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EPA Announces Winners of the 2021 Green Chemistry Challenge Awards

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The U.S. Environmental Protection Agency (EPA) announced on June 15, 2021, the winners of the 2021 Green Chemistry Challenge Awards. EPA states that "[g]reen chemistry is the design of chemical products and processes that reduce or eliminate the generation and use of hazardous substances." According to EPA, the 2021 winners "developed new and innovative green chemistry technologies that provide solutions to significant environmental challenges, and spur innovation and economic development." The 2021 winners are:

- Professor Srikanth Pilla of Clemson University, South Carolina, for creating the first nonisocyanate polyurethane foam. Traditional polyurethane foams are widely used in the plastics industry and are typically manufactured from diisocyanates, a potential human carcinogen. This new foam is made using lignin, a natural polymer from pulp and paper waste that is derived from vegetable oils and uses no isocyanates. According to EPA, the lignin-based foams have the same mechanical properties as traditional polyurethane foams and were specifically designed for chemical recycling at the end of their life, making the foam a more environmentally friendly option.

- XploSafe, Oklahoma, for creating PhosRox, a novel sorbent used to make fertilizer. The product simultaneously removes ammonia, phosphate, and nitrate from contaminated waters. The resulting material is a granulated time-release fertilizer that can help lower dependence on manufactured fertilizers by recycling nutrients. According to EPA, this product will also help wastewater treatment operators maintain compliance with regulations and potentially generate revenue from the sale of the resulting fertilizer. EPA states that when this is added to agricultural soils, it will not only release plant nutrients slowly but, in future years, could enhance the nutrient-holding capacity of the soil, preventing fertilizer runoff and protecting the watershed.

- Colonial Chemical, Tennessee, for developing environmentally friendly, high performing Suga®Boost surfactants. While many surfactants used in traditional cleaners are made from petroleum-based materials and can be highly toxic, EPA states that SugaBoost surfactants are plant-based, biodegradable, generate no air emissions or wastewater discharges, and do

not contain known carcinogens or endocrine disruptors. According to EPA, they perform as well as or better than “toxic, energy-intensive petroleum-based surfactants, creating the potential to yield huge environmental improvements in the cleaning industry.”

- Bristol Myers Squibb, New York, for a new class of sustainable reagents -- substances used to cause a chemical reaction. The new reagents use less solvent and are derived from limonene, a waste product from discarded citrus peels, which increases sustainability and decreases environmental impact. They also can tolerate air and moisture better than traditional reagents, eliminating the need for expensive technology and specialized shipping and storage.

- Merck, New Jersey, for developing a green and sustainable manufacturing process for a drug used to treat chronic coughs. According to EPA, by incorporating green chemistry techniques into the manufacturing process, the team not only replaced two highly toxic and hazardous chemicals, it also reduced carbon monoxide and carbon dioxide emissions. According to EPA, life-cycle assessment data show that these changes are expected to decrease the carbon footprint of manufacturing this drug by more than 80 percent.

EPA recognized the winners during the virtual American Chemical Society Green Chemistry & Engineering Conference. EPA states that the 2021 awards have special meaning because it is also the 25th anniversary of the Green Chemistry Challenge Awards. During the quarter century of the Green Chemistry program, EPA and the American Chemical Society, which co-sponsor the awards, have received more than 1,800 nominations and presented awards to 128 technologies that decrease hazardous chemicals and resources, reduce costs, protect public health, and spur economic growth. According to EPA, winning technologies are responsible for annually reducing the use or generation of hundreds of millions of pounds of hazardous chemicals and saving billions of gallons of water and trillions of BTUs in energy. An independent panel of technical experts convened by the American Chemical Society Green Chemistry Institute formally judged the 2021 submissions and made recommendations to EPA for the 2021 winners.

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