



News release

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Smart biotechnology for toxic waste

Australian scientists have discovered a new technology that can easily break down recalcitrant chlorinated hydrocarbons (CHC) on-site. Most CHCs are highly toxic products or by-products of chemical reactions and are associated with some well known environmental problems.

“Our technology is based on the use of granulated activated carbon which together with a common solvent and an electron enhancer helps hydrogen turn a CHC into a hydrocarbon and salt, thereby converting a harmful compound into harmless ones”, said Dr David Garman, Executive Director of Environmental Biotechnology CRC (EBCRC).

“We also add a biologically based compound, such as a vitamin, to assist an inorganic reduction of CHCs. These are very stable organic compounds and without the additional boost the reaction is so slow and inefficient that it had previously been rejected as a viable clean-up process. “

“The technology mimics a biological process by using molecules to assist with reactions that wouldn’t occur under normal conditions.”

The novel process, developed by EBCRC researchers at Murdoch University and the University of New South Wales, allows the re-use of activated granulated carbon used to remove and breakdown CHCs. The process regenerates activated granulated carbon by solubilising the bound halogenated hydrocarbons to a gas and a liquid which will allow their safe destruction. The activated carbon is then recycled for reuse or disposed of as a low impact waste.

Current CHC disposal methods include rotary kiln incineration which involves the establishment of expensive infrastructure and makes the activated carbon less active, thus compromising its future use. Therefore, due to its expensive nature and the loss of activated carbon, existing users simply store the contaminated material.

“Cleanup of halogenated hydrocarbons from industrial and commercial processes is an ongoing and expensive undertaking. One of the great features of our technology is that the novel in-vessel process can be transported to the contaminated site. This is a critical feature when transport or incineration of waste material is undesirable”, Dr Garman continued.

“There is an increasing awareness of the detrimental effects of CHCs on human health as well as the environment at large. Our technology will definitely contribute towards a cleaner and healthier environment”, Dr Garman concluded.

CHCs represent a large group of synthetic chemical compounds whose physical and chemical properties give them a broad range of applications such as pesticides and dry cleaning solvents. CHCs have a number of negative health effects: they have been shown to be highly carcinogenic and hepatotoxic. Due to the highly stable nature of the carbon-chlorine bond, CHCs are very resistant to normal biological degradation. Consequently, these compounds are environmentally persistent and because of their lipid solubility, multiply through the food chain.

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