



PLASTIC IN COSMETICS

ARE WE **POLLUTING** THE ENVIRONMENT
THROUGH OUR PERSONAL CARE?

PLASTIC INGREDIENTS THAT CONTRIBUTE TO MARINE MICROPLASTIC LITTER

FACT SHEET

1.0542 millimeters

1.24 millimeters

1.002 millimeters

1.002 millimeters

KEY MESSAGES

This paper “Plastics in Cosmetics” aims to provide input to the ongoing discussions on plastics in cosmetics and personal care products (PCCPs).

What is the problem?

- A large number of plastic materials are currently being applied in personal care and cosmetics products (PCCPs). Since their appearance in cosmetics 50 years ago, plastics have become widespread in cosmetic and personal care formulations and have replaced natural options.
- Their use goes well beyond scrubbing effect in scrubs. Plastic ingredients are applied in a variety of leave-on and rinse-off formulations such as: deodorant, shampoo, conditioner, shower gel, lipstick, hair colouring, shaving cream, sunscreen, insect repellent, anti-wrinkle creams, moisturizers, hair spray, facial masks, baby care products, eye shadow, mascara etc.
- Microbeads and other plastic ingredients are present in different products at different percentages, ranging from **less than 1% to more than 90%** in some cases. For example, a typical exfoliating shower gel can contain roughly as much microplastic in the cosmetic formulation as is used to make the plastic packaging it comes in.
- A total amount of 4360 tonnes of microplastic beads were used in 2012 across all European Union countries plus Norway and Switzerland according to a survey by Cosmetics Europe, focusing on the use of microplastic beads, with polyethylene beads representing 93% of the total amount equaling 4037 tonnes.
- Plastic ingredients in PCCPs that are poured down the drain after use, **cannot be collected for recycling** (unlike the packaging, which can be recycled). The plastic ingredients do not decompose in wastewater treatment systems, which can be lacking in large parts of the world. The ingredients are emitted via raw sewage, treated effluents or with sewage sludge applied as fertilizer (biosolids) on agricultural land, landfilled or dumped at sea.

How big are these plastics?

- There is more to 'microbeads' than meets the eye – while some are large enough to be easily visible to the naked eye, other microbeads on the market for PCCP formulations are as small as 1 μm . Others are even smaller than that (nano-particulates).
- The size of the particulates applied depends on the function in the cosmetic formulation. Many of the particulates in PCCPs today are between 1 and 50 μm in size.

Microplastic particle sizes

PARTICLE	SIZE RANGE
Microbead	1 – 1000 X 10^{-6} m
Microspheres	1 – 1000 X 10^{-6} m
Microcapsule	1 – 2 X 10^{-6} m
Nanospheres/capsules	10 – 1000 X 10^{-9} m

What are they used for?

- Plastics are used as ingredients in PCCPs for a variety of purposes such as sorbent phase for delivery of active ingredients, film formation, exfoliation, viscosity regulation and many others. 'Microbead' is one of many terms applied to plastic PCCP ingredients; they may also be called microplastics, microspheres, nanospheres, plastic particulates etc.

POLYMER	EXAMPLES OF FUNCTIONS IN PCCP FORMULATIONS
Nylon-12 (polyamide-12)	Bulking, viscosity controlling, opacifying (e.g. wrinkle creams)
Nylon-6	Bulking agent, viscosity controlling
Poly(butylene terephthalate)	Film formation, viscosity controlling
Poly(ethylene isophthalate)	Bulking agent
Poly(ethylene terephthalate)	Adhesive, film formation, hair fixative; viscosity controlling, aesthetic agent, (e.g. glitters in bubble bath, makeup)
Poly(methyl methacrylate)	Sorbent for delivery of active ingredients
Poly(pentaerythritol terephthalate)	Film formation
Poly(propylene terephthalate)	Emulsion stabilizing, skin conditioning
Polyethylene	Abrasive, film forming, viscosity controlling, binder for powders
Polypropylene	Bulking agent, viscosity increasing agent
Polystyrene	Film formation
Polytetrafluoroethylene (Teflon)	Bulking agent, slip modifier, binding agent, skin conditioner
Polyurethane	Film formation (e.g. facial masks, sunscreen, mascara)
Polyacrylate	Viscosity controlling
Acrylates copolymer	Binder, hair fixative, film formation, suspending agent
Allyl stearate/vinyl acetate copolymers	Film formation, hair fixative
Ethylene/propylene/styrene copolymer	Viscosity controlling
Ethylene/methylacrylate copolymer	Film formation
Ethylene/acrylate copolymer	Film formation in waterproof sunscreen, gellant (e.g. lipstick, stick products, hand creams)
Butylene/ethylene/styrene copolymer	Viscosity controlling
Styrene acrylates copolymer	Aesthetic, coloured microspheres (e.g. makeup)
Trimethylsiloxysilicate (silicone resin)	Film formation (e.g. colour cosmetics, skin care, sun care)

Why should you care?

- Most of the plastic ingredients in PCCPs contain nondegradable polymers. These plastics may take hundreds of years to completely degrade via oxidative or photodegradation routes. Replacing plastic ingredients with biodegradable plastics such as Polylactic acid (PLA) is not advisable as PLAs only degrade when subjected to high temperatures in industrial settings.
- Knowledge is emerging about the ubiquitous occurrence of microplastics throughout the world's marine environment and their potential for secondary health impacts via the food chain, including to humans who consume seafood. This coupled with emerging knowledge about the toxic effects such particles have on biological organisms including mammals has led to concern and actions to monitor and reduce microplastics emissions.
- The global PCCP industry was worth 433 billion USD in 2012 – even if a fraction of those products contain small percentages of plastic ingredients, the total emission from this source is still quite significant.

What can be done?

- **Producer:** Taking the potential impact of product ingredients on the natural environment into account during the design phase and achieving cleaner production of PCCPs could eliminate microplastic by (and also packaging) pollution from PCCPs.
- **Consumer:** Look in your bathroom – what contains microbeads – download the Beat the microbead app and avoid buying products that contain these plastics.
- **Governments:** Promote phase out of microplastics in personal care and cosmetic products
- **Researchers:** Further research is needed to better understand the implications of nano- and micro-sized plastics in PCCPs on human and marine ecosystem health, especially through ingestion and chemical transfer through the food chain. Help us to better understand and drive mitigation activities. Consumers, policymakers, industry and businesses with knowledge provided by scientific communities and propagated by NGOs and other civil society representatives are enabled to make informed choices to protect marine ecosystems and human well-being.

CONCLUSION

Given the associated potential risks of microplastics, **a precautionary approach is recommended toward microplastic management, with the eventual phase-out and ban in PCCPs.**

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https://www.yunbaogao.cn/report/index/report?reportId=5_11859

