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Biodegradable plastics: distinguishing the real from the fake

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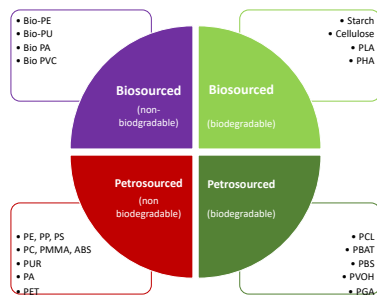
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Sheet 5: Biodegradable plastics: distinguishing the real from the fake

by Jean-François Ghiglione & Marie-France Dignac

Biosourced, biodegradable, compostable, bioplastic, what are we talking about?



- **Biodegradable:** Ultimate transformation of the polymer by microorganisms into biomass and CO₂, CH₄ or mineral salts.
- **Biosourced:** Polymer produced from biomass, as opposed to petrosourced made of fossil origin. Biosourced is not necessarily associated with biodegradability.
- **Bioplastic:** Biosourced and/or biodegradable.
- **Compostable:** Complete biodegradation under industrial and/or domestic composting conditions.¹³

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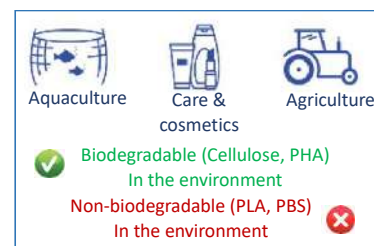
Note: These definitions only consider the polymer, which constitutes part of the plastic, without taking into account additives¹⁴. The term bioplastic is rarely used, because it is misleading and suggests that a biosourced polymer is ecological.

Biodegradable plastics do not replace conventional plastics

If the market has been increasing slightly over the past ten years, **biosourced and biodegradable plastics** (see [Sustainable alternatives to plastics](#)) represent less than 1% of plastic production.

Biodegradable plastics are only of interest for products whose end of life is mainly in the environment (cosmetics, agricultural mulch films, fishing nets, etc.). **They are not intended to replace all conventional plastics**¹⁴.

Let us remember that the history of biosourced materials in the 19th century (latex, resins, cotton, etc.) is punctuated by serious attacks on the environment and human rights¹⁵.



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Current standards do not represent the reality of the environment



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Several scientific studies have shown that **current standards (ISO, AFNOR) do not reflect the reality of the environment**, with so-called “biodegradable” plastics which do not show signs of biodegradation after several years in the natural environment. The question of the biodegradability of additives is not addressed. **The collection system for compostable plastics is difficult to set up and they are generally not biodegradable in the environment**¹⁶.

¹³ Gontard et al. (2019) Les bioplastiques biodégradables et compostables. Sphere.

¹⁴ Paul-Pont et al. (2023) Discussion about suitable applications for biodegradable plastics regarding their sources, uses and end of life. Waste Management Journal. <https://doi.org/10.1016/j.wasman.2022.12.022>.

¹⁵ Altman 2021. The myth of historical bio-based plastics. Science, 373(6550), pp.47-49.

¹⁶ Napper & Thompson (2019). Environmental deterioration of biodegradable, oxo-biodegradable, compostable, and conventional plastic carrier bags in the sea, soil, and open-air over a 3-year period. Environmental science & technology. <https://doi.org/10.1021/acs.est.8b06984>.

Plastics : Poison most handy

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