). *Special issues of Utusan Konsumer and Utusan Pengguna*. <https://consumer.org.my/special-issues-of-utusan-konsumer-and-utusan-pengguna/>