ability of CS_2 against organic polar substances on charcoal or reaction of methanol contained in the desorbing solution with EGMEA, so called alcoholysis or transesterification. Although transesterification is not expected to occur when a small amount of aqueous stock solution is injected, the process is rather cumbersome and adds analytical burden. To reduce unstable desorption results and multi-step procedures, a better desorbing medium for EGMEA is sought. In this study, a mixture of dimethylformaldehyde (DMF) and CS_2 was tested as a substitute. The results of desorption efficiencies with the DMF/ CS_2 mixture ranged 96.0-102.4 (mean=97.9%) with a coefficient of variation of 2.26%. In summary, to obtain stable desorption efficiencies for EGMEA collected on charcoal tubes, the DMF/ CS_2 mixture over previously suggested CS_2 only or MC/MeOH mixture is recommended as a suitable substitute.

362.

LEL METER RESPONSE TO JP-8 AND SINGLE COMPONENT VAPORS. D. Carpenter, Karta Technologies, San Antonio, TX; R. Walton, AFIERA/RSHI, Brooks AFB, TX; K. Parekh, PortaGas, Houston, TX.

The United State Air Force (USAF) uses vast quantities of jet fuel; the current blend is referred to as JP-8. The decision to use JP-8 is based on safety issues; JP-8 has a relatively low vapor pressure and high flash point as compared to other acceptable military jet fuels. Unfortunately, these characteristics of JP-8 also result in Lower Explosive Limit (LEL) meters responding differently to JP-8 than the other jet fuels. The purpose of this study is two-fold: calibrate multiple LEL meters (using different sensor technologies) with both single component vapors (hexane and isobutylene) and a surrogate multi-component vapor mixture that mimics a typical JP-8 vapor, and observe the LEL meters responses in terms of response time and instrument response drift. Standard single component test gases were obtained from standard commercial sources. The surrogate JP-8 test vapor was blended assuming an average molecular weight of the vapor to be 126 grams and reviewing the elemental analysis of several JP-8 vapor samples. A series of response curves were developed for each LEL meter to 10%, 30%, and 50% LEL of JP-8 and single component gases. Then, each LEL meter was exposed for extended periods to 10% and 30% of the LEL for JP-8. This exposure included both steady state and periodic episodes. Each instrument's response time, repeatability, and drift is reported. Also, the relationship between each instrument's response to the surrogate JP-8 and single component gas is provided. A final summary table of the key functional characteristics of all the meters is provided.

363.

SYSTEMATIC SAMPLING AND ANALYSIS OF TWENTY-ONE ACRYLATE ESTERS. C. Manning, F. Posey, Assay Technology Inc, Pleasanton, CA

Air sampling and analysis methods for esters of acrylic acid are desirable since acrylates are irritating and widely used in plastic and adhesive applications. Acrylates, containing a reactive, unsaturated carbon-carbon bond, may be subject to decomposition on certain media, and their analysis can be challenging. While many sorbents, desorption solvents, and chromatography systems have been recommended for different acrylates, the goal of the study was to specify simplified sampling methods capable of collecting and retaining a number of acrylates coupled with an analytical method capable of analyzing as many acrylates as possible in a single chromatography scan. 21 acrylates were selected and classified as non-polar (13), polar (6), or very polar (2). A gas chromatography system was established using a 60m x 0.32mm methyl silicone column capable of analyzing 19 acrylates (non-polar and polar) in a single temperature-programmed scan. Non-polar acrylates were recovered from sampling media by carbon disulfide while polar acrylates required addition of 3% dimethylformamide. Non-polar acrylates were stable on charcoal, while non-polar and polar acrylates were more stabile on XAD-7 and Tenax. Very polar acrylates required additional stabilization and analysis by high performance liquid chromatography (HPLC). Finally, a comprehensive scheme for sampling and analysis was devised utilizing essentially two sorbents and two chromatography systems for sampling and analysis of 21 acrylate esters including alkyl acrylates and methacrylates, acrylates and methacrylates of hydroxy alcohols, and cyanoacrylates.

364.

DETERMINATION OF AQUEOUS ALDEHYDES AND KETONES BY SOLID PHASE EXTRACTION WITH GAS CHROMATOGRAPHY/ELECTRON CAPTURE DETECTOR AND GAS CHROMATOGRAPHY/MASS SPECTROMETRY. J. Tso, S. Que Hee, University of California at Los Angeles, Los Angeles, CA

Carbonyl compounds (especially low molecular weight aldehydes) are receiving increasing attention in workplace, ambient, indoor air exposures, and water pollution. Formaldehyde, acetaldehyde, furfural, and crotonaldehyde are known animal carcinogens. There is a need to have a convenient method to sample trace amounts of aldehydes in ground water from hazardous waste sites and waste streams after disinfection treatment. O-(2,3,4,5,6-pentafluorophenyl)methylhydroxylamine hydrochloride (PFBHA) is a promising reagent that reacts with carbonyl compounds. A liquid/liquid extraction batch method to form O-oxime derivatives is the standard method for aqueous samples. However, it is time consuming, and water samples are heavy and expensive to transport. A solid phase extraction (SPE) method has been developed by using cation exchange and reverse phase C18 coated with PFBHA that reacts with aldehydes and ketones in aqueous samples. The cation exchange cartridges were activated by 5 ml of 0.2N sulfuric acid and charged with 3 ml of 1% (w/v) PFBHA aqueous solution at a flow rate of 1 ml/min. After loading aqueous mixture of aldehydes and a microwave heating treatment, the oxime products were eluted from the cartridges by 4 ml of hexane and analyzed quantitatively by gas chromatography/electron capture detection (GC/ECD) and gas chromatography/mass spectrometry (GC/MS). The recoveries of formaldehyde, acetaldehyde, propionaldehyde, butyraldehyde, valeraldehyde, hexanal, heptanal, octanal, nonanal, and decanal at 500 ppb were > 88%. The recoveries for glyoxal and methylglyoxal were 63± 3% and 70± 3%, respectively. The detection limits of the cation exchange method were below 0.038 pg/ml for all the straight chain aliphatic aldehydes. The technique was also extended to lower aldehyde concentrations.

365.

DETERMINING EXTRA-THORACIC PARTICLE SIZE DISTRIBUTIONS OF WOOD DUST SAMPLES. M. Harper, The University of Alabama at Birmingham, Birmingham, AL

WITHDRAWN

366.

ALTERNATIVE FILTERS FOR CRYSTALLINE SILICA ANALYSIS. R. Key-Schwartz, D. Ramsey, NIOSH, Cincinnati, OH; M. Archibald, North Carolina Central University, Durham, NC

X-ray diffraction analysis of crystalline silica is currently accomplished by deposition of the sample onto silver membrane filters. An alternative type of filter has been investigated for use in X-ray diffraction analysis. A thin layer of silver was evaporatively coated onto polypropylene and nylon capillary pore filters. Scanning electron microscopy of the coated filters indicated that the filtration characteristics of the substrate filters were not changed significantly by the deposition of the thin silver layer on the surface. Coated capillary pore filters may enable an improvement in sensitivity for crystalline silica analysis over that seen with the use of conventional silver "tortuous pore" membrane filters. Polypropylene and nylon were chosen from several filter substrate materials due to their smooth surface, their chemical resistance to tetrahydrofuran, and their availability in the required 0.45 um pore size.

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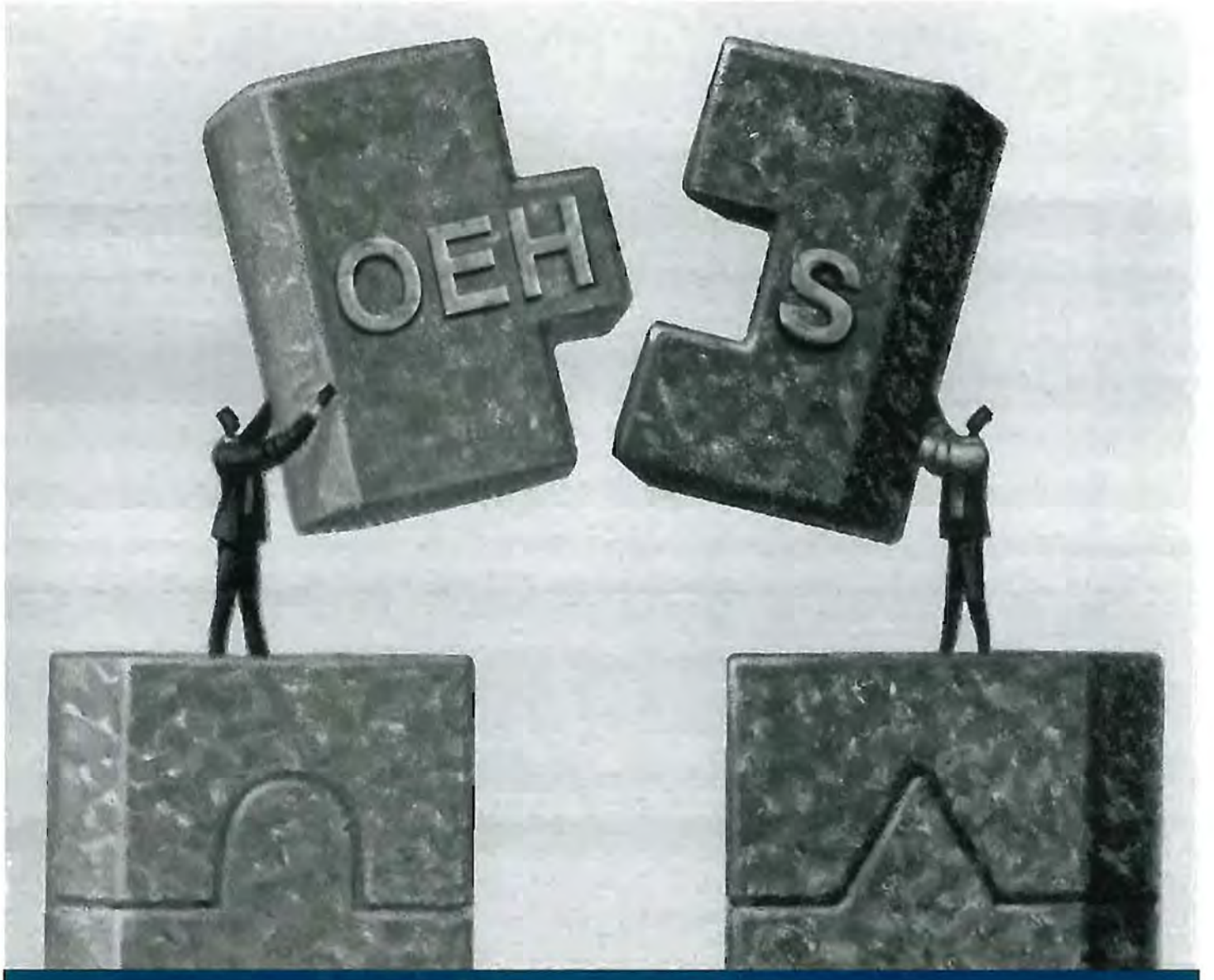

ABSTRACTS

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2002 Abstract Index by Session Topic

PF 101 Agricultural Health and Safety

Papers 1–6

1.

RELATIONSHIPS BETWEEN WORK EXPOSURE AND RESPIRATORY OUTCOMES IN POULTRY WORKERS.

S. Kirychuk, J. Dosman, P. Willson, L. Dwernychuk, University of Saskatchewan, Saskatoon, SK, Canada; J. Feddes, A. Senthilselvan, C. Ouellette, University of Alberta, Edmonton, AB, Canada

A pilot study was conducted on 74 poultry barn workers in Western Canada during the winters of 1998–2000. General respiratory health, current, chronic and work related respiratory symptoms; general work duties, and work-site factors were ascertained, pre-exposure, by questionnaire. Personal airborne exposure levels and changes in symptoms and lung function were measured across the work-shift for all workers. Workers were classified according to the type of poultry operation (floor based, n=53; cage based, n=13) in which they worked. There was no significant difference in daily hours spent in the barn between those who worked with caged poultry (5.41±2.35 hours) and those who worked with floor-based poultry (4.42±2.48 hours). Age of birds was 47.10±58.36 days for floor based versus 155.91±63.01 days for cage based facilities. There were no significant differences in personal environmental measurements between cage-based and floor-based facilities (ammonia 13.22±13.70 ppm, 17.34±16.35 ppm; total dust 5.74±4.85mg/m^3, 10.01 ±8.84 mg/m^3; endotoxin 6046±6089 EU/m^3, 5457±5934 EU/m^3 respectively). There were no significant differences in across work-shift change in pulmonary function indices between workers from cage and floor-based operations. For the entire sample total dust dose (work hours/day x total dust) significantly correlated with across-shift change in FEV_1, whereas endotoxin dose and ammonia dose did not. Stocking density was significantly correlated with average ammonia (ppm, p=0.002) and ammonia dose (ppm x work hours/day; p=0.004) in floor based operations and with total dust (particles/ml, p=0.002) in cage based populations. Stocking density was also significantly correlated with chronic cough (p=0.003) and across work-shift cough (p=0.05) and chest tightness (p=0.06) for workers from floor based operations; and with phlegm when working (p=0.018) and chest tightness across the work-shift (p=0.004) for workers from cage based operations. Type of poultry production operation and therefore type of work exposures appear to significantly impact symptoms experienced by workers exposed to these atmospheres.

2.

DUST GENERATION SYSTEM FOR AGRICULTURAL SOIL DUST.

K. Lee, R. Domingo-Neumann, R. Southard, UC Davis, Davis, CA

Agricultural workers are prone to exposure to mixed dust of inorganic and organic compounds. Diverse working conditions and operations in agriculture make direct measurements of the mixed dust exposure difficult. This study was conducted to develop a new dust generation system to determine possible exposure potency indicators of soil samples. The dust generator consists of a blower, a rotating chamber and a settling chamber. The rotating chamber has inner baffles to provide sufficient agitation of the samples while the chamber is rotating. A blower provides air into the rotating chamber, and the suspended dust is moved to the settling chamber through a perforated pipe. A small fan inside the settling chamber helps maintain suspension of the dust. Various size fractions of dust are sampled on filters suspended in the chamber via outlet ports and attached pumps. Air pressure is released through a filter plate mounted on the wall of the settling chamber. Various operating conditions were evaluated: air intake from blower, speed of rotation, soil mass and sampling time. To evaluate the characteristics of dust from the system, we collected dust samples from agricultural fields while the soil was prepared for