Reference 3

# Japan de-toxicates PCBs with U-V

Two Japanese research bodies have announced successful attempts to almost completely de-toxicate polychlorinated biphenyls (PCBs) by means of ultra-violet rays.

One of the bodies, the semi-governmental Institute of Physical and Chemical Research, dissolved 0·2 grammes of PCB and 0·07 of a metallic sodium in 10 millilitres of 2-propyl alcohol, then bombarded the solution with ultra-violet rays from a 6-watt mercury lamp. All chlorine was precipitated as sodium chloride and a near-complete result was obtained in six hours and 40 minutes of operation.

The Tokyo Metropolitan Industrial Technology Centre conducted its research on a larger scale and obtained an almost complete result on 1·96 grammes of PCB with a 100-watt mercury lamp in 15 minutes.

European Chemical News, September 29, 1972

Reference 4

# *PCBs Yield to Good Vibes, Bugs*

Discovery of a scientific technique for rendering polychlorinated biphenyls virtually harmless also may help answer environmental problems related to a whole range of other persistent toxic chemicals.

Dr. Dickson Liu, a research scientist at the Canada Centre for Inland Waters in Burlington, Ontario, is responsible for the breakthrough. It involves a newly-developed strain of bacteria and a special technique for providing them access to the hitherto almost indestructible compound.

PCBs are highly valued as electrical insulating fluids because of their resistance to fire. The compound has become an environmental health problem, however, because it degrades extremely slowly.

The oil, PCB material is highly insoluble in water. Thus, its carbon content remained largely inaccessible as a food source for bacteria. Dr. Liu reasoned that the solution might be found through increasing the PCB-to-water interface. Ultrasonic vibration was used to disperse the PCBs into very fine particles, and a common pulp-mill effluent was then added to maintain an emulsified suspension of the chemical.

This technique provided the opportunity to introduce bacteria, obtained from sewage sludge, which feed on the dispersed PCBs. A highly-acclimated strain of bacteria is so effective that even the most chlorinated and stubborn members of the PCB family, such as arochlor 1254, are reduced in one week from concentrations of 300,000 parts per billion to 19 ppb, Dr. Dickson claims.

The value of the discovery is seen in treatment of PCB-rich industrial wastes and in disposing of such things as transformers which contain the chemical. The new technique may not answer the problem of PCBs already in the environment nor be applicable to diffuse sources in which the pollutant already has been mixed with other effluents.

Still in the developmental stage, a pilot plant is being planned at the Canada Centre for Inland Waters. Dr. Liu also is commencing experiments with the new bacteria on pesticides such as lindane and chlordane.



Dr. Liu treats PCB with high-frequency sound waves in a sonic dismembrator.

Chemeology April 1976

**NEW BACTERIA DISCOVERED WHICH DECOMPOSES PCBs: . . . Canadian researchers have isolated a new strain of bacteria which decomposes one of the most persistent water pollutants--polychlorinated biphenyls (PCBs). The bacteria are commonly found in sewage and are capable of breaking down PCBs into carbon dioxide and organic acids. So far, testing of the bacteria has been accomplished in the laboratory. However, the Canadian government is planning to build a pilot plant this year for large scale tests. Additional information on this project can be obtained by writing Environment Canada, Toronto, Canada.**

Pollution Engineering, August 1976

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