Abstract

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Title of Thesis: Optimization of derivatization reaction conditions for GC-MS analysis of selected compounds

Quinolinic acid is an endogenous molecule, downstream product of the kynurenine pathway, through which the amino acid L-tryptophane is metabolised. Quinolinic acid acts as an agonist at the NMDA receptor. Overactivity of this receptor leads to the cell death of neurons. Current research shows the connection between a high level of quinolinic acid and a higher risk of neurodegenerative diseases development and behavioural disorders. The level can be increased by the excessive intake of tryptophane (e.g. food supplements declaring calming effect and mental health support) or ongoing inflammation in the organism.

The current work deals with the development of an analytical method for the determination of quinolinic acid in various biological matrices using GC/MS and complements methods analysing other metabolites of tryptophan. Derivatization by alkyl chloroformate was met with success.

The selectivity was compared on column RTX-5MS containing non-polar stationary phase and polar column SLB-IL59 using ion liquids. Analytes were detected on a single quadrupole mass spectrometer in SIM mode using electron and chemical ionisation. The calibration curve was plotted in the range of 0.5 to 12.5 nanograms. It covers both physiological and pathological levels of quinolinic acid.

key words: quinolinic acid, alkylchloroformates, gas chromatography, mass spektrometry