FEATURE

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Chinese Scientists Develop Fully Bio-degradable Bamboo Plastic

China-environment news
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Petrochemical plastics have perhaps been one of humanity's greatest industrial triumphs—but also one of our biggest ecological blunders. Now Chinese researchers have developed a type of strong, bio-degradable plastic from bamboo that promises to provide an environmentally friendly "plastic".

Developed by researchers from China's Northeast Forestry University, and described as a high-strength bamboo molecular plastics (BM-plastic), the material surpasses petroleum-based plastics in strength and shapeability.

From an ecological perspective the material can fully biodegrade in soil within 50 days. Plastics made from organic biomass (such as bamboo composite plastics) have shown promise in replacing traditional oil-based plastics. Howver this new BM bioplastic offers a

superior pathway towards sustainable plastic alternatives.

The new plastic made entirely from bamboo is stronger than regular petroleum-based plastic. It handles heat above 180°C, resists heavy stress, and can be shaped using normal factory machines — just like conventional plastic.

The widespread adoption of existing bamboo composite plastics has been limited by their inferior mechanical properties. Additionally bamboo composite plastics are typically composed of bamboo fibres immersed in a plastic or resin, and thus these composites cannot be completely degraded, undermining efforts to find truly sustainable solutions to oil-based plastics, according to researchers.

This bamboo plastic fully breaks down in soil within 50 days, unlike plastic which can presist for decades. No microplastics. No toxic waste.

The research was published in Nature Communications in October 2025. The article explained that this bamboo plastic is developed by a "molecular engineering strategy to fabricate high-strength bamboo molecular plastics (BM-plastics) through a solvent-regulated shaping process."

In tests it was shown to outperform most commercial plastics and bioplastics in mechanical and thermo-mechanical metrics "while maintaining full biodegradability in soil within 50 days. It also is suitable for closed-loop recyclability with 90% retained strength."



Techno-economic analysis confirms it is cost competitive, bridging the gap between sustainability and industrial scalability. Producing the new plastic costs about $2,300 per ton—which is competitive with both oil-based and bio-based plastics.

In summary, the researchers said the "this work establishes a method for transforming abundant bamboo cellulose into high-performance, eco-friendly materials, offering a viable pathway to mitigate plastic pollution and fossil resource dependence."

Sources:

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ZME Science, October 7, 2025. https://www.zmescience.com/ecology/bamboo-plastic-biodegradable/

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