# Study exposes serious health risks in starch-based bioplastics once deemed safe



Research has recently raised alarming questions about the health implications of starch-based bioplastics, materials often promoted as more sustainable alternatives to traditional petroleum-based plastics. An influential study published in a peer-reviewed journal found that these bioplastics, while biodegradable, can potentially be as toxic as their petroleum counterparts, leading to serious health risks.

Bioplastics are frequently touted as environmentally friendly options, as they break down faster than conventional plastics and are derived from renewable sources such as corn, rice, and sugar. They find their way into a variety of products, from fast fashion apparel to disposable cutlery. However, the new research indicates that long-term exposure to starch-based bioplastics can result in significant health issues, including organ damage and alterations to metabolic functions.

Yongfeng Deng, a co-author of the study, commented that “biodegradable starch-based plastics may not be as safe and health-promoting as originally assumed,” which is especially worrying given their prevalence in everyday items. The study further highlights that these plastics could lead to gut microbiome imbalances and increased risks for cardiovascular diseases and other metabolic disorders. Such findings contradict the perception that bioplastics are inherently safe for human health.

Parallel studies have added weight to these concerns, indicating that leachates from both conventional and bioplastics can have detrimental effects on organisms. Research involving *Caenorhabditis elegans*, a model organism, revealed that leachates from bioplastics were even more toxic than those from traditional plastics, affecting lifespan and locomotion, and inducing neurotoxicity. This calls for a re-evaluation of the safety standards in bioplastic production.

Despite their promise, the bioplastics market is rife with complications. Many are not as easily compostable as advertised. Reports have surfaced showing that even when these materials do break down, they can release hazardous additives such as endocrine disruptors and PFAS into the environment. This is particularly concerning as stricter regulations and standards are often lacking, leading to a proliferation of subpar bioplastics in the market.

Research has also demonstrated that UV exposure can enhance the toxic properties of bioplastics, indicating that degradation processes might not yield harmless results as previously assumed. This fear of toxicity resonated in a statement from industry advocates, who have critiqued studies claiming bioplastics pose greater risks, suggesting that they may not adequately represent scientific consensus on bioplastic safety.

The rapid expansion of bioplastic production — with estimates suggesting a projected doubling of use within five years — poses urgent challenges for regulatory bodies and consumers alike. The industrial push for bioplastics, substantiated by claims about carbon footprints and sustainability, can obscure pressing health and environmental concerns. Activists and researchers alike advocate for more comprehensive studies and regulations to ensure that bioplastics, while potentially beneficial, do not perpetuate the toxic legacies of traditional plastics.

As the conversation around bioplastics evolves, it becomes clear that while innovations may offer partial solutions to plastic pollution, they may also introduce new risks that society must confront. Until more robust safety standards and research are established, consumers may need to remain cautious about the purported benefits of bioplastics in their daily lives.

**Reference Map**

* Paragraph 1: [[1]](https://www.theguardian.com/environment/2025/may/13/starch-based-bioplastic-petroleum-plastic-study)
* Paragraph 2: [[1]](https://www.theguardian.com/environment/2025/may/13/starch-based-bioplastic-petroleum-plastic-study), [[3]](https://www.ft.com/content/39ec3f72-5840-4127-9c8f-f1f8d5bf036d)
* Paragraph 3: [[1]](https://www.theguardian.com/environment/2025/may/13/starch-based-bioplastic-petroleum-plastic-study), [[4]](https://news.mongabay.com/2024/04/bioplastics-as-toxic-as-regular-plastics-both-need-regulation-say-researchers/)
* Paragraph 4: [[2]](https://pubmed.ncbi.nlm.nih.gov/38914198/), [[5]](https://news.mongabay.com/2024/07/most-compostable-bioplastics-are-anything-but-says-new-report/)
* Paragraph 5: [[6]](https://pubs.acs.org/doi/10.1021/acs.est.3c02193), [[7]](https://www.european-bioplastics.org/press-statement-european-bioplastics-debunks-scientifically-questionable-study-on-compostable-plastics/)
* Paragraph 6: [[1]](https://www.theguardian.com/environment/2025/may/13/starch-based-bioplastic-petroleum-plastic-study), [[4]](https://news.mongabay.com/2024/04/bioplastics-as-toxic-as-regular-plastics-both-need-regulation-say-researchers/)
* Paragraph 7: [[1]](https://www.theguardian.com/environment/2025/may/13/starch-based-bioplastic-petroleum-plastic-study), [[3]](https://www.ft.com/content/39ec3f72-5840-4127-9c8f-f1f8d5bf036d), [[6]](https://pubs.acs.org/doi/10.1021/acs.est.3c02193)

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## Bibliography

1. <https://www.theguardian.com/environment/2025/may/13/starch-based-bioplastic-petroleum-plastic-study> - Please view link - unable to able to access data
2. <https://pubmed.ncbi.nlm.nih.gov/38914198/> - A study published in the journal *Science of the Total Environment* investigated the toxicity of leachates from plastics and bioplastics using *Caenorhabditis elegans* (C. elegans) as a model organism. The researchers found that leachates from both types of plastics reduced the lifespan, decreased locomotion, and induced neurotoxicity in C. elegans. Notably, leachates from bioplastics were found to be more toxic than those from conventional plastics, suggesting that both materials pose ecotoxicological and human health risks. The study emphasizes the need for further research into the safety of bioplastics. ([pubmed.ncbi.nlm.nih.gov](https://pubmed.ncbi.nlm.nih.gov/38914198/?utm_source=openai))
3. <https://www.ft.com/content/39ec3f72-5840-4127-9c8f-f1f8d5bf036d> - An article from the *Financial Times* discusses the rise of bioplastics as a sustainable alternative to conventional plastics. It highlights that bioplastics are derived from renewable sources like corn, seaweed, and sugarcane, and are promoted for their smaller carbon footprint and biodegradability. However, the article also points out that bioplastics face scrutiny due to varying degrees of compostability, chemical similarities to fossil-based plastics, and the inclusion of toxic additives. The piece calls for stricter regulations and standards to ensure the genuine eco-credentials of bioplastics. ([ft.com](https://www.ft.com/content/39ec3f72-5840-4127-9c8f-f1f8d5bf036d?utm_source=openai))
4. <https://news.mongabay.com/2024/04/bioplastics-as-toxic-as-regular-plastics-both-need-regulation-say-researchers/> - A report from *Mongabay* highlights emerging research indicating that plant-based plastics, like bioplastics, contain numerous synthetic chemicals, many of which are extremely toxic. The article notes that while bioplastics are marketed as sustainable alternatives, the chemical processes used in their manufacture and the additives required for desired attributes can be hazardous. The piece emphasizes the need for regulation of both bioplastics and conventional plastics to mitigate health and environmental risks. ([news.mongabay.com](https://news.mongabay.com/2024/04/bioplastics-as-toxic-as-regular-plastics-both-need-regulation-say-researchers/?utm_source=openai))
5. <https://news.mongabay.com/2024/07/most-compostable-bioplastics-are-anything-but-says-new-report/> - An article from *Mongabay* discusses a new report revealing that many 'compostable' bioplastics do not break down as claimed. The report highlights that even if bioplastics decompose, they can release toxic additives, including PFAS and endocrine disruptors like BPA, into the environment. The piece underscores the potential health risks associated with these substances and calls for more stringent regulations to ensure the safety of compostable bioplastics. ([news.mongabay.com](https://news.mongabay.com/2024/07/most-compostable-bioplastics-are-anything-but-says-new-report/?utm_source=openai))
6. <https://pubs.acs.org/doi/10.1021/acs.est.3c02193> - A study published in *Environmental Science & Technology* examines the toxic properties of weathered commercial bioplastic bags under UV exposure. The research found that increased UV exposure led to stronger toxic effects in compostable materials, suggesting that degradation can enhance toxicity. The study highlights the need for further investigation into the environmental and health impacts of bioplastics, particularly as they degrade in natural conditions. ([pubs.acs.org](https://pubs.acs.org/doi/10.1021/acs.est.3c02193?utm_source=openai))
7. <https://www.european-bioplastics.org/press-statement-european-bioplastics-debunks-scientifically-questionable-study-on-compostable-plastics/> - A press statement from European Bioplastics addresses a study claiming that compostable plastics and recycled plastics are more toxic than conventional plastics. The statement criticizes the study's methodology and asserts that the findings are not supported by scientific evidence. European Bioplastics emphasizes the importance of adhering to established standards and regulations to ensure the safety of compostable plastics. ([european-bioplastics.org](https://www.european-bioplastics.org/press-statement-european-bioplastics-debunks-scientifically-questionable-study-on-compostable-plastics/?utm_source=openai))