B26 The Analysis of 2,5-Dimethoxy-N-(N-methoxybenzyl)phenethylamine (NBOMe) Isomers Using Traditional and Fast Gas Chromatography/Mass Spectrometry (GC/MS)

Jay T. Davidson, BS, West Virginia University, 21 Marion Street, Apt 101, Morgantown, WV 26505; and Glen P. Jackson, PhD, West Virginia University, Dept of Forensic and Investigative Science, 208 Oglebay Hall, Morgantown, WV 26506-6121*

After attending this presentation, attendees will better understand NBOMes and their analysis via traditional and fast GC/MS. The concepts of retention time, retention index, relative ion abundance, and characteristic ion ratios will be discussed, as well as an assessment of the relative contribution of various factors on the relative ion abundances of the different isomers.

This presentation will impact the forensic science community by providing attendees with characteristic ion ratios for the ortho, meta, and para isomers of 25C- and 25I-NBOMes. Additionally, the effect of tune file on each analysis as well as the assessment of the variability of relative ion abundances through repeated analyses will assist attendees through a more comprehensive understanding of their casework. Finally, the conserved nature of the characteristic ion ratios between traditional and fast GC will further validate the use of fast GC as a means of seized drug analysis.

It is hypothesized that each NBOMe isomer has a unique retention time (and therefore retention index) and Electron Ionization (EI) fragmentation pattern that can be used to successfully identify each isomer from a series of possibilities. Additionally, it is proposed that although the tune profile will have an impact on the data, it will not be statistically significant in practice. Finally, it is hypothesized that the developed characteristic ion ratios will be conserved between both traditional and fast GC/MS.

In this project, the analysis of NBOMe isomers was conducted using both traditional and fast GC/MS. NBOMes are synthetic phenethylamine derivatives that have become increasingly popular throughout the world. Due to their hallucinogenic potency being derived from their structure, the ability to differentiate NBOMe isomers is becoming increasingly important.

For the purpose of this research an Agilent GC/MS was used for both the traditional and fast analyses. The traditional analyses were performed with a 30m HP-5 column in less than 30 minutes, while the fast GC analyses were performed with a 10m VF-5MS column in less than seven minutes. Standards of the ortho, meta, and para isomers of both 25C- and 25I-NBOMe were obtained from the Drug Enforcement Administration (DEA). The retention times, retention indices, relative ion abundances, and characteristic ion ratios were determined using both traditional and fast GC/MS. Furthermore, the variability of the relative ion abundances was assessed through repeated analyses of each NBOMe isomer standard. Finally, an evaluation of the effect of the tune profile on each analysis was performed.

One-way Analysis of Variance (ANOVA) was performed to evaluate the significance of different factors on the within-factor to between-factor variance. The factors that were assessed include positional isomers, day of analysis, week of analysis, tune profile, and speed of GC. The variables that were used to assess these factors include the retention time, retention index, absolute peak areas, relative ion abundances, and characteristic ion ratios.

It was determined that each NBOMe isomer had a different statistically significant (α=0.05) retention time, retention index, and characteristic ion ratios. Additionally, the variability of relative abundances through repeated analyses of each NBOMe isomer standard was captured. Finally, it was determined that the tune profile does not have a statistically significant effect on the variables assessed

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