

Biodegradable foam plastic substitute made from milk protein and clay

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Lighter-than-a-feather, this new material, made from milk protein and clay, could become a new bio-degradable substitute for traditional foamed plastics. Credit: Tassawuth Pojanavaraphan

Amid ongoing concern about plastic waste accumulating in municipal landfills, and reliance on imported oil to make plastics, scientists are reporting development of a new ultra-light biodegradable foam plastic material made from two unlikely ingredients: The protein in milk and ordinary clay.

The new substance could be used in furniture cushions, insulation, packaging, and other products, they report in the ACS' *Biomacromolecules*, a monthly journal.

David Schiraldi and colleagues explain that 80 percent of the [protein](#) in cow [milk](#) is a substance called casein, which already finds uses in

making adhesives and paper coatings. But casein is not very strong, and [water](#) can wash it away. To beef up casein, and boost its resistance to water, the scientists blended in a small amount of clay and a reactive molecule called glyceraldehyde, which links casein's protein molecules together.

The scientists freeze-dried the resulting mixture, removing the water to produce a spongy aerogel, one of a family of substances so light and airy that they have been termed “solid smoke.” To make the gossamer [foam](#) stronger, they cured it in an oven, then tested its sturdiness. They concluded that it is strong enough for commercial uses, and biodegradable, with almost a third of the material breaking down within 30 days.

More information: “Development of Biodegradable Foamlike Materials Based on Casein and Sodium Montmorillonite Clay”, *Biomacromolecules*.

Provided by American Chemical Society

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