

BIOTECHNOLOGY

★ Makes a Home More Livable ★



Biobased products can be made from renewable raw materials rather than petroleum or produced through biological processes. Consumers can buy more than **40,000** biobased products that are just as effective and priced the same as conventional petroleum-based products.¹

1 Sustainable fuels

Biofuels reduce tailpipe emissions along with reliance on fossil fuels. Biotechnology enables new, more sustainable advanced fuels and increases conventional biofuel yields.²

2 Carpets/Fabrics

One biobased polymer requires 30 percent less energy to manufacture than nylon; and it is stain resistant and more durable, for a longer life.³

3 Household Cleaners

Plant-based surfactants, solvents and other ingredients are biodegradable and can replace toxic chemicals.

4 Laundry Detergents

Enzymes efficiently break down stains in colder water. If every household in the United States lowered water temperatures in the average 400 loads of laundry each does per year, they could save \$1 billion in energy. And they could save the planet 7.4 million tons of carbon emissions.⁴

5 Food Ingredients

Vitamins and antioxidants that boost food nutrition are developed with biotechnology. Enzymes and other processing ingredients make food more affordable — for instance, by keeping food fresher longer.

6 Packaging/Bottles

Every year, 275 million tons of plastic is discarded, and as much as 12.7 million tons ends up in the ocean.⁵ Biobased plastics are recyclable and, often, biodegradable, which can reduce environmental waste.

7 Paints/Coatings

Biobased building blocks can replace petroleum-based volatile organic chemicals, without sacrificing performance or affordability.

8 Personal Care

Natural, cosmetic ingredients can be sustainably sourced from plants instead of petroleum. They can provide new properties — such as better moisturizing, for example.

The benefits of **biobased products** and **renewable chemicals**...

...start with **sustainable agriculture** and



- With insect resistant biotech crops, farmers reduced pesticide spraying by 8.1 percent from 1996 to 2015, **saving 26.2 million metric tons in carbon emissions.**
- Using microbes, algae and other biological tools enables farmers to **increase productivity and crop health while reducing chemical use.**
- By planting biotech crops, farmers **saved 7.66 million acres of pasture and forest and 900 million tons of greenhouse gas emissions.**

continue with **cleaner manufacturing.**



- Biotech processes are inherently consistent with the principles of **green chemistry.**
- Biotech processes **reduce pollution in manufacturing** by decreasing heat and energy inputs and avoiding use of toxic chemicals.
- Biotech processes can **capture carbon emissions** for reuse in biobased products.
- By 2030, biogas systems could **capture and reuse as much as 54 million metric tons of carbon emissions.**
- Biological processes naturally produce **less toxic waste.**

Source: Biotechnology Innovation Organization. "Industrial Biotechnology: A Unique Potential for Pollution Prevention." Industrial Biotechnology. Aug 2017. <http://doi.org/10.1089/ind.2017.29088.bio>.

REFERENCES

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- ⁴ Biotechnology Innovation Organization. "Industrial Biotechnology: A Unique Potential for Pollution Prevention." Industrial Biotechnology. Aug 2017. <http://doi.org/10.1089/ind.2017.29088.bio>.
- ⁵ Jambeck, J. et al. "Plastic waste inputs from land into the ocean." *Science*, 13 Feb. 2015: 768–771. DOI: 10.1126/science.1260352.