

## EPA's Consolidated Pesticide Information Dataset (CPI)

### What information is CPI?

EPA scientists have developed the Consolidated Pesticide Information Dataset (CPI) — a spreadsheet dataset compiled from multiple sources that contains basic information for approximately 1,700 pesticides. The CPI dataset is located at [www.epa.gov/heads/research/cpi.html](http://www.epa.gov/heads/research/cpi.html).

The dataset contains a total of twenty fields, including chemical names, identification numbers, structures, and pesticide-use classes (such as insecticide, herbicide, and fungicide). The CPI dataset provides important information for those interested in pesticide mixtures, green or sustainable pesticides, development of methods and models (e.g., analytical and QSAR), or other areas of pesticide research. The dataset also consolidates information scattered widely throughout the Internet, including published and unpublished scientific literature.

### Chiral chemicals

In developing the CPI database, EPA scientists used a combination of computer modeling and expert judgement to evaluate each pesticide structure to determine if it was chiral. The term chiral is used to describe objects that cannot be superposed on their mirror image. Human hands are a common example of chirality. They are



mirror images of each other, but if you try to stack them, your thumbs will be on opposite sides.

Chiral compounds have two forms that are mirror images of each other. These mirror images — known as enantiomers — can degrade differently from one another in the environment. Research shows that the less toxic enantiomer sometimes degrades faster, thus increasing the toxicity of the remaining mixture. Other times, the more toxic enantiomer degrades faster in the environment, thus decreasing the toxicity of the remaining mixture.

### One-stop shop for chiral pesticide data

EPA's CPI database is the only known resource that explicitly

evaluates chirality. Of the 1,693 pesticides in this dataset, 482 (28 percent) are chiral. With CPI, researchers can quickly develop a list of insecticides, chiral insecticides, or chiral insecticides that have analytical methods available.

Scientists routinely conduct exposure, toxicity and degradation research on small groups of related pesticides. Some pesticides are mixtures of several chemicals or even different forms of the same chemical.

Because of the complexity of pesticide mixtures, they provide special challenges for monitoring environmental concentrations and for predicting exposures, effects and risks.

The CPI dataset provides researchers with pesticide information that can be sorted and searched a variety of ways. Modelers can use the pesticide structures presented to determine if a reaction might happen, if a pesticide will degrade under certain conditions and how it might be transported in the environment or to humans. As such, the dataset provides a one-stop shop and starting place for important information about chiral pesticides.

#### Reference:

Ulrich, E. M.; Morrison, C. N.; Goldsmith, M. R.; Foreman, W. T., Chiral Pesticides: Identification, description, and environmental implication. Reviews of Environmental Contamination and Toxicology 2012, 217, 1-74.

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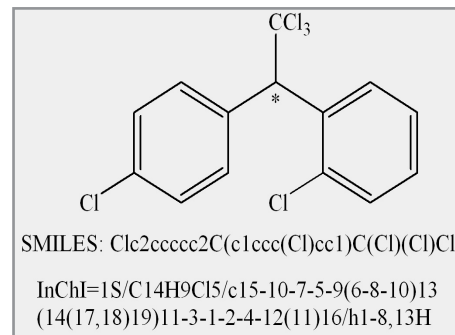
#### More Information:

EPA's Consolidated Pesticide Information Dataset (CPI):

[www.epa.gov/heads/research/cpi.html](http://www.epa.gov/heads/research/cpi.html)

EPA Chemical Safety Research:

[www.epa.gov/research/chemicalscience](http://www.epa.gov/research/chemicalscience)



The Consolidated Pesticide Information Dataset (CPI) includes one-and-two-dimensional structures, like the one shown for *o,p'*-DDT. The asterisk shows the location of a chiral center.