RE: Note on substance identification and the potential scope of a restriction on uses of microplastics – NGO feedback

To: ECHA's Microplastics Restriction Team

Brussels, 10 September 2018

Dear Microplastics Restriction Team,

We welcome the publication of ECHA's note on substance identification and the potential scope of a restriction on uses of microplastics of the 11 July 2018, compiling the developments that took place so far and informing the direction ECHA intends to take for certain considerations under the microplastics restriction procedure. We intend to react on the aspects developed in the note, specifically the substance identification and the potential scope for a restriction.

We acknowledge the note's broad approach, generally not focusing on specific uses for the scope of the restriction and thus considering microplastics as a general concern.

The definition

The note indicates that ECHA reserves its right to deviate from the presented elements based on hazard, exposure, risk and socio-economic considerations. We insist that the definition of microplastics should not be influenced by risks or socio-economic considerations and must remain strictly based on scientific and technical considerations.

Substance identity. We welcome ECHA's approach to define microplastics as "any polymer, or polymer containing, solid or semi-solid particle having a size of 5 mm or less in at least one external dimension". We believe that for consistency, the term polymer grounding the microplastic's definition should be defined as in

Article 3(5) of REACH[1]. The Note indicates that the risk assessment might conclude on the need to create a "sub-set of polymers"[2], we believe that these conclusions should not restrict the scope of the current definition of microplastics. Legislating against a set list of microplastic ingredients poses a significant risk because it would create the opportunity to replace 'like with like'. Maintaining a list of prohibited polymers would also place an unnecessary economic and administrative burden on the relevant authorities, would not provide clarity for industry, and would continue to permit microplastic pollution. Any restriction should cover all microplastic ingredients.

Physical state and non-solid polymers. We believe that the focus on the solid and semi-solid polymers is the right way to tackle the concerns of microplastics in the environment as it permits identification of a broader scope of microplastic that may be a threat for environmental health rather than focusing on "plastic" for instance.

As already highlighted in our submission on the call for evidence[3], we support a broad definition of microplastics, that includes semi-solid polymers as well as liquid polymers. There are many types of synthetic waxes - for example, polyethylene waxes - used in personal care products which can be defined as solid or semi-solid compounds. Although softer, these compounds may still retain their shape and persist in the marine environment as marine litter. While the industry does not always consider these to be classed as microplastics, scientists confirm that polyethylene waxes fall under the definition of marine microplastic litter as they are non-degradable, water insoluble and are solid materials with a melting point well above sea temperatures.[4] Given the lack of knowledge on non-solid polymers, ECHA should adopt a precautionary approach to ensure that the potential risks caused by liquid polymers are foreseen, especially if the use of non-solid polymers is widespread.

For further developments, we would like to highlight that during the procedure for a UK ban of microplastics, the proposal to identify polymers through a list of 7 most commonly used polymers was rejected because they were largely limiting the scope of the definition and creating loopholes for polymers newly placed on the market.

Nanoplastics. We welcome ECHA's approach on nanoplastics. We strongly support an identification of microplastics that includes nanoplastics both under their particle as well as fibre form as scientific evidence suggests high concerns. The risks of setting lower size limits for the identification of microplastics are to fail to regulate a threat to the environment. The smaller the particle size the greater the range of organisms that can ingest it. Recent studies have demonstrated the potential for nanoplastics to affect plankton development and

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[1] Article 5(5) of REACH provides that "Polymer: means a substance consisting of molecules characterised by the sequence of one or more types of monomer units. Such molecules must be distributed over a range of molecular weights wherein differences in the molecular weight are primarily attributable to differences in the number of monomer units. A polymer comprises the following:

(a) a simple weight majority of molecules containing at least three monomer units which are covalently bound to at least one other monomer unit or other reactant;

(b) less than a simple weight majority of molecules of the same molecular weight.

In the context of this definition a "monomer unit" means the reacted form of a monomer substance in a polymer."

[2] ECHA, Note on substance identification and scope of restriction on microplastics published, 11 July 2018, p. 4

[3] EEB and Clientearth submission to the call for evidence on intentionally added microplastics, May 2018, p.8 https://www.documents.clientearth.org/wp-content/uploads/library/2018-05-11-clientearth-and-eeb-joint-submission-to-echas-call-for-evidence-on-microplastics-coll-en.pdf

[4] Leslie, H. A. (2015). *Plastic in Cosmetics, Are we polluting the environment through our personal care?*. United Nations Environment Programme (UNEP), Report for the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA).

reduce microalgal photosynthesis and population growth.[5] The transfer of nano-sized plastics across cell membranes has also been demonstrated and such plastic nanoparticles may act as a cellular vector for chemicals and nano-additives.[6] Smaller particles are known to be more reactive due to their ratio/surface area (p.6 of the Note) and have a higher sorption capacity.

Enforceability should not be a concern to approach the restriction on lower size particles, the primary rationale should be the risk to the environment and scientific evidence for their restriction. Such a restriction will drive innovation and support the development and use of substances that do not impact the environment. The preliminary stages of the restriction procedure should not be constrained due to potential enforceability difficulties while environmental health is at risk.

Potential scope for a restriction

1. Presence of microplastics at the point of use

ECHA should make clearer what it identifies under "use". The use, as roughly described in the note does not seem to include the production of microplastics, or the production of substances or mixtures to which microplastics might be added. We rely on ECHA to soundly assess the potential for leakage during the production cycle of these components.

We encourage ECHA to assess the impacts of microplastics *formed* at the point of use, as referred to in the note, as such microplastics would be expected to have the same detrimental impacts in the environment as those included as ingredients.

We have concerns over the hypothesis where microplastics are fully managed to prevent environmental leakages as referred in the note for pharmaceuticals. If those microplastics were to be exempted from the restriction of microplastics, a clear demonstration of the absence of release or leakage in the environment should be communicated to ECHA. This should also take into account the circumstance of secondary leakages of intentionally added microplastics.

2. Microplastics released in the environment during use or a subsequent life-cycle step

The note indicates that ECHA considers microplastics that are fully consumed or "strictly contained" throughout their complete lifecycle as not contributing to the concern of marine pollution. However, there is clear evidence that such microplastics do leak into the natural environment in significant quantities during production, transport, storage and use (for example, see section at the end of this document on nurdles and biobeads).

To ensure that this criterion is founded and to ensure enforcement capacity, stakeholders claiming that a microplastic can be fully consumed or "strictly contained" should be able to prove it under an established methodology, previously set by ECHA or other relevant authority. Fragmentation of the plastic, dispersion and release of added substances to the microplastic should be relevant factors included in the methodology.

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[5] Bergami, E., Bocci, E., Vannuccini, M.L., Monopoli, M., Salvati, A., Dawson, K.A. and Corsi, I., 2016. Nano-sized polystyrene affects feeding, behavior and physiology of brine shrimp Artemia franciscana larvae. Ecotoxicology and environmental safety, 123, pp.18-25; Bhattacharya, P., S. Lin, J. P. Turner and P. C. Ke (2010). Physical adsorption of charged plastic nanoparticles affects algal photosynthesis. The Journal of Physical Chemistry C 114(39): 16556-16561.

Potential for persistence in the environment: solubility and (bio)degradability

We have expressed our concerns as regards considerations for soluble and biodegradable microplastics during the call for evidence[6] and voice them hereby again. A UNEP Report on Biodegradable Plastics and Marine Litter[7] proposes definitions for:

- Degradation: that is "the partial or complete breakdown of a polymer as a result of microbial activity, into CO2, H2O and biomasses, as a result of a combination of hydrolysis, photodegradation and microbial action (enzyme secretion and within-cell processes)";
- environmental biodegradation: which is "Biological process of organic matter, which is completely or partially converted to water, CO2/methane, energy and new biomass by microorganisms (bacteria and fungi).

The UNEP Report further warns of the absence of clear definitions of bio-based and bio-degradable plastics, leading to inaccurate claims for biodegradation. In marine conditions, particularly in oceans, UV radiation, one of the essential factors for fragmentation is not guaranteed if the plastics are laying in the sediments, move through unexposed UV waters or are covered in organic and inorganic films.

ECHA considers that polymers "occurring in nature" inherently biodegrade in the environment and should not be considered as microplastics; in the meantime, it also recognises that "[w]hilst soluble polymers may be considered as not contributing to the 'microplastic' concern, this is not equivalent to a conclusion that they do not pose any risk to the environment. We will ensure that, where relevant, any information relating to the risks of soluble polymers in the environment is summarised in our Annex XV report". Any restriction should not allow any exemption for 'biodegradable' plastics, as there are none that have been conclusively demonstrated to fully biodegrade in real-world marine environmental conditions or to be harmless to marine life. Most such 'biodegradable' plastics require specific conditions to biodegrade which are not met in the marine environment. The international standard for marine biodegradability has been withdrawn and not replaced.

There is already evidence that soluble and biodegradable polymers are not without risk to the environment. The frequent addition of chemicals to plastics, such as UV and thermal stabilisers hinder the fragmentation process[8]. In the event where coatings, additives or any other substances have been intentionally or unintentionally added to the polymer, a microplastic, even proven as biodegradable under realistic environmental conditions can be harmful to the environment in which it is released as it leaks chemicals into the environment. We understand that ECHA intends to consider chemically modified polymers as microplastics, but it is unclear whether this will impact their ability to be considered as soluble or biodegradable.

While the fate of microplastic released in the environment might depend on its utilisation as a fertiliser, cosmetic, paint, etc., it cannot be guaranteed that microplastics will not simply migrate from one environmental compartment to another – that is water to soil for instance – thus modifying the biodegradability conditions.

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[6] EEB and Clientearth submission to the call for evidence on intentionally added microplastics, May 2018, p.8 https://www.documents.clientearth.org/wp-content/uploads/library/2018-05-11-clientearth-and-eeb-joint-submission-to-echas-call-for-evidence-on-microplastics-coll-en.pdf

[7] UNEP (2015) Biodegradable Plastics and Marine Litter. Misconceptions, concerns and impacts on marine environments. United Nations Environment Programme (UNEP), Nairobi, p.10

[8] *Ibidem*

Furthermore, the risks caused by the presence of microplastics in soils, including the uptake by terrestrial species may have been underestimated so far[9], as already stated during the 30-31 May 2018 Stakeholder's workshop organised by ECHA.

We are concerned that the developments envisaged by ECHA do not tackle essential properties of the microplastics such as:

- their high mobility rate increasing the risks of impacts on marine and soil biodiversity and preventing further biodegradation,
- conditions required for biodegradation being unlikely to be met where such 'biodegradable' plastics leak into the environment,
- the bioavailability of the polymers as well as of the chemical substances potentially added to the microplastic,
- the time-dependence of the biodegradability factor,
- finally, the high reactivity of small-size polymer particles.

We strongly oppose the view that a polymer that (bio)degrades "relatively quickly under environmentally relevant conditions is unlikely to contribute to the concern", particularly given that there is no indication of what time scales are considered relatively quick and whether consideration has been given to interim impacts on biodiversity, variability of conditions for decomposition and transfer of microplastics to other ecosystems, where the conditions for biodegradation may not be met (e.g. leaching from soil to freshwater ecosystems). This statement translates a latent lack of ambition in tackling the issue: as this assumption does not take into account the essential properties of microplastics previously mentioned: the high mobility rate of microplastics making it not possible to demonstrate their containment within one environmental compartment and their bioavailability to the environment and fauna. In addition, no internationally recognised standard for marine biodegradability or testing for aquatic toxicity exist. A conformity mark was developed for products described as biodegradable in seawater by Vinçotte OK Biodegradable MARINE. The biodegradability component of this certificate is based on the, now withdrawn, international standard ASTM D7081-05, and thus should not be considered as safe for the marine environment. The test procedures involved do not address the impacts on multispecies communities and biogeochemical processes, and the toxicity assays required by the OK Biodegradable MARINE label do not account for the ability of microplastic particles to adversely affect aquatic organisms[10].

In comparison, the Canadian restriction included in the Microbeads in Toiletries Regulations of 2017[11] , the American Microbead-Free Waters Act of 2015[12], the Taiwanese[13] restriction on cleansing productsand the UK microbead ban do not exempt biodegradable microbeads for the purpose of the regulation; finally, the ongoing discussions under the single-use plastic debate are currently including "biodegradable plastics" in the definition of single-use plastics, which are either restricted or regulated under this framework.

On the basis of the above, ECHA should not support the claim for biodegradable plastics.

[9] Environmental Investigation Agency, Ocean – Fields of plastics: The growing problem of agriplastics, https://eia-international.org/wp-content/uploads/Agriplastics-final.pdf, August 2018, p.3 and Kay, P., Hiscoe, R., Moberley, I. et al., Wastewater treatment plants as a source of microplastics in river catchments, Environ Sci Pollut Res (2018) 25: 20264. , 7 June 2018

[10] Harrison, J.P., Boardman, C., O'Callaghan, K., Delort, A.M. and Song, J., 2018. Biodegradability standards for carrier bags and plastic films in aquatic environments: a critical review. *Royal Society open science*, *5*(5), p.171792.

[11] Microbeads in Toiletries Regulations, SOR/2017-111, http://laws-lois.justice.gc.ca/PDF/SOR-2017-111.pdf

[12] Microbead-Free Waters Act 28 December 2015, https://www.congress.gov/114/plaws/publ114/PLAW-114publ114.pdf

[13] Restriction on the manufacture, import and sale of cosmetics and personal cleansing products containing plastic particles https://enews.epa.gov.tw/enews/fact_Newsdetail.asp?InputTime=1060803112904 (in Chinese)

As the Note indicates that ECHA will also consider the scenario where no criteria for (bio)degradation can be established under this restriction proposal, we encourage ECHA to properly assess all the properties of microplastics when evaluating biodegradability of the substances and exclude the scenario of biodegradation to exempt the restriction for some particles.

Table 1. Application of microplastic identification criteria to indicative uses of polymers alongside risk-related criteria for identifying 'relevance to the restriction scope'

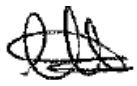
This table claims that polymer pellets (nurdles) are "completely consumed" and not released into the environment. It further states that they are not persistent in the environment and are not of concern for further assessment. Whilst we understand that such emissions may not be the target of the REACH process, these statements are untrue and do not reflect the current state of knowledge on pre-production pellets. Recent scientific studies have demonstrated that millions of pellets enter waterways from production sites annually and they are the second largest source of direct microplastic emissions; with plastic leakage occurring during transport, storage, loading and cleaning[14]. Recent analysis suggests that up to 230,000 tonnes of nurdles may be entering the ocean across Europe each year[15]. This has impacts on marine life, with several species of fish and birds have been shown to ingest plastic pellets, which they mistake for fish eggs floating in the water column[16]. The example of nurdles demonstrates that while a microplastic may be designed to be "completely consumed" in production, in practice this does not prevent leakage into the marine environment, particularly where auditing and policing of best practice standards are inadequate.

While pre-production pellets may be covered by other future legislative instruments, we suggest the ECHA amends this table to reflect the risks they pose to the marine environment.

Similarly, biobeads, used in waste water treatment, would be considered to fall under the category of 'polymers used for water and waste water treatment' (Table 1, page 12). These meet the conditions of being a solid, synthetic polymer and are lost to the environment, where they persist and can be ingested by marine and terrestrial fauna, along with potentially high levels of contaminants adsorbed in the water treatment process.[17] As with pellets, biobeads may be better covered through other policy measures but we suggest ECHA amend the table to reflect the risks they pose to the environment.

Please do not hesitate to contact us should you wish to discuss any of the above points further.

Yours Sincerely,



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[14] For example, see Karlsson et al, 2018. *The unaccountability case of plastic pellet pollution*, Marine Pollution Bulletin 129, pp 52-60
[15] Eunomia (2016) http://www.eunomia.co.uk/reports-tools/plastics-in-the-marine-environment/
[16] https://phys.org/news/2018-04-fuss-nurdles.html
[17] https://www.theguardian.com/environment/2017/oct/11/sewage-plants-are-leaking-millions-of-tiny-plastic-beads-into-britains-seas

In the name of:

CHEM Trust
Friends of the Earth Europe
Environmental Investigation Agency
European Environmental Bureau