

# TRACKING POLYCHLORINATED DIBENZODIOXIN (PCDD) AND FURAN (PCDF) CONCENTRATIONS WITHIN THE ENVIRONMENT SURROUNDING INCINERATION FACILITIES USING ATMOSPHERIC PRESSURE PHOTOIONIZATION - MASS SPECTROMETRY (APPI-MS)

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## Abstract

Polychlorinated Dibenzodioxins (PCDD) and Furans (PCDF) are classes of highly toxic combustion byproducts that must be routinely monitored in order to avoid widespread environmental contamination events. Due to their particularly low polarity, the ionization efficiency for these analytes using traditional methods such as ESI and APCI is typically quite poor.

LIFE DIOXDETECTOR is a project financed by LIFE program and its main objective is the application of a new analytical technique for the quantification of dioxin, tracking PCDDs/PCDFs concentrations in air, soil and biota (vegetal) at the surroundings of a MSW incinerator facility.

This abstract is focused on evaluate the performance of a novel low-flow Atmospheric Pressure Photoionization (APPI) source as an alternative ionization method for the trace determination of PCDDs and PCDFs using fast MS workflows. Air, soil and vegetation samples were collected monthly from a location near Madrid, Spain, within the vicinity of an industrial incineration facility. Air samples were collected over a 24-hour period (700 m<sup>3</sup> in total) upon both fiberglass filters and polyurethane foam (PUF). All samples were prepared by soxhlet extraction in toluene and concentrated by rotavapor and under nitrogen gas flow. Ten analytes, including 2, 3, 7, 8-tetrachlorodibenzodioxin (TCDD), were efficiently detected using the APPI-MS method, with LODs routinely in the low picogram range. The Toxic Equivalence (TEQ) was estimated for each sample. The fast APPI-MS method was determined to be suitable for the routine determination of polychlorinated dioxins and furans within real, complex environmental sample matrices.

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