

The Fate of Endosulfan in Water

H. M. Shivaramaiah,^{1,2} F. Sanchez-Bayo,^{1,3} J. Al-Rifai,^{1,4}
and I. R. Kennedy¹

¹Department of Agricultural Chemistry and Soil Science, University of Sydney, Australia

²Department of Food Protectants and Infestation Control, Central Food Technological Research Institute, Mysore, India

³Laboratory of Pesticide Toxicology, Faculty of Horticulture, Chiba University, Matsudo-shi, Chiba-ken, Japan

⁴Department of Civil, Mining, and Environmental Engineering, University of Wollongong, Australia

Although the use of endosulfan to control cotton pests has declined, this insecticide still has widespread application in agriculture and can contaminate riverine systems as runoff from soil or by aerial deposition. The degradation of endosulfan in pure water at different pH values of 5, 7 and 9 and in river water from the Namoi and the Hawkesbury rivers of New South Wales (NSW), Australia, was studied in the laboratory. Endosulfan transformation into endosulfan sulfate in river water using artificial mesocosms was also investigated. The results show endosulfan is stable at pH 5, with increasing rates of disappearance at pH 7 and pH 9 by chemical hydrolysis. Incubation of endosulfan with river water at pH 8.3 resulted in the disappearance of endosulfan and the formation of endosulfan diol due to the alkaline pH as well as formation of endosulfan sulfate. Although the degradation of endosulfan by *Anabaena*, a blue-green alga, did not result in the transformation of endosulfan to endosulfan sulfate, we conclude that other microorganisms catalyzed the formation of the sulfate. Significant conversions of endosulfan into endosulfan sulfate were also reported from associated field studies using artificial mesocosms containing irrigation water from rivers inhabited by micro-macro fauna. From these results, we conclude that the presence of endosulfan sulfate in river water cannot be used to distinguish contamination by runoff from soil from contamination by aerial drift or redeposition.

Key Words: Endosulfan; Degradation; Water; Endosulfan sulfate; Blue-green algae.

INTRODUCTION

Endosulfan (6,7,8,9,10,10-hexachloro-1,5,5a,6,9,9a-hexahydro-6,9-methano-2,3,4-benzo-dioxathiepin-3-oxide) is a cyclodiene organochlorine currently used

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Address correspondence to H. M. Shivaramaiah, Ph.D., Department of Food Protectants and Infestation Control, Central Food Technological Research Institute, Mysore-570020, India; E-mail: Shivramaiah@yahoo.com