ENVIRONMENTAL QUALITY

Chairperson: Robert H. L. Howe
Eli Lilly and Company, T483, Building T8/2
Lafayette, Indiana 47902

Chairperson-Elect: William Beranek, Jr.
Indianapolis Center for Advanced Research, 1201 E. 38th Street, P.O. 647
Indianapolis, Indiana 46223

ABSTRACTS

Comparison of Exchange Rate of Quaternary Ammonium Ions on Various Cation Exchangers. P. C. Chiang, Graduate Institute of Environment Engineering, National Taiwan University, Taipei, Taiwan, ROC, and Robert H. L. Howe, Center for Advanced Biotech Information, West Lafayette, IN 47906.——A study was undertaken to evaluate the exchange rate of several quaternary ammonium ions, i.e. Benzyl Hexadecyl Dimethyl Ammonium Chloride (BHDAC), Hexadecyl Pyridinium Chloride, (HPC), and Lauryl Pyridinium Chloride (LPC), on the macroporous (Amb-200 and Amb-DP1) and gel structure (Dow-50-x8 IRC-84, and C-464) ion exchangers. The results of this investigation indicated that the rate-determining-step of these quaternary ammonium ions on the strong acid cation exchanger was particle diffusion controlled. The macroporous resin provided higher particle-diffusion coefficient than that of gel structure resins. A linear relationship between log Dp (Particle-diffusion) and Ω. (Limiting Equivalent Conductivity) equation for determining the Dp by measurement of Ω. for various quaternary ammonium ions.

Passive NO_2 Sampling in Indoor Environments. Thad Godish, Indoor Air Quality Research Laboratory, Ball State University, Muncie, Indiana 47306.——Nitrogen dioxide (NO_2) levels were monitored in a variety of residential environments. Seven day average NO_2 concentrations were determined from exposed Palmes diffusion tubes. Residences were classified as to the presence/absence of a gas cooking range and the primary source of space heat. Residence categories included those with (1) gas cooking range, (2) gas/oil heat, (3) wood stove heat, (4) electric heat, and (5) steam heat. Median NO_2 concentrations were 35, 8, 15, 7, and 9 ppb respectively. Residences with a gas cooking stove irrespective of the source of space heat had consistently the highest level of NO_2 contamination. A population of residences in which wood was utilized as the primary source of heat were monitored to determine whether NO_2 levels could be related to outdoor temperatures which could be the primary determinant of fuel needs and combustion frequency, intensity, and duration. No correlation was observed between heating degree days, a measure of the 24-hour average outdoor temperature and the concentration of NO_2 indoors. A single residence with a gas furnace located in the basement level was monitored. Significantly higher levels were monitored in the basement level as compared to a first floor living level. Study results demonstrate that indoor contamination by NO_2 can be realted to combustion appliances used for cooking and space heating.

Lake Residential Sewage Disposal Effects on Ground Water Quality. Peter Hippensteel, Department of Biology, Tri-State University, Angola, Indiana 46703.——During the past five years well water samples have been analyzed from lake residential areas of Northeastern Indiana. These samples were tested for fecal and total coliform, phosphates, nitrates, chlorides, and conductivity. The concentrations of the

ground water samples were compared to soil types and well depth. Since all of the homes in the lake area have their own on-site septic system, sewage effluent is the most probable source of contamination.

Eleven percent of the wells sampled indicated various levels of contamination. Fecal coliform and nitrates were the most common contaminates. These ground water pollutants were most evident in shallow wells (less than forty feet deep) and the highly porous soil types.

As the lake residential areas become more intensively used with the building of multiple family housing, and the conversion of seasonal homes to permanent use, ground water contamination will increase drastically. These trends will require new approaches to on-site sewage treatment and continued monitoring of the ground water to assure reduction of ground water contamination.

The Presence of Transformation of Formaldehyde in Nature. ROBERT H. L. HOWE, West Lafayette, Indiana 47906.——The presence and transformation of formaldehyde in nature is discussed. The pathways of such transformation are presented. Some experimental data are reviewed. This study has reinforced strongly the prior views of many that the relatively low concentration of formaldehyde in nature does not necessarily mean the contamination by industrial discharge.

One simple illustration is:

$$(C{\cdot}H_2O)\,6 \rightleftharpoons 6\ HCHO$$

Other reaction pathways involving the transformation of formaldehyde also are discussed.

Evaluation of Muskmelon and Watermelon Cultivars for Damage Attributed to a Combination of Ozone and Sulphur Dioxide. GARY L. REED and DAVID K. REED, Fruit and Vegetable Insects Research Laboratory, Agriculture Research Service, USDA, Vincennes, Indiana 47591 and Department of Entomology, Purdue University, West Lafayette, Indiana 47907.——The melon crops of Southwestern Indiana developed considerable leaf injury in the forms of chlorosis, spotting, and early senescence of mature leaves during the 1983 season. The early senescence caused fruit of both muskmelon and watermelon to become sunburned or scalded and thus unmarketable. The disorder was identified as injury caused by ozone, sulphur dioxide, or the two in combination. Observation of muskmelon and watermelon cultivars indicated differential amounts of leaf injury which will enable the grower to select more tolerant plants for 1984. The observed differences also indicate a potential for breeding resistant cultivars.