



SUMMARY

Company **Mango Materials**

Country **United States**

Founder & CEO **Molly Morse**

Postcode Lottery

Green Challenge **Winner 2012**

What **Natural biopolymers**

How **Mango Materials produces a naturally occurring biopolymer from waste biogas (methane) that is economically competitive with conventional oil-based materials.**

Founded in **2010**

Employees **20+**

Founders wisdom **"Spend a lot of time putting together your Green Challenge application. It's incredibly valuable – we still refer to it from time to time."**

A CLOSED-LOOP CARBON CYCLE

Mango Materials | Molly Morse

Humans are exceptionally thorough in making sure our plastic waste fills every corner of the earth and simultaneously they're shockingly effective in allowing methane gas to burn away the ozone layer. Methane, is a greenhouse gas emitted from industry, agriculture, and waste management activities, such as wastewater treatment plants. Molly Morse, Anne Schauer-Gimenez and Allison Pieja, founders of Mango Materials, have found a way to tackle both our plastics and methane problem.

Here's the science

They take the methane gas produced by, for example, a wastewater treatment plant and feed this to bacteria. Through a microbial process, these bacteria then produce a biopolymer called PHA (which stands for poly-hydroxyalkanoate), which is very similar to polypropylene (currently a widely-used thermoplastic). The PHA is then used to substitute "plastic" products like those found in shampoo bottles, toys, packaging etc. etc.

The difference is that the PHA-polymer can biodegrade back down to either methane (in anaerobic waste treatment plants) or can be eaten by microorganisms found in nature and be broken down this way (our current water bottles will take 450 years on average to degrade). "When you are composting, you are slowly releasing CO2 into the atmosphere. The beauty of our product – and the link to methane – is that you can actually create value with your biodegradable products. There is a commercially viable business model here," Morse explains. "Mango Materials's technique is completely cost-competitive with conventional oil-based plastics."

"Our initial vision was to give methane new life and produce a product that is not toxic to the world in a closed-loop carbon cycle," says Morse. "We've managed to figure out the technique that makes this possible, but we need to scale up significantly in order to make true and lasting impact. This is our biggest challenge now. If we want to produce shampoo bottles for a big client, for example, we need billions of pounds of material, which is logistically difficult to collect in only one biogas plant."

The biggest bang for the buck

"It seems as though we never have enough people, time or money," says Morse, "prioritizing has been a steep learning curve. This has meant that we, for example, no longer apply for grants or awards we aren't a complete match with. We can't afford to spend time on things that are likely not going to pay off. We're constantly looking where we can get the biggest bang for our buck. I don't know how I am going to pay my employees in a year's time, I'm working on it and I'll make it happen, but nothing is certain and at times that can be stressful."

In 2012, Mango Materials won the Postcode Lottery Green Challenge competition, allowing Morse to start producing sample products while simultaneously offering validation and extensive international coverage for the business. The closed-loop approach to our polymers and methane problem has continued to win Mango Materials many awards, including the Top Green Chemistry Innovator award by LAUNCH and Think Beyond Plastic's "Most Innovative Business" award in recent times.

"We're very focused on becoming fully commercialized," says Morse, "I think I underestimated how much time goes into building corporate partnerships and product development, but the good thing is that everyone is very positive and eager to make a difference or increase their sustainability profile." "Of course it helps that our product is sustainable as well as cost-competitive," Morse laughs.

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