



DETERMINATION OF PHENOXYCARBOXYLIC ACID HERBICIDES IN WATER

LUMEX Method M 01-34 (2007)

INTRODUCTION

The method allows determination of herbicides classified as phenoxy-carboxylic acids, specifically: 2,4-dichloro-phenoxybutyric acid (2,4-DB), 2,4-dichlorophenoxypropionic acid (2,4-DP, Dichlorprop), 2,4-dichlorophenoxyacetic acid (2,4-D), and phenoxyacetic acid in samples of natural, potable and treated waste water by capillary electrophoresis.

MEASUREMENT METHOD

The capillary electrophoresis method for evaluation of 2,4-D class herbicides concentration is based on the differential migration and separation of these substances in the electric field due to their different electrophoretic mobility. Identification and quantitative determination of the analyzed components are performed by detecting the inherent UV absorption at 205 nm wavelength.

MEASUREMENT RANGE

Ranges of measurable concentrations for analysed herbicides are **0.2–20 mg/L**.

If minimal concentrations should be detected (less than 0.2 mg/L), the sample must be concentrated by solid-phase extraction, in this case the range of detectable concentrations will be **0.002–0.2 mg/L** for a **100-mL** sample.

Humic acids, if below 50 mg/L, do not influence determination of subject components.

Analyzed herbicides are decomposed in aqueous media to form 2,4-dichlorophenol, which completely separates with subject components during analysis and does not influence their proper determination.

EQUIPMENT AND REAGENTS

The "CAPEL[®]-105/105M" capillary electrophoresis system with high-voltage positive polarity is used in measurements.

Data acquisition, collection, processing and output are performed using a personal computer running under "WINDOWS[®] 2000/XP" operating system with installed dedicated software package for acquisition and processing of chromatography data.

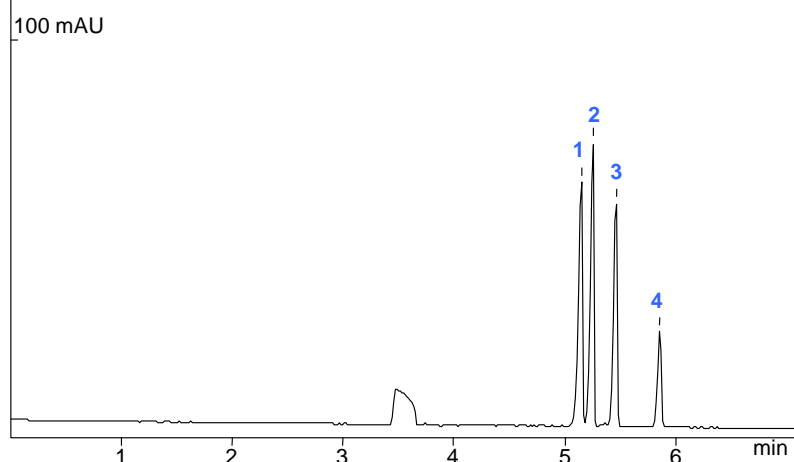
All reagents must be of analytical grade or better.

EXAMPLE OF A REAL ANALYSIS

Buffer: borate
Capillary: L_{EFF}/L_{TOTAL} 50/60 cm, ID 75 μ m
Injection: 450 mbar x sec
Voltage: + 25 kV
Detection: 205 nm

Sample: test solution
(20 mg/L of each compound)

- 1 – 2,4-dichlorophenoxybutyric acid
- 2 – 2,4-dichlorophenoxypropionic acid
- 3 – 2,4,5-trichlorophenoxyacetic acid
- 4 – phenoxyacetic acid



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