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1

AIHA EMPAT PROGRAM: MICROBIOLOGY PROFICIENCY AND LABORATORY ACCREDITATION, 1996-2000. P. Dulaney, M. Newell, E. Cole, DynCorp Health Research Services, Morrisville, NC.

The AIHA EMPAT (Environmental Microbiology Proficiency Analytical Testing) Program has, since 1996, provided performance evaluation to laboratories specializing in the microbial analysis of environmental samples such as bioaerosol and bulk samples collected from office, industrial, agricultural, and other work environments. Rounds of EMPAT microorganisms — a variety of samples for fungi (molds and yeasts) and bacteria analyses are shipped to participant laboratories three times a year. Reference laboratories pre-validate test organisms while referee laboratories confirm acceptability of the samples. As of June 2000, after 12 rounds, 60 laboratories across the US, Canada and Europe participated in EMPAT, 30% of which have been involved with the program since inception. Of these, 51 (85%) completed the last 3 rounds, while 9 (15%) completed 2 or less. Proficiency requires an average minimum score of 85% over the last 3 rounds, and qualifies laboratories to apply for accreditation. The following numbers of laboratories performing both fungal and bacterial analysis were deemed proficient over rounds 9-12 respectively: 15/32 (47%); 21/36 (58%); 24/37 (65%); and 26/39

(66%). The following laboratories performing fungal analysis only, were deemed proficient over rounds 9-12 respectively: 7/7 (100%); 6/8 (75%); 8/10 (80%); and 11/12 (92%). Those rounds included molds such as *Trichoderma viride*, *Ulocladium botrytis*, *Exophiala jeanselmei*, *Penicillium citrinum*, *Aspergillus penicillioides*, *Penicillium aurantiogriseum*, and *Acremonium strictum*, and bacteria such as *Myroides odoratus*, *Streptomyces griseus*, *Citrobacter freundii*, *Burkholderia cepacia*, *Enterobacter cloacae*, and *Kocuria rosea*. In the summer of 2000, under the guidance of the Environmental Microbiology Laboratory Accreditation Committee (EMLAC), AIHA began the accreditation of laboratories involved in the AIHA Environmental Microbiology Laboratory Accreditation Program (EMLAP) program. Currently, 6 laboratories are accredited under the EMLAP. With this accreditation from AIHA, industrial hygienists have the knowledge that those laboratories have met defined performance, personnel, and facility requirements set by AIHA's Laboratory Accreditation Program.

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MEASUREMENT AND CONTROL OF AIRBORNE MICROORGANISMS USING ELECTROSTATIC METHODS. G. Mainelis, R. Gorny, K. Willeke, S. Grinshpun, T. Reponen, University of Cincinnati, Cincinnati, OH; P. Baron, NIOSH, Cincinnati, OH.

Most of the widely used bioaerosol sampling devices employ collection techniques that are known to reduce viability of sampled microorganisms. An electrostatic collection method, where airborne particles are electrically charged and then removed from

the air by electrostatic forces, has the potential for being a "gentle" collection technique. Our tests with an Electrostatic Aerosol Sampler showed that charged microorganisms could be effectively removed from the airstream. However, charging by a conventional corona discharge inactivated sensitive airborne cells. The goal of this study was to determine how the bacterial recovery and injury depended on the amount of electric charge imparted on bacteria.

In our tests, the charging of airborne microorganisms was achieved not by the traditionally used corona discharge, but by applying induction charging. In this setting, bacteria were aerosolized and then imparted a charge ranging from -10,000 to +10,000 elementary charges. The bacteria carrying a desired electric charge were selected using a parallel plate mobility analyzer and collected with a BioSampler (SKC Inc., Eighty Four, PA) for a subsequent analysis of their relative recovery and injury.

The results showed that the relative recovery of *Pseudomonas fluorescens* bacterial cells carrying from -4,100 to +30 electrical charges ranged from 40 to 60%, while the recovery of the same cells carrying about -9,000 charges was below 20%. The relative recovery of *P. fluorescens* cells carrying more than 2,700 positive charges was less than 1.5%. In contrast, the relative recovery of *Bacillus subtilis* var *niger* did not depend on the amount of imparted electric charge. The extent of metabolic and structural injury of *P. fluorescens* cells also did not depend on the amount of electric charge carried by airborne bacteria. The study showed that polarity and magnitude of imparted electric charge is very important when developing microorganism collection methods employing electrostatics.

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