APPLICATION OF OZONE FOR TREATMENT OF WATER CONTAMINATED WITH PESTICIDES

SANTOS, T. P. S.[1]; ROSA; A. C. S.[1]; ALVES, S. R.[1]; PENNA, L. M.[1]; SOARES, R. V. F.[1] and MENDONÇA, H. V.[2]

1 – Toxicology Lab/CESTEH/ENSP/FIOCRUZ/Rio de Janeiro/RJ; 2 - Bioenergy and Environmental Technologies Laboratory at the Engineering Department of the Institute of Technology, Rio de Janeiro Federal Rural University/ Rio de Janeiro/RJ.

INTRODUCTION: Brazil is one of the largest consumers of pesticides worldwide. Using these chemical compounds in agriculture leads to serious environmental issues, such as contamination of surface and underground water that supplies drinking water. OBJECTIVE: To evaluate the degradation of seven types of pesticides: Atrazine, Chlorpyrifos, Malathion, Trifluralin, Lambda-Cyhalothrin, Chlorothalonil, and Trifloxystrobin mixed in water at a concentration of 1ng mL^{-1} METHODOLOGY: The analytical method was based on a chemical oxidation system with the application of ozone at a concentration of 2.000 mg h^{-1}, with reaction times (RT) of 5, 10, 15, 20, 25, 30, 60, 90, 120, and 150 minutes. After the treatment with ozone, the samples went through solid phase extraction (SPE) with detection and quantification by gas chromatography coupled to triple quadrupole mass spectrometry (GC-MS/MS) and subsequent acute toxicity assay with *Artemias salinas*, to check whether the samples presented toxicity even after ozonation. RESULTS AND CONCLUSION: Detection limits were observed between 0.011 and 0.164 ng mL^{-1} and quantification limits between 0.050 and 0.498 ng mL^{-1}, for the method of pesticides analyzing in water. Degradation by ozonation reached 100% for the pesticides atrazine, chlorpyrifos, malathion, trifluralin and lambda-cyhalothrin in up to 20 minutes of reaction, being considered “non-toxic” for the target species of this study. Trifloxystrobin reached 100% degradation in 120 minutes of reaction and chlorothalonil had a maximum percentage of degradation of 84%, for the RT of 150 minutes. The toxicity test for trifloxystrobin and chlorothalonil found the samples to be “toxic” to *Artemias salinas*.

Key words: pesticides, surface water, ozone, oxidation, degradation.

Financial support: Oswaldo Cruz Foundation (FIOCRUZ), Ministry of Health (MS) and Rio de Janeiro Federal Rural University (UFRRJ)