

# Deconstructing the Sparkle

Glitter is engineered high composite material. It has a PET core, coated with a microscopic layer of metal, which is then coated with a protective plastic layer. It enters the environment through wastewater (washing off cosmetics), or via direct littering. It is frequently underestimated in scientific studies because standard detection methods often fail to capture.

## Counting the devils

When counting microplastics you would go to a beach, scoop up some sand, and you separate the plastic to count it. Or you would take a sample of ocean sediment, mix the sample with a salt solution, so that the plastic floats and the rest sinks. The density of the salt solution is 1,2g per cubic centimeter. Most common plastics are lighter than that. However, glitter sinks to the bottom.

The sediment also has to be cleaned before being analyzed, that is usually done by using some acid or chemical, but that dissolves the glitter, leaving only the PET core. Under a microscope it no longer looks like glitter but a generic plastic particle. So there is a huge data gap. The number of particles found in the ocean is actually low, when glitter isn't accounted for, and then we cannot regulate what we cannot measure.

## Toxicity and Leaching

Sea urchins and brown mussels are studied as bioindicators. Mussels filter huge amounts of water, so when they are sick, the water is sick. Sea urchin embryos are extremely sensitive to chemical changes.

Glitter is leaching heavy metals and chemical additives such as parabens, benzene, toluene, and elemental silver - exceeding marine safety levels. Heavy metals like silver are toxic and disrupt cellular processes.

## Color Matters

Green glitter has a much more complex chemical profile than white glitter. 10mg per liter is enough to result in developmental failure of brown mussels, their embryos would fail to reach larval state. The substances identified in glitter, such as propylparaben, are used to extend the shelf life of personal care products but are known endocrine disruptors. These particles are frequently used in direct-contact products like body paints, nail polish, and cosmetics.

## Sewage Fertilizer

The solid byproduct of Sewers treatment is sewage sludge. This sludge is used as fertilizer on agricultural land (a common practice globally). Because of the density of glitter, it sinks during wastewater treatment rather than floating, and flowing out with the treated water. When the sludge is used as fertilizer, the accumulated glitter is reintroduced into the terrestrial environment. From there, it can leach chemicals or eventually wash back into waterways, creating a cycle of pollution.

## Alt Glitter

In response to plastic pollution concerns, alternatives such as modified regenerated cellulose (MRC), synthetic mica, and mineral-based glitters have entered the market. However, "biodegradable" does not necessarily mean environmentally safe. A study comparing conventional PET glitter to biodegradable MRC glitter found that the biodegradable options caused stronger negative effects on freshwater duckweed, including reduced root length and biomass. Alternative glitters may still contain coatings and additives that leach into the water as the particle degrades, potentially making them more chemically active in the short term than conventional plastic.

**Mica** is a common mineral alternative used in cosmetics. Elemental analysis revealed that synthetic mica glitter contained a wider range and higher quantities of metals—including aluminum, iron, manganese, and titanium—compared to PET glitter. In terms of biological toxicity to duckweed, synthetic mica showed "little effect" compared to the high toxicity of MRC. However, mica glitters can still reduce the biomass of primary producers in the water.



## Ok Queen, Now What?

"Eco-friendly" alternatives often rely on coatings and additives to maintain their shine, which can make them chemically active and toxic in aquatic environments. Therefore, biodegradable materials are not necessarily safer than conventional plastics. When it comes to makeup and cosmetics, mica (ideally ethically sourced) is better for contact with skin, but not necessarily for the environment. You can opt for natural, organic makeup.

## Makeup, the Better Options

Brands like Inika, Ilia, RMS, Und Gretel, ĀTHR BEAUTY, NUI Cosmetics, or (M)ANASI, use mica instead of glitter, and generally avoid microplastics, PET or PVC, microbeads. Great news, but even organic makeup needs to add some color to its natural shine, so heavy metals are oftentimes still used. Like Titanium Dioxide (CI 77891) and Iron Oxides (CI 77491) in RMS Beauty Eyelights Cream Eyeshadow Luster. Sounds bad in this context, but organic makeup is healthier than the traditional products. Just make sure to avoid propylparaben and butylated hydroxytoluene (BHT).

