

Environmental awareness fuels green chemistry

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Story Highlights

- Green chemistry: The development of products that won't hurt the environment
- Only about a dozen colleges teach green chemistry
- Yale chemistry director: Green chemistry is useless unless it is profitable
- Businesses are seeking graduates with backgrounds in green chemistry

BOSTON, Massachusetts (AP) -- Terry Collins sounds like the world's most dour pessimist.

The Carnegie Mellon University chemistry professor paints a bleak picture of the Earth's future, a planet damaged by global warming and ravaged by toxins, with a population sickened by poisonous chemicals.

"We are practicing time-limited technologies that cause all sorts of environmental damage, and are damaging to the species, to our very civilization," said Collins, director of Carnegie Mellon's Institute for Green Oxidation Chemistry in Pittsburgh.

But Collins also is an optimist, hoping science can solve those problems.

He is encouraged by an increasing number of colleges and universities that incorporate the principles of green chemistry -- the idea that chemical processes and products can be designed without using toxins or generating hazardous waste.

"When you think about chemistry, most people think about the hazards," said Paul Anastas, who coined the term green chemistry in 1991 while working at the U.S. Environmental Protection Agency. He is now director of Yale University's Center for Green Chemistry and Green Engineering.

"People think about how it's going to hurt them, how it's going to hurt the world. But green chemistry looks at how we can develop products that won't hurt the environment."

The American Chemical Society, which certifies more than 600 college chemistry programs, lists only about a dozen that teach green chemistry. But that number is growing.

Yale's center opened at the beginning of this year, while Cambridge College in Cambridge, Massachusetts, is offering an introduction to green chemistry class this fall and has the nation's first bachelor's and master's degrees in green chemistry.

Other colleges, including Carnegie Mellon and the University of Oregon, have been teaching green chemistry for years.

Students who have been brought up in an age of unprecedented environmental awareness are eager to embrace green chemistry.



Cambridge students examine a brood of irregular sized fish during a class in green chemistry.

"There's a moral imperative to do this," said Chad Ellis, a doctoral student at Carnegie Mellon and a research assistant in Collins' lab, where they are working on a process to break down toxins and make them benign in the environment.

"The biggest issue here is the exponential growth of the world's population," he said. "All those people are going to want food, light bulbs, cars, etc., and we're going to have to figure out a way to do that, because current techniques won't work."

Cambridge's program will have classes in toxicology, environmental science, sustainability and even environmental law and policy, Warner said. The subjects are not traditionally taught to chemistry majors.

Anastas points out that feel-good green chemistry is useless unless it is profitable. "Green is also the color of money," he said.

Businesses increasingly are seeking graduates with backgrounds in green chemistry, because it can help them make or save money in the development, manufacturing, disposal and cleanup of products, Anastas said.

Pharmaceutical giant Merck & Co. is developing new ways of making drugs that eliminate millions of pounds of waste, and S.C. Johnson & Son Inc.'s has reformulated some consumer cleaning products. "We need people who can understand not just optimizing their step in the chain, but people who understand the whole worldwide view," said Adam Peterson, a specialty chemicals division manager at Dow Corning Corp.

The chemistry department at the University of Oregon is trying to fill that need by developing a database of green chemistry teaching resources and annually bringing in college and high school chemistry instructors for a summer workshop.

Julie Haack, assistant head of the University of Oregon's chemistry department, estimates the program has educated 130 to 150 teachers since its inception in 2001.

"The workshop is oriented to help people go to their home institutions and build the case for green chemistry opportunities there," she said.

Dana Garves, a junior chemistry major at the University of Oregon, is a believer. She wants to become a high school chemistry teacher.

"I think by learning about and teaching green chemistry, I can open people's eyes and make a difference," she said.

Anastas envisions a day when all chemistry taught in the world's universities is considered green.

"The good news is that this is no longer a theory, it's been demonstrated, it makes money while reducing risks to humans and the environment," Anastas said. "The better news is that so far this is just the tip of the iceberg."