

Letter to the Editor

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A call to ban non-essential microplastics used in cosmetics, festival and holiday decorations

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Abstract

Festivities, holidays and celebrations are often associated with unsustainability and high environmental impact. Examples include unsustainable overconsumption and waste during Christmas, Ramadan and during the Chinese New Years celebrations among many others. Microplastics (i.e., plastic fragments 5 mm) have also become a significant environmental concern during these periods. Common non-essential festive items like glitter, confetti, balloons and other decorations along with glitter used in cosmetic products contribute to microplastic pollution, potentially causing adverse effects on ecosystems and human health. Despite overwhelming evidence of the adverse impacts of microplastics on human and environmental health, how non-essential microplastics used in cosmetics, festival and holiday decorations will be addressed within the Global Plastics Treaty remains unclear. Although the draft Global Plastics Treaty text includes non-essential plastic items such as balloons and rinse-off microbeads in cosmetics, no other decorative or aesthetic use of microplastics have been included. Whilst the inclusions of non-essential plastics are commendable, we argue that further inclusions be made for non-essential microplastics used in cosmetics, festival and holiday decorations within the Global Plastics Treaty.

Impact statement

The Global Plastics Treaty has been under negotiation by the Intergovernmental Negotiating Committee since 2022. The second part of the fifth session of the Global Plastics Treaty negotiations is scheduled for August 2025 in Geneva with the aim to develop an instrument with the objective to “end plastic pollution and to protect human and environmental health”. However, despite the overwhelming evidence of the adverse impacts of microplastics (i.e., plastic fragments <5 mm) on human and environmental health, how non-essential microplastics used in cosmetics, festival and holiday decorations will be addressed within the Global Plastics Treaty remains unclear. In this Letter to the Editor, we argue that inclusions be made for non-essential microplastics used in cosmetics, festival and holiday decorations under “non-essential plastics” within the Global Plastics Treaty.

Letter to the editor

The Global Plastics Treaty, an international legally binding instrument on plastic pollution, including in the marine environment, has been under negotiation by the Intergovernmental Negotiating Committee (INC) since 2022 (Walker, 2022). The second part of the fifth session of Treaty negotiations is scheduled for August 2025 in Geneva with the aim to develop an instrument with the objective to “end plastic pollution and to protect human and environmental health” (Diana et al., 2022). Despite overwhelming evidence of the adverse impacts of microplastics (i.e., plastic fragments <5 mm) on human and environmental health, how non-essential microplastics used in cosmetics, festival and holiday decorations will be addressed within the Global Plastics Treaty remains unclear (Gündoğdu et al., 2024).

Festivities, holidays and celebrations are often associated with unsustainability and high environmental impact. Examples include unsustainable overconsumption and waste during Christmas (Kopnina, 2014; Thompson, 2019), the excessive purchase resulting in food waste during Ramadan (Hassan and Low, 2024) or the worsening of air quality due to fireworks used during the Chinese New Years celebrations (Islam, 2024). Microplastics have also become a

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significant environmental concern during these periods. Common festive items like glitter, confetti, polymer laminate coating for spring festival couplets (also known as “door couplets”; *i.e.*, plastic-coated banners used to decorate doorframes), plastic lanterns, window paper-cut decals, mooncake boxes (*i.e.*, festive plastic packaging) (Zhang, 2017), balloons and other decorations contribute to microplastic pollution, potentially causing adverse effects on ecosystems and human health. For instance, popping 100 balloons can release up to 33 million microplastics (Luo *et al.*, 2024). There was also a peak in microplastic concentration in the surface waters of the River Thames Rivers in London, UK after the firework display on New Years Eve (Devereux *et al.*, 2022).

Another item associated with festivities is glitter, which is often found in decorations, clothing, cosmetics, toys, arts and crafts and a myriad of various other non-essential items (Yurtsever, 2019a; Piccardo *et al.*, 2022a). Glitter is composed of 300–700 μm plastic particles coated with metals, which may increase their toxicity (Piccardo *et al.*, 2022a). Multiple studies have found glitter in wastewater, sediment and street dust samples (Yurtsever, 2019b). Others found that glitter, either directly or through leachates, has adverse effects on aquatic organisms (Green *et al.*, 2021; Piccardo *et al.*, 2022b). While glitter may have some practical applications, such as its use as a reflective coating or thermal insulation, uses solely based on non-essential aesthetic purposes often result in its indiscriminate release and environmental contamination with unnecessary human exposure. This avoidable exposure is especially concerning in children’s toys, where it may result in ingestion of the particles.

Similarly, cosmetics also contain glitter, but most research focuses on the presence of microbeads with abrasive functions. Glittering or shimmering cosmetics may be achieved using microplastics, cellulose, mica or glass. Of the products tested (*e.g.*, cream, nail polish), 3.5% of leave-on cosmetics contained microplastics, which have been overlooked in many regulations specifically targeting microplastics (Kukkola *et al.*, 2024). A random audit of glittering or shimmering makeup products found glitter microplastics in 32% of them (Siegel, 2021). These particles may be harmful to ecosystems (Green *et al.*, 2021), especially considering their rinse-off properties. However, their direct application on the body can increase the risks of adverse human health effects. For instance, application of a pencil eyeliner inside the lash line results in migration of glitter particles into the tear film (Ng *et al.*, 2015) and exposure of the ocular mucosa. Glitter makeup may also contain preservatives (*e.g.*, methylchloroisothiazolinone) that can cause allergic contact dermatitis (Vincenzi *et al.*, 2019).

A similar but understudied product is plastic confetti, which is like glitter but with larger dimensions. For instance, a 9-month-old girl was admitted to the hospital following a large retropharyngeal abscess compromising the airways due to the ingestion of a confetti plastic star (Heyworth and Shulman, 2019). Besides their use as decorations in festivities, confetti are often found in Party Poppers and spread during the explosion. A study in Italy reported the presence of polyethylene terephthalate confetti in Party Poppers and estimated the yearly release of 400 million individual particles of confetti (8 tons) during graduation celebrations in the country (Brambilla *et al.*, 2024). The use of Party Poppers has also produced ocular injuries, including the introduction of foreign bodies in the eye (Ravilla and Vardhan, 2022). If released to the environment, animals may ingest these particles, leading to gastrointestinal lesions with fibrosis, known as “plasticosis” (Charlton-Howard *et al.*, 2023).

Fake snow may be a source of microplastics during winter holidays. One type of fake snow is composed of sodium

polyacrylate, which forms a white foam when exposed to water. While sodium polyacrylate may not be strictly considered a microplastic (Frias and Nash, 2019), its high-water absorption capacity has been associated with ocular injuries (Al-Amry and Al-Ghadeer, 2016) and asphyxiation (Stalder *et al.*, 2024). Yet, many other forms of fake snow are made of microplastics. The use of fake snow indoors might lead to human exposure, while outdoors it is likely to be dispersed and result in environmental contamination. Nonetheless, there is an indiscriminate use of fake snow (Figure 1), and it is widely available in markets without any warning label or restriction regarding its use.

Regulations aimed at reducing or banning single-use plastics have often overlooked decorations or non-essential aesthetic uses, such as glitter (Grosso, 2022). Balloon sticks have been banned by the European Union (EU) Directive 2019/904 on single-use plastics. Despite their functional use as abrasives, microbeads have been included in bans since 2015 in the United States (The Microbead-Free Waters Act) and in Canada (Microbeads in Toiletries Regulations) in 2016 (Xanthos and Walker, 2017; Schnurr *et al.*, 2018). Canada became the first country to list microbeads as a “toxic substance” with regulations to ban the manufacture, import and sale of products containing microbeads (Pettipas *et al.*, 2016). However, bans have often been misleading to the public because products may contain other added microplastics beyond microbeads (Kukkola *et al.*, 2024).

More recently, the EU’s Commission Regulation 2023/2055 extended restrictions to other microplastics intentionally added to products, including glitter in cosmetics but is still undecided in many products (*e.g.*, fake polyester grass coverings, flock-coated products) and includes multiple exceptions (*e.g.*, glitter incorporated in articles, sequins). Yet, glitter and other microplastics incorporated into products can be easily separated and lost (Figure 2). These applications are frequently aesthetical and other natural alternatives exist, such as paper or mineral-based particles. Moreover, the lack of awareness of the environmental impact of glitter or other decorative microplastics (*e.g.*, fake snow) may lead to a higher risk of littering (Tagg and Ivar do Sul, 2019; Yurtsever, 2019b).

The Global Plastic Treaty, still under negotiation, aims at establishing an international legally binding agreement on managing the full life cycle of plastics, initiated by the United Nations Environment Assembly. The scope of the most recent draft, which is the Chair’s Text (developed at INC – 5.1) remains unambitious, suggesting bans and restrictions like those already in place in many countries (United Nations Environment Programme, 2024). While the list of products in Article 3 Plastic Products, Annex Y and X can be expanded based on the Party’s suggestions, any inclusions will also depend on consensus, which has been hard to achieve so far (Arora *et al.*, 2024; Knoblauch and Mederake, 2024). Similar to previous regulations, only balloons and rinse-off microbeads in cosmetics are addressed, and no other decorative or aesthetic use of microplastics has been included. For example, in Article 3 Plastic Products, Annex Y “Rinse-off cosmetics and personal care products containing intentionally added microbeads” and “Toys and children’s products” are included, but the latter is only focused on harmful chemicals in toys and the former addresses only microbeads. While these inclusions of non-essential plastics are commendable, we argue that further inclusions be made for non-essential microplastics used in cosmetics, festival and holiday decorations within the Global Plastics Treaty. New regulations should be broader and more comprehensive, based on a list of undesirable product properties, such as hazardous or



Figure 1. Microplastics used as storefront decorations in Porto, Portugal, during December 2024.



Figure 2. Glitter, a form of microplastics, released from Christmas decorations into a storage box in a local market in Porto, Portugal, during December 2024.

harmful to the environment and human health, difficult to reuse or recycle and non-essential. This ambitious approach, including to “phase out the most problematic plastic products and chemicals of concern in plastic products,” was recently reaffirmed by almost 100 INC member states at the United Nations Oceans Conference in Nice (UNOC3, 2025).

The current approach of listing products is reductionist and insufficient due to the diversity of products in the market. For instance, the EU’s Directive 2019/904 bans food containers made of expanded polystyrene, but this material continues to be used for decorative purposes. Notably, expanded polystyrene eggs are often used in egg hunts during Easter, which may lead to environmental losses. By adopting the Essential Use Concept proposed by members of the Scientists’ Coalition for an Effective Plastics Treaty, new

regulations would complement broader Global Plastics Treaty priorities (Scientists’ Coalition, 2024). This would allow for the Global Plastics Treaty to be more comprehensive, to include a list of non-essential microplastic products used in cosmetics, festival and holiday decorations, as their properties are hazardous or harmful to the environment and human health, difficult to reuse or recycle and non-essential.

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