

# ATMOSPHERIC FATE OF PESTICIDES: STUDIES OF THE ATMOSPHERIC DEGRADATION OF PESTICIDES AT EUPHORE CHAMBERS.

A. Muñoz (1), T. Vera(1), A. Mellouki(2), E. Borrás(1), M. Rodenas(1), M. Vázquez (1) and M. Marqués (1)

(1) Fundación CEAM. Parque Tecnológico.C/Charles R..Darwin 14 46980 Paterna (Valencia), Spain. (e-mail: amalia@ceam.es / Tel: +34 961318227 / Fax: 34 961318190)

(2) ICARE, CNRS, 1C Avenue de la Reserche scientifique, 45071Orleans cedex 02. FRANCE

Pesticides are extensively used in agriculture, gardening and a variety of other household applications. They can be emitted into the atmosphere through dispersion during spraying, which is carried out mainly in spring and autumn, but also through volatilization from ground or leaf surfaces, especially in summer when the temperatures are high. Once in the atmosphere pesticides are distributed between the gas, particle and aqueous phases. The following range of pesticides are commonly used in many European countries; Trifluralin (dinitroaniline herbicide), Dichlorvos (organophosphate insecticide), chloropicrin (fungicide), diazinon (organothiophosphate insecticide), fenpropidin (piperidine fungicide), hymexazol (oxazol insecticide), propachlor (chloroacetanilide insecticide), chlorpyrifos and chlorpyrifos-methyl (methylorganophosphate insecticides) and lindane (chlorinated insecticide).

As for other organic compounds, the gas-phase degradation of pesticides in the atmosphere is controlled by photolysis and/or reaction with ozone, OH and NO<sub>3</sub> radicals. However, studies of the gas-phase degradation of pesticides are problematic because of their low vapour pressures. One advantage of large simulation chambers, such as those at the European Photoreactor (EUPHORE), is that compounds with vapour pressures as low as 5 mPa can be introduced into the chamber in the gas-phase.

The EUPHORE facility is up to the moment, one of the best equipped european outdoor photoreactor. The installation consists of two half-spherical photoreactors made of FEP-foil (Teflon®) transparent to sunlight (also UV), each with a volume of 200 m<sup>3</sup> approximately. For the detection of the compounds, the chambers are equipped with a wide number of sophisticated analytical techniques, ranging from monitor type instrumentation, chromatographic techniques and particle measurement as well as in-situ optical measurements in addition to the important physical parameters

A general overview of the use of the EUPHORE chambers for studying the atmospheric fate of pesticides will be presented. The results of the experiments carried out at this facility show the usefulness of the EUPHORE chambers as a sophisticated tool for studying the atmospheric fate of pesticides under controlled conditions. The data derived from such studies are of potential importance to assess the impact of these species on air quality and on human health.