

Opportunities for restricting chemicals and polymers of concern in plastics

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Restricting chemicals and polymers of concern

- Underlying mechanisms
- Number of chemicals and polymers in plastics
- Identifying and listing chemicals of concern
- Existing criteria for prioritization
- Grouping of chemicals approach
- Hazard- or risk-based approach
- Transparency
- Scientific mechanism
- International sustainability criteria



Underlying mechanism of the agreement



Number of chemicals used in plastics



Number of chemicals used in plastics

Category	Number	Share
No hazard data	6000	46%
Regulated	128	1%
Unregulated	3076	24%
Low concern (based on existing hazard data)	3800	29%



Number of polymers of concern

- The number of polymers of concern has not been properly assessed
- According to one estimate:
 - there could be 200,000 polymers in use
 - from which 30,000 could be hazardous
 - many not used in plastics
- Lack of information on polymer identities hinders their hazard assessment



MEAs with control measures to restrict production and use of plastics-related chemicals

 Prohibits &/or restricts use of listed POPs, some of which are used, among others, as additives in plastics (e.g., as flame retardants, plasticizers, or surfactants) Restricts releases of unintentional POPs deriving, inter alia, from open burning 	rohibits use of controlled abstances (ODSs & HFCs), cluding their use as blowing gents in production of ctruded polystyrene & olyurethane foams rovides exemption for use of ontrolled substances as rocess agents & feedstocks	 Restricts use of mercury & mercury compounds in production of polyurethane using mercury-containing catalysts & in vinyl chloride monomer production

Approaches for identifying and listing chemicals

Negative (black) list "Stockholm Convention model"	Negative (black) list "Rotterdam Convention model" (adapted)	Positive (white) list "London Protocol model"	Hybrid approach
 Hazard and risk criteria are used by a scientific committee to provide recommendations for listing by the COP 	 Presence of a chemical in regulatory lists from two UN regions could trigger listing Large portion of chemicals would directly qualify for listing Moderate workload 	 The use of safe chemicals is allowed if approved by a scientific body and listed in a positive list Could be narrowed to specific applications (e.g. food contact materials and toys) 	 Could include a black, and white list, and even a gray list Mechanism is needed for needed for moving chemicals from one list to another
 Data on exposure is scarce Could lead to duplication of work or undermine the work of existing scientific bodies 	 Countries and regions with limited data on chemicals could be underrepresented Ad hoc nature of listing problematic 	 May lead to regrettable substitution as it is not commonly based on groups of chemicals High risk for white listing of hazardous chemicals 	

Overview of existing criteria for prioritization

Chemicals of concern (MEAs)

- Persistent organic pollutants (POPs)
- Mercury & mercury compounds
- Ozone depleting substances (ODSs)
- Hydrofluorocarbons (HFCs)

Chemicals of concern (SAICM)

- Persistent, bioaccumulative and toxic substances (PBTs)
- Very persistent & very bioaccumulative (vPvB) substances
- Chemicals that are carcinogens or mutagens or that adversely affect, among other things, the reproductive, endocrine, immune or nervous systems
- Persistent organic pollutants (POPs)
- Mercury & other chemicals of global concern chemicals
- Produced or used in high volumes
- Those subject to wide dispersive uses
- Other chemicals of concern at the national level

Polymers of concern (OECD)

- Molecular weight
- Oligomer content
- Reactive functional groups
- Metal content
- Extractivity/solubility in water
- Cationic charge density
- Stability/degradability
- Chemical structure classes
- Hazard classifications
- Fluorinated polymers
- Water absorption
- Unreacted monomers
- Surface activity
- Lipophilicity
- Particle size/respirability
- Production volume
- Intended uses

Moving towards a grouping of chemicals approach

- Stockholm Convention example of grouping based on "negative list":
 - Grouping of congeners (e.g. PCBs, PCDD/PCDFs)
 - Grouping of precursors & transformation end products (e.g. PFOA)
- Chemical simplification
 - implies use of "positive list" for limited number of substances known to be safe
 - facilitates grouping
- Could start with groups of chemicals for which there is scientific consensus of harm caused by plastic-related exposure
 - High (bisphenols, flame retardants and phthalates)
 - Medium (PFAS)
- Example of ECHA:
 - assessed group of 148 bisphenols & recommended restriction for over 30 bisphenols



Adopting a hazard- or risk-based approach?

Hazard-based approach

- Focuses on intrinsic ecotoxicological properties of chemicals, such as
 - PMTs (persistent, mobile & toxic substances)
 - vPvB (very persistent and very bioaccumulative)
 - PBT (persistence, bioaccumulation & toxicity)
 - CMR (carcinogenicity, mutagenicity, or reproductive toxicity)
 - EDC (endocrine-disrupting chemicals)
- Aligns with the precautionary approach

Risk-based approach

- Combines hazards of chemical with likelihood & extent of exposure
- Considers
 - Volume
 - frequency of use
 - potential routes of exposure
 - sensitivity of the exposed population, etc.
- Scarcity of exposure data problematic
 - allows continued use of numerous known chemicals of concern until risk evaluation completed



Transparency for chemicals safety

- Is about the need to strengthen the right-to-know
 - Aarhus Convention
 - Escazú Agreement
- Why do we need it:
 - To inform consumers to help drive informed consumer choices
 - To facilitate detection of chemicals of concern in customs control
 - To enable a safe circularity of plastics
- Provision of publicly available information on chemical content of plastics
 - Labelling of products
 - Provision of safety data sheets
 - Use of modern digital tools
 - Use of HS codes
- Collection and dissemination of information through inventories
- Sharing of hazard and risk assessment data between countries
- -> Agreement on global transparency criteria



What is the current level of transparency?

- Transparency across the value chain of plastics is limited
- Stockholm Convention
 - Mandatory labelling for some POPs, specific exemptions for uses in plastics
- Rotterdam Convention
 - Information on the trade of particular chemicals, some have uses in plastics
- Basel Convention
 - Transboundary movement of plastic wastes must be accompanied by a movement document specifying hazardous characteristic of the waste or that its management requires special consideration
- SAICM (voluntary)
 - General requirement to provide information on chemicals throughout their life cycle, including chemicals in products



The role of a scientific mechanism

- Develop and maintain sustainability criteria, including track updates and compatibility with relevant MEAs
- Assess new chemicals of concern and provide recommendations for listing
- Review and aggregate science on environment and human health effects
- Determine financial needs for developing countries to meet obligations to transition to safer chemicals and polymers



International sustainability criteria

- Develop international sustainability criteria for plastics
 - recommended to fill in governance gaps in the chemicals and material phases
- Principles to guide the development of the criteria focusing on performance outcomes:
 - non-toxicity, longevity, stability, recyclability and reduction/minimization
- Supported by transparency criteria across the life cycle of plastics
- Start with phased approach
 - Outline high-level sustainability criteria in the text of the agreement (INC)
 - Develop detailed criteria in possible annexes to the agreement (COP)



International sustainability criteria – opportunities for synergies



International sustainability criteria -Filling the governance gaps

Categories	Chemicals & polymers	Materials & products	Plastic waste
Elimination / minimization (for items to be removed from the economy)	 Stockholm Convention (POPs) Minamata Convention (mercury) Montreal Protocol (ODSs & HFCs) Criteria for elimination of other chemicals of concern in plastics 	Criteria for minimization of releases of chemicals of concern and microplastics Criteria for elimination of problematic plastics	 Basel Convention (generation and trade of plastic waste) MARPOL Annex V (all plastic waste) London Protocol (whitelist)
Performance (for items to stay in the economy)		Criteria for reusability, repairability, etc.	Criteria for recyclability of plastics
Transparency (information that needs to be disclosed in items to slaty in the economy)	 ILO-170 (labelling & safety sheets) Rotterdam Convention (PIC) Stockholm Convention (information exchange) 	 Stockholm Convention (labelling under specific exemptions) Criteria for transparency of plastics 	 Basel Convention (PIC) London Protocol (information exchange)

Key recommendations for consideration

- 1) Develop criteria for sustainable design of plastics
- 2) Develop prioritization criteria to create global negative / positive / hybrid lists using a grouping approach
- 3) Develop trade controls
- 4) Establish a central knowledge hub to manage, store & help access data
- 5) Establish a (or mandate an existing) scientific mechanism

- performance
- transparency
- chemicals of concern
- polymers of concern
- Between Parties, Non-Parties
- hazard
- occurrence
- identities of chemicals & polymers of concern
- develop & update prioritization & design criteria
- provide recommendations for listing chemicals & polymers of concern





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Full report available at the BRS Conventions website

http://www.basel.int/tabid/8335

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