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End-of-life myths and facts about cosmetic ingredients

Personal care products end their lifecycle in water, where poor biodegradability is a concern. But what exactly does it mean when a product is biodegradable? Are natural products always more biodegradable than their synthetic counterparts? We examine six commonly held notions about biodegradability to help set the record straight.

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1. Biodegradation just happens.

Biodegradation is actually an active process. Microorganisms like bacteria and fungi do most of the work by breaking down organic matter and using the nutrients for energy and growth or making it available to the environment. Wind and light can weaken chemical bonds and accelerate biodegradation. Temperature and other environmental conditions have an impact on the process as well.

2. Biodegradation is a disappearing act.

In some ways, yes. When a product is biodegradable, it decomposes and the carbon and other elements in its molecules get ready to start a new chapter. Once they are broken down, they can be assimilated into new biomass so they can reappear in another form later.

3. Biodegradability is about time.

Absolutely correct. When assessing the biodegradability of a substance, "Can it biodegrade"? is not the only question. We also want to know: "How long will it take to biodegrade"? The key factor is how fast the process takes place. For example, according to OECD norms, substances that qualify as "readily biodegradable" are degraded by at least 60 percent within 28 days under test conditions designed to resemble water treatment plants. Persistent substances, in contrast, can remain unmodified for hundreds of years.

4. Only natural products can biodegrade.

Depending on the way they are designed, synthetic substances can also biodegrade, sometimes even better and faster than some natural substances. Some types of polyurethane, for example, contain chemical bonds found in nature and are easily biodegradable. On the other hand, synthetic polymers like polyolefins or polyacrylates are not generally biodegradable and can accumulate in the environment.

5. Natural polymers are more biodegradable in cosmetics.

Natural doesn't always mean more biodegradable. Some natural polymers are very stable and can take longer to biodegrade than synthetic polymers. In the case of cosmetic ingredients, natural polymers such as cellulose are often chemically modified in order to improve their performance or compatibility in formulations. These modifications can strongly reduce biodegradability.

6. Liquid polymers used in hairstyling products are biodegradable in water.

Actually, the biodegradability of a polymer depends mainly on its chemical structure and not on its physical form. A liquid or water-soluble polymer is not necessarily biodegradable in water. That's why biodegradability testing of each individual substance is crucial to avoid potential accumulation in the environment. Polyurethane-based liquid polymers are good candidates for use in biodegradable hairstyling formulations since they contain naturally occurring bonds that are known to biodegrade in the environment and be broken down by microorganisms as part of their natural metabolic activity.



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