DEVELOPMENT OF AN IMMUNOASSAY METHOD FOR THE DETECTION OF ALACHLOR IN AGRICULTURAL WORKERS' URINE: CORRELATION WITH A GAS CHROMATOGRAPHIC (GC) CHEMICAL METHOD

By Raymond E. Biagini, Ph.D.
NIOSH, Cincinnati, Ohio

A NIOSH field study of commercial pesticide applicators was conducted to characterize their exposure to alachlor, a major component of Lasso, which is a commonly used pre-emergent herbicide. To assess exposure and estimate uptake of alachlor, worker urine samples were analyzed using two different techniques for alachlor or its metabolites. The first was a published gas chromatographic method for analysis of urinary alachlor metabolites. We also developed an enzyme-linked immunosorbent assay (ELISA) method. The ELISA method is based on the use of antibodies directed against alachlor. The antibodies are also tagged with an enzyme whose reaction products are colored; adding the substrate of the enzyme to the reaction mixture yields varying intensities of color which are related to alachlor concentration. Preliminary results indicate a high correlation between the two methods. Immunochemical technology appears to be a viable alternative to traditional wet chemical and instrumental methods of analyses for assessing exposures in agricultural environments. Benefits of this technology include simpler sample preparation, reduced cost and analysis time, and the potential for onsite field measurements. A detailed description of the ELISA method and the results of the analyses for the field study samples will be presented.

THE USE OF CONTINUOUS EXPOSURE MONITORING COMBINED WITH VIDEO TASK ANALYSIS TO CHARACTERIZE AND PREVENT OCCUPATIONAL HAZARDS IN AGRICULTURE

By James A. Gideon, Ph.D., Mike Gressel, Leroy Mickelsen, M.S.
NIOSH, Cincinnati, Ohio

NIOSH researchers have developed a powerful new technique that combines two separate tools for analyzing occupational hazards: videotaping and "real-time" continuous exposure monitoring. The level of hazard exposure can then be superimposed onto the videotape in the form of a moving bar. This permits a simultaneous inspection of individual tasks that are performed during a workday and of the exposures associated with each task. The result is a much clearer understanding of the sources of exposures and the ability to formulate a much more specific intervention strategy. This technique applies to chemical, physical, ergonomic, and any other hazards for which the level of hazard can be continuously monitored. A videotape of industrial processes demonstrating this technique will be available.

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