

PBT Profiler Case Study
Bayer's Experience In The Use And Application Of The PBT Profiler for Predicting Persistence, Bioconcentration and Aquatic Toxicity of Chemical Substances
May 2003

Bayer's Goals:

- Determine the potential PBT characteristics of product alternatives under consideration at R&D
- Understand the extent to which the PBT Profiler provided other data that would help identify the most environmentally preferable alternatives.

Purpose:

Bayer Corporation wanted to evaluate the applicability of the PBT Profiler to Bayer's stewardship objectives. In particular, Bayer desired to use the PBT Profiler to evaluate nine materials in the early stages of research and development that were under consideration for commercialization. Bayer sought to learn if the PBT Profiler could provide useful information, in real time, without significant resource implications.

PBT Profiler Tool

The PBT Profiler is a simple, user friendly, web-based computerized screening level tool that can indicate the persistence (P), bioconcentration potential (B), and fish chronic toxicity (T) of discrete organic chemical substances, in the absence of data. The PBT Profiler can help prioritize chemicals at R&D by predicting potential PBT characteristics. The PBT Profiler also compares P, B, and T results to EPA regulatory criteria for PBT-related action under the Toxic Release Inventory (TRI) and the New Chemical provisions of the Toxic Substances Control Act (Premanufacture Notice (PMN) requirements). The PBT Profiler also provides other pollution prevention-related information.

The PBT Profiler was developed by the Environmental Protection Agency, with contributions and Beta testing by the American Chemistry Council, The Synthetic Organic Chemical Manufacturers Association, The Chlorine Chemistry Council, Environmental Defense and the University of New Hampshire. The PBT Profiler is available for use, at no cost, on the Internet at: www.pbtprofiler.net

In Using the PBT Profiler

Bayer found that:

- No additional resources are necessary in terms of equipment and computer power.
- The assessment methodology is readily available on the web at no cost to the user.
- Provisions were adequate to ensure the confidentiality of Bayer's product information.
- Results were returned to Bayer virtually instantaneously.
- R&D materials, not yet assigned a CAS Number, were readily assessed using the drawing tool to formulate SMILES notation.

Results:

- The PBT Profiler provided Bayer both summary and detailed information on the chemicals under evaluation. The summary information was particularly valuable in that it allowed Bayer to predict that none of the product alternatives under consideration were likely to exceed EPA PBT criteria. This gave Bayer the confidence to conclude that the use of any of the alternatives under consideration would result in a product that is PBT free.
- Having determined that all the alternatives were likely to be PBT free, Bayer continued to use the PBT Profiler to determine the extent to which the Profiler provided additional information that allowed Bayer to discriminate or otherwise differentiate among product alternatives based on PBT-related and other risk-related characteristics. Although no chemicals were found to be P, B, and T, by using a tiered approach, Bayer was able to rank the chemicals in order of environmental friendliness. Some product alternatives had more appealing environmental qualities, (i.e. very low P, B, and T, or high in only one characteristic) while continuing to meet Bayer's stringent performance characteristics.

As a result, this analysis allowed Bayer to quickly and cost effectively rank product alternatives based on potential PBT characteristics, and to identify those alternatives with optimum environmental characteristics.

Confidential business information restrictions prevent Bayer from providing specific chemical information.

Other Observations

The PBT Profiler allowed Bayer to enhance the companies stringent product stewardship program and to move forward with the more environmentally friendly alternative(s).

Acknowledgment

Bayer appreciates the help and support of the Chemical Engineering Department at the University of New Hampshire during the development of this case study.

If you have questions or if you would like to discuss this case study, contact:

Robin Ruppel-Kerr
Manager Product Safety
Product Safety & Regulatory Affairs
Bayer
100 Bayer Road, Building 5
Pittsburgh, PA 15205-9741
Phone 412-777-2285
Fax: 412-777-7484
Email: robin.ruppel-kerr@bayerpolymers.com