

Monitoring Field Applicator Exposure to Pesticides

T. L. LAVY and J. D. MATTICE

Alzheimer Laboratory, Department of Agronomy, University of Arkansas, Fayetteville, AR 72701

For the past 6 years the research team at the pesticide laboratory of the University of Arkansas has been conducting research on pesticide applicator exposure studies. During this period we have analyzed over 9000 samples from nine different studies to evaluate applicator exposure to 2,4,5-T, 2,4-D, 2,4-DP, paraquat, EPN, MSMA, picloram, and methyl parathion. During these studies we have attempted to determine, not only how much exposure applicators receive, but also how large a dose they absorb. We have attempted to learn how to best collect samples incorporating quality controls which allow us to best evaluate exposure and dose measurements. The results of our individual studies have been published elsewhere (see related literature following the references). Consequently, the primary purpose here is to present further details and some general conclusions of these studies. In addition, we offer our opinions on how best to design and conduct exposure studies.

Exposure and Dose

The following three parameters are involved in determining the potential health effects of pesticides on humans: 1) toxicity of the compound, 2) absorbed dose, and 3) absorption and excretion rates.

It is important to note the difference between exposure and dose. Exposure to a chemical occurs when a person makes contact with a chemical. Unless the compound causes damage to the part of the body it comes into contact with, exposure per se does not represent a danger. The absorbed dose may be defined as that amount of the chemical that actually gets inside the body. The amount that enters the body is related to the amount of exposure occurring but many factors play a role in determining the fraction of the exposure that is absorbed into the body. Some of these factors probably controlling the absorption include the binding properties of the chemical, volatility of the chemical, resistance to photodecomposition, the moisture and lipophilic