

Scientists develop new approaches to predict the environmental safety of chemicals

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Baylor University environmental researchers have proposed in a new study a different approach to predict the environmental safety of chemicals by using data from other similar chemicals.

For many chemicals in use every day, scientists do not have enough information to understand all of the effects on the environment and human health. In response to this, the European Union enacted the REACH regulation, which places greater responsibility on industry to manage the risks from chemicals and to provide safety information on the substances. The Registration, Evaluation, Authorisation and Restriction of [Chemical Substances](#) (REACH) [regulation](#) was enacted in 2006 and requires manufacturers and importers to gather information on the properties of their [chemical](#) substances and to register the information in a central database. Regulators say the goal of REACH is to improve the protection of [human health](#) and the environment through better and earlier identification of the harmful properties of chemical substances.

In the Baylor study, researchers suggest using data from other chemicals, such as what concentrations can cause toxicity in [aquatic organisms](#) to predict the toxicity of another chemical that scientists expect causes toxicity in the same way.

"This study proposes one approach to advance the three R's of [sustainability](#) – reduce, replace, refine – for studying biological impacts of chemicals in the environment," said study co-author Dr. Bryan

Brooks, associate professor of environmental science and biomedical studies and director of environmental health science at Baylor.

"Identifying, testing and implementing new approaches to leverage available information to support better environmental decision-making remains a critical need around the world."

Baylor researchers used statistical and mathematical techniques called chemical [toxicity](#) distributions to understand the relative potency of two groups of chemicals. They then used these findings to develop environmental safety values, which they hope will help determine the environmental impacts of chemical substances without unnecessary testing on animals.

"The biggest hurdle we face when protecting public health and the environment is the general lack of information," said study co-author Dr. Spencer Williams, a research scientist at Baylor. "The approach we propose should help prioritize the selection of chemicals and organisms for additional safety assessments. Instead of having to test similar chemicals on many organisms over and over again, scientists could estimate safety levels using fewer tests, which could be more efficient without compromising environmental safety."

The study appears online in the journal *Environmental Toxicology and Chemistry*.

Provided by Baylor University

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