tilation and exposure control measures. It is essential to reach the artist welder community with occupational health and safety training programs specifically tailored to their needs, in order to increase health hazard awareness related to their work practices.

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116.

AIR-BORNE FUNGI: A TOOL FOR IEQ ASSESSMENT. E. Ziegler, R. Sahay, Pure Air Control Services, Clearwater, FL.

Indoor, as well as outdoor, air samples from commercial and residential buildings were collected by spore trap technique over a period of 10 years throughout the North America. Approximately four thousand (4,000) samples collected from the above technique were than analyzed to determine the quality and quantity of the air trapped bio-particulate with special reference to air-borne fungi. A comparison is made between indoor air-borne fungi with that of the outdoor air-borne fungi to find out the biodiversity and quantitative value in terms of sampling site. The study concludes that despite the ubiquitous nature of air-borne fungi, some fungi does influence the indoor air quality both quantitatively and qualitatively in spite of building types (commercial or residential). The data collected during this endeavor helps in determining the base line conditions of a building under normal conditions.

117.

METHODS TO ADDRESS VARIANCE IN BIOAEROSOL SAMPLING DATA. M. Hodgson, Clayton-Bureau Veritas, Edison, NJ.

Evaluation of bioaerosol sampling data is typically performed based on a comparison between the indoor and outdoor air, as recommended by several publications including the ACGIH, *Bioaerosols Assessment and Control.* Typically these comparisons look at total concentrations, rank order, and biodiversity to compare sampling data sets without consideration for the very high variances observed in the two data sets. This presentation looks at the variance that is to be anticipated in the data sets generated and presents several statistical tools that can be used to make comparisons of the data sets. Working from case histories the author will show many of the common mistakes made in interpreting data sets and make suggestions as to how the errors can be avoided. The paper will additionally look at the scale of error typically found in bioaerosol data and how this impacts the interpretation of the data.

118.

FUNGAL GENERA AND SPECIES OBSERVED ON WIDE BODY COMMERCIAL PASSENGER AIRCRAFT AND AIRPORT TERMINALS. L. Taylor, CDC/NIOSH/Harvard University, Cincinnati, OH; K. Wallingford, M. Hein, CDC/NIOSH, Cincinnati, OH; H. Burge, R. Herrick, Harvard University, Boston, MA.

To date, there is limited research regarding the identification of specific fungal genera on commercial passenger aircraft. We have studied concentrations of genera/species of airborne culturable fungi and total spore concentrations by genus or larger group on a series of twin aisle wide-body aircraft. Twelve flights on B-767 aircraft between 4.5 and 6.5 hours in duration were evaluated. Using N-6 impactor and spore traps, triplicate samples were collected in the front and rear of coach class during six sampling intervals throughout each flight: boarding, mid-climb, early cruise, mid-cruise, late cruise, and deplaning. Comparison samples were also collected inside and outside airport terminals at the origin and destination cities. Data were analyzed using both frequency (percentage of samples in which genus/species was detected) and peak concentration methodologies within the different sampling intervals. A total of 522 culturable and 517 spore samples were collected on twelve aircraft flights and inside and outside airport terminals. A variety of 46 genus/species were observed in both the culturable and total spore samples. The composition of fungal genera varied between inside and outside the airport terminal locations. The genera also differed between sampling intervals on the aircraft, specifically between boarding or deplaning compared to the cruise intervals. A frequency analysis of the fungal data indicated that *Cladosporium, Aspergillus* and *Pencillium* were predominant genera in the culturable samples whereas *Cladosporium, Basidiospores, Pencillium/Aspergillus*, and *Ascospores* were predominant in the total spore samples. The peak analysis revealed isolated genera/species spike events observed on particular flights. The analysis of genera indicates that fungi from both inside and outside the terminal are migrating onto the aircraft while the aircraft is attached to the gate. Other probable sources for the fungal concentrations are likely human shedding from the passengers themselves or reservoirs contained within the aircraft.

119.

INFLUENCE OF TIME DELAY IN INDOOR AND OUTDOOR BIOAEROSOL SAMPLING FOR BUILDING EVALUATION. R. Spicer, Centrenel, Inc., Haddonfield, NJ; H. Gangloff, Hudson International, Wayne, PA.

Culturable airborne fungal spore sampling (Andersen N-6; MEA culture media) at five building sites during the period 2002-2005 provided a bank of data to evaluate the influence of time lag between indoor and outdoor samples when utilizing bioaerosol levels for building investigation. Differences in detection frequency above the median concentration of the combined indoor and outdoor levels (for each fungal species) was used as the criterion to evaluate the data. Under the test hypothesis that indoor and outdoor air are from the same population, differences that could occur at a random probability of 0.10 (10%) or less were deemed significant (equivalent to a probability equal to or greater than 0.90 [90%] that the airborne levels in the test zone exceed the outdoor air). A base data set of indoor and outdoor air samples were collected during the same general time period throughout the day at each site; all buildings had some degree of recent water damage and/or visible mold. The indoor and outdoor base data set (approximately 33-40 samples) for each site was then subdivided by start and stop times to create "overlap" data sets, so that indoor air sampling began and terminated approximately one or two hours after outdoor air sampling. Thus, each site was represented by indoor and outdoor air samples collected contemporaneously, as well as "offset" data. Significant differences in levels of usual "indicator" fungi (most often species of *Penicillium* and *Aspergillus*) that appeared indoors during sampling in the same time period outdoors, also generally occurred in the one and two hour "offset" periods. This indicates the influence of a lag in infiltration and/or reduction in indoor bioaerosols through HVAC filtration within a two hour time frame is minimal.

120.

MOLDRANGE—A REFERENCE DATABASE FOR OUTDOOR FUNGAL AEROSOLS. H. Burge, K. Ramanathan, D. Gallup, Environmental Microbiology Laboratory, Inc., San Bruno, CA.

Outdoor spore populations vary widely over short periods of time especially during changes in weather. Understanding this variability is crucial if indoor/outdoor ratios are to be used for data interpretation. We have developed the MoldRange, which is a database compiled from outdoor spore trap samples collected across the country and throughout the year. All samples were collected by field investigators using their own protocols, and analyzed in our lab following our standard protocols and subject to our quality control processes. The database differentiates between sampler types and provides some information on local weather conditions during sampling. Spores were identified and tabulated by genus or higher grouping, and relative amounts of background debris were noted. Tabulations were entered directly into a database, compiled by date and state, and analyzed for range and percentiles by state and by month. As of September 2005, the database includes approximately 90,000 samples collected from 47 states, and for every month of the year. Separate analyses have been conducted by state and by month, although within-state comparisons have been done for a few states. MoldRange is presented to the originating investigator as a table that allows comparison with his/her outdoor counts to the range and percentiles for his state and for the appropriate month. In a broader sense, the data can be used for investigations of the prevalence of specific spore types across the United States, seasonality of fungal aerosol populations by state, and many other purposes. MoldRange is probably the largest outdoor spore database and the most consistently collected and analyzed. It should provide a valuable tool for increasing understanding of the outdoor fungal aerosol.

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