measured and compared to the manufacturer claim. The retention of structurally related compounds was also quantified and compared to published claims. Applications to the clean-up of spiked samples of apple juice, animal derived-food and algae extracts was also carried out in order to check for the efficiency of these columns to clean-up such complex matrices.

105.
WITHDRAWN.

106.
CLINICAL BIOLOGICAL MONITORING USING IMMUNOBIOCHEMICAL METHODS. ***Cynthia A.F. Striley***[1], *Raymond E. Biagini*[1], *John E. Snawder*[1], *Barbara A. MacKenzie*[1], *and Cynthia J. Hines*[2]. *(1) Division of Biomedical and Behavioral Science, National Institute for Occupational Safety and Health, 4676 Columbia Parkway, Mailstop C-26, Cincinnati, OH 45226, fax: 513-533-8494, chs3@cdc.gov, (2) Division of Surveillance, Hazard Evaluations and Field Studies, National Institute for Occupational Safety and Health, 5555 Ridge Ave, Mailstop R-14, Cincinnati, OH 45213*

Monitoring of urinary metabolites from pesticide applicators' has been routinely used in NIOSH field studies. Commercially available enzyme linked immunosorbant assays (ELISAs) have been successfully used for screening. Currently we are investigating immunochemical biological monitoring methods for organophosphate pesticides including chlorpyrifos. A magneto-particle ELISA for trichloropyridinol (TCP), a human metabolite of chlorpyrifos, was modified for urinary biomonitoring by β-glucuronidase pretreatment to yield parent TCP. Biological monitoring for exposure to metolachlor necessitated the development of an ELISA for its putative mercapturic acid metabolite. Development of these biological monitoring strategies entails knowledge of agent specific human pharmacokinetics. We have procured a library of human tissue sub-fractions to serve as an *in vitro* surrogate of human pharmacokinetics. Each tissue sample has been immunochemically and phentotypically characterized for its toxicokinetic potential. Aspects of inter-individual variation in xenobiotic metabolism can then be evaluated as a covariate in a fully integrated system to develop biomonitoring strategies.

107.
IMMUNOASSAYS AS BIOMARKERS OF HUMAN EXPOSURE TO TOXINS. *Shirley Gee and* ***Bruce Hammock****. Entomology, Univ. Calif, 1 Shields Avenue, Davis, CA 95616, fax: 530-752-1537, sjgee@ucdavis.edu*

To evaluate human exposure to foreign materials such as pesticides, rapid quantitative analytical methods are needed. This laboratory has developed a variety of immunoassays to monifor for pesticide residues in food and environmental samples. More recently we have developed assays to monitor possible human exposure. In many cases it is better to design the assay for a major- or indicator metabolite of the pesticide rather than the parent pesticide. In some cases this requires that human metabolism studies be run at exposures commensurate with the likely human exposure level. Accelerator mass spectrometry has proven valuable in this regard. We have developed in the laboratory a variety of immunoassays to monitor exposure to pesticides including triazines (such as atrazine) or pyrethroids (such as permethrin). The assays are highly sensitive and can be performed on human body fluids. The ELISA format has been the most common format used in the laboratory, however we are examining a variety of other formats including performance of ELISA-type assays on the surface of compact disks.

108.
DETERMINATION OF 3,5,6-TRICHLORO-2-PYRIDINOL (TCP) BY ELISA. ***Jeanette M. Van Emon***[1], *Allan W. Reed*[2], *Jane C. Chuang*[3], *Angel Montoya*[4], *and Juan J. Manclus*[4]. *(1) U.S. EPA, NERL, HEASD, HERB, P.O. Box 93478, Las Vegas, NV 89193-3478, fax: 702-798-2243, vanemon.jeanette@epamail.epa.gov, (2) NAHE, U.S. EPA, (3) Battelle, 505 King Street, Columbus, OH 43201-2693, (4) Laboratorio Integrado de Bioingenieria, Universidad Politecnica de Valencia, Camino de Vera, s/n, Valencia, 46022, Spain*

A sensitive, competitive enzyme-linked immunosorbent assay (ELISA) for 3,5,6-trichloro-2-pyridinol (TCP) has been developed to quantitate parts per billion (ppb) amounts of the analyte in urine. TCP is a major metabolite and environmental degradation product of the insecticide chlorpyrifos and the herbicide triclopyr. Thus, TCP can be used as a biomarker for monitoring levels of exposure or contamination from these pesticides. The least detectable dose estimated for this assay is 0.01 ppb in hydrolyzed and diluted urine samples. Immunoassay results have been compared with GC/MS measurements from occupational and nonoccupational exposure studies yielding good correlations (r=0.990 and r=0.970). Notice: The U.S. Environmental Protection Agency (EPA) through its Office of Research and Development (ORD) funded this research and approved this abstract as a basis for an oral presentation. The actual presentation has not been peer reviewed by EPA. Mention of trade names or commercial products does not constitute endorsement or recommendation for use.

109.
EVALUATION OF ANALYTICAL METHODS FOR DETERMINING PESTICIDES IN BABY FOOD AND ADULT DUPLICATE-DIET SAMPLES. ***Jane C. Chuang***[1], *Kathy Hart*[1], *Joseph S. Chang*[1], *Allan W. Reed*[2], *and Jeanette M. Van Emon*[3]. *(1) Battelle, 505 King Ave, Columbus, OH 43201-2693, fax: 614-424-3638, chuangj@Battelle.org, (2) NAHE, U.S.EPA, P. O. Box 93478, Las Vegas, NV 89193-3478, (3) U.S.EPA, NERL, HEASD, HERB*

Determinations of pesticides in food are often complicated by the presence of fats and require multiple cleanup steps before analysis. Cost-effective analytical methods are needed for conducting large-scale exposure studies. We examined two extraction methods, supercritical fluid extraction (SFE) and accelerated solvent extraction (ASE), coupled with various cleanup techniques for the analysis of pesticides in baby foods. The SFE-GC/MS method did not provide quantitative recoveries (<50%) of the pesticides spiked into fatty baby foods. This led to the evaluation of ASE-ELISA and ASE-GC/MS using a Dionex Model ACE 2000 system. Two solvents (acetonotrile [ACN] and ethyl acetate), three extraction temperatures (80°C, 100°C, and 120°C), and several different sample clean-up procedures were evaluated. A set of ASE conditions was developed that consists of extracting baby food with ACN at 80°C under 2,000 psi pressure. An ENVI-Carb SPE condition was also developed to clean the ACN extract. The cleanup fraction was analyzed by ELISA for chlorpyrifos and by GC/MS for malathion, chlorpyrifos, p,p'-DDE, and p,p'-DDT. Duplicate diet samples were analyzed for target pesticides by ASE-ELISA and by ASE-GC/MS. Concentrations of these compounds ranged from <0.3 to 110 ppb.

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110.
COMPARISON OF IMMUNOASSAY AND CONVENTIONAL METHODS FOR THE DETERMINATION OF DIAZINON IN SURFACE WATERS. ***Donna Zaruk***[1], *Michael Comba*[1], *John Struger*[2], *and Selina Young*[2]. *(1) Environment Canada, National Laboratory for Environmental Testing, 867 Lakeshore Rd, P.O. Box 5050, Burlington, ON L7R4A6, Canada, fax: 905-336-6404, Donna.Zaruk@cciw.ca, (2) Ecosystem Health Division, Environmental Conservation Branch-Ontario Region, Canada*

We have successfully used immunoassay as a technique to verify the presence of organic contaminants. The InsiteTM Diazinon Plate Kit was tested for its ability to identify diazinon in agricultural surface waters known to have inputs from organophosphate pesticide applications. The quantitative accuracy of test kit results were compared against the conventional National Laboratory for Environmental Testing (NLET) gas chromatography (GC) method. Of sixteen GC observations, ten were below the immunoassay detection limit, four were observed, and two were not detected. Overall, precision amongst immunoassay replicates was poor (c.v. 50%). There were no false positives. All observed immunoassay results were biased high compared to corresponding GC concentrations. Of the four immunoassay observations, three had GC concentrations below the detection limit of the test kit, which would imply these immunoassay values included cross-reactivity from other compounds. Based on the limited data set, application of immunoassay for screening the presence of diazinon at our test site did not appear favorable. Differences in sample storage conditions were not expected to contribute to differences, but may have to be re-examined.

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