

A15 A STUDY OF EXTERNAL FACTORS PROMOTING VARIABILITY IN μ ECD RESPONSE

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Previous studies demonstrated that external factors could influence in nitrous oxide (N_2O) analysis performed by gas chromatography (GC) with Electron Capture Detector (ECD). Together with these past studies, to minimize the interferences effects on analyses, since 2012, the analysis were performed in triplicate, enabling a better understanding of the detector variability as it is more than 3500 samples per year in average and to obtain more reliable concentrations. Suspecting that the covariance of N_2O and CO_2 concentrations could be a technical ECD problem, a new detector was acquired to substitute the old one, and the experiments were repeated to verify the interference of external factors in the N_2O analysis. The new detector is a micro Electron Capture Detector (μ ECD), which use Argon – Methane (5%) as carrier gas. This gas provides a higher ECD sensitivity than N_2 or Ar gases (Wang et al., 2010). The pre-column and column used were both stainless steel 3/16" ED, 183cm length, packed with HayeSep® Q 100/120 mesh. Loop with 15ml volume and oven with constant temperature of 70°C. The μ ECD temperature was 350°C. The tests involved variation in the room temperature and carbon dioxide (CO_2) concentrations. The room temperature is controlled by a regular air conditioning system which varies $\pm 1^\circ C$ of the set temperature. The CO_2 source used was dry ice as it is moist and heat free. Both the studied external factors showed interferences in μ ECD response. These studies are relevant as N_2O is the third most important natural greenhouse, then the efforts in produce a better precision is very valuable and ECD is the most used detector to analyze N_2O in reference laboratories.

References:

Wang, Y., Ling, H., A new carrier gas for accurate measurements of N_2O by GC-ECD. *Advances in Atmospheric Sciences*, Vol. 27, NO. 6, 2010, 1322-1330.

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