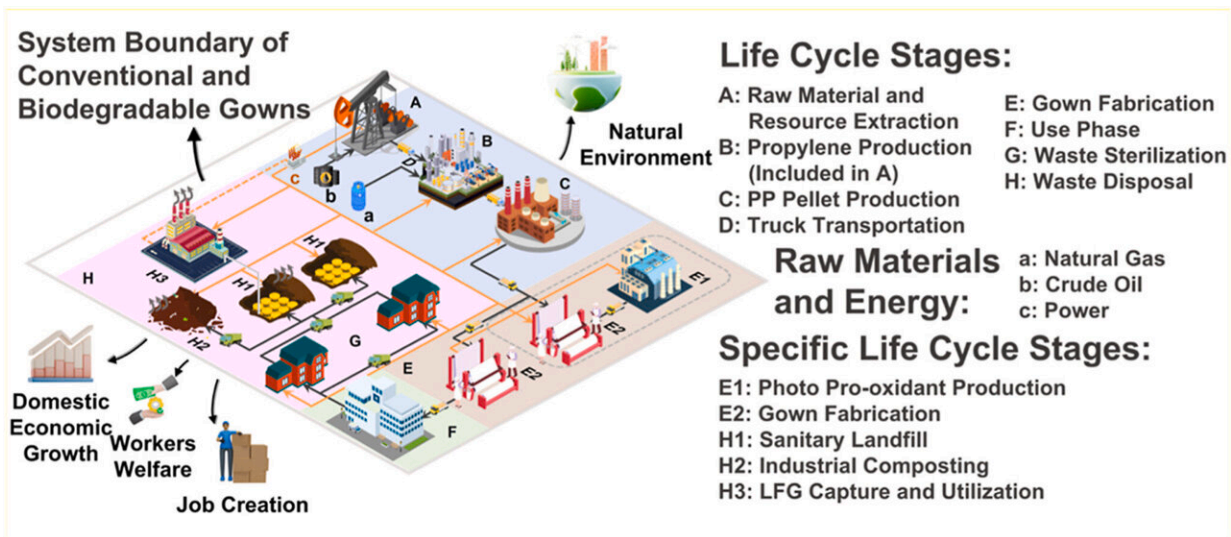


Biodegradable medical gowns may add to greenhouse gas

December 16 2022, by Blaine Friedlander



Graphical abstract. Credit: *Journal of Cleaner Production* (2022). DOI: 10.1016/j.jclepro.2022.135153

The use of disposable plasticized medical gowns—both conventional and biodegradable—has surged since the onset of the COVID-19 pandemic. Landfills now brim with them.

Because the biodegradable version decomposes faster than conventional gowns, popular wisdom held that it offers a greener option by less space use and chronic emissions in landfills.

That wisdom may be wrong.

Biodegradable medical gowns actually introduce harsh greenhouse gas discharge problems, according to new research published Dec. 20 in the *Journal of Cleaner Production*.

"There's no magic bullet to this problem," said Fengqi You, the Roxanne E. and Michael J. Zak Professor in Energy Systems Engineering, in the Smith School of Chemical and Biomolecular Engineering.

"Plasticized conventional medical gowns take many years to break down and the biodegradable gowns degrade much faster, but they produce [gas emissions](#) faster like added methane and [carbon dioxide](#) than regular ones in a landfill," said You, who is a senior faculty fellow in the Cornell Atkinson Center for Sustainability. "Maybe the conventional gowns are not so bad."

In this research led by Cornell doctoral student Xiang Zhao, biodegradable gown production poses an additional 11% higher ecotoxicity rate than conventional alternatives, according to the new paper.

Adopting landfill gas capture and utilization processes in biodegradable [gown](#) sanitary landfills can reduce 9.79% of [greenhouse emissions](#), life-cycle landfill use by nearly 49%, and save at least 10% fossil resources by employing onsite power co-generation, the researchers found.

Conventional gowns are environmentally and socially sustainable because they can pose 14% less toxicity to humans, cause 10% fewer greenhouse gas emissions, and are nearly 10% less toxic to freshwater when compared to biodegradable gowns in [landfills](#) with extra gas emissions.

Improving the gas capture efficiency above 85% can make biodegradable gowns more environmentally sustainable than conventional gowns.

"It's nice to break down the plastic into smaller things," Zhao said. "But those small things eventually decompose into gas and if we don't capture them, they become [greenhouse gases](#) that go into the air."

More information: Xiang Zhao et al, How sustainable are the biodegradable medical gowns via environmental and social life cycle assessment?, *Journal of Cleaner Production* (2022). [DOI: 10.1016/j.jclepro.2022.135153](#)

Provided by Cornell University

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