877

DETERMINATION OF THE PHYTOTOXICITY OF VOLATILE ORGANIC COMPOUNDS BY MEASURING THE GERMINATION RATE OF TOBACCO POLLEN

Ute Schubert, Linda Wisniewsky & Ulrich Kull, Biologisches Institut, Universität Stuttgart, Pfaffenwaldring 57, D-(W)-7000 Stuttgart 80, Germany

The germination rate of pollen grains can be used as an indicator for environmental pollution. Pollen was collected from Nicotiana tabacum plants and stored in plastic tubes at -20° C. The same quantity of pollen (about 0,5 mg) was placed in 3,5-cm Petri dishes and held in a water saturated atmosphere for one hour. 1 ml germinating medium (Kappler and Krisam, Environ. and Exp. Bot. 27, 305-309, 1987) was added and the pollen then exposed to different gas concentrations in a glass chamber for two hours. The percentage of pollen germination was counted by microscopy. Eight highly volatile organic compounds (dichloroethane, trichloroethane, tetrachloroethane, trichloroethene, tetrachloroethene, benzene, toluene, and xylene) were investigated. The concentrations which cause a 50%-inhibition of germination were determined (effective dose 50; ED_{50}). The ED_{50} values decrease in the sequence of saturated aliphatic hydrocarbons with increasing number of chlor atoms (dichloroethane 4300 ppm, trichloroethane 3300 ppm, tetrachloroethane less than 700 ppm), the ED_{50} values of the unsaturated chlorinated hydrocarbons are higher than those of the corresponding saturated compounds (trichloroethene 5800 ppm, tetrachloroethene 5000 ppm). The ED_{50} values for aromatic hydrocarbons are: benzene 11400 ppm, toluene 7600 ppm, xylene 4500 ppm.