DETERMINATION OF ALCOHOL IN POSTMORTEM BLOOD SAMPLES USING AUTOMATED HEADSPACE GAS CHROMATOGRAPHY – MASS SPECTROMETRY

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FACULTY OF SCIENCE
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KUALA LUMPUR

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DETERMINATION OF ALCOHOL IN POSTMORTEM BLOOD SAMPLES USING AUTOMATED HEADSPACE GAS CHROMATOGRAPHY – MASS SPECTROMETRY

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DEPARTMENT OF CHEMISTRY
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ORIGINAL LITERARY WORK DECLARATION

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Title of Project Paper (“this Work”): “DETERMINATION OF ALCOHOL IN POSTMORTEM BLOOD SAMPLES USING AUTOMATED HEATSPACE GAS CHROMATOGRAPHY – MASS SPECTROMETRY”

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# TABLE OF CONTENT

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACKNOWLEDGEMENT</td>
<td>v</td>
</tr>
<tr>
<td>TABLE OF CONTENT</td>
<td>vi</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>ix</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>x</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>xi</td>
</tr>
<tr>
<td>ABSTRAK</td>
<td>xii</td>
</tr>
</tbody>
</table>

## CHAPTER 1

1.0 INTRODUCTION 1-6
1.1 PURPOSE OF STUDY 7
1.2 OBJECTIVES OF STUDY 8

## CHAPTER 2

2.0 LITERATURE REVIEW 9-13
2.1 BLOOD AND ITS CONSTITUENTS 9-13
2.2 ALCOHOL AND ITS EFFECT 13-25
2.3 HEAD SPACE ANALYSIS 26-33

## CHAPTER 3

3.0 METHODOLOGY 34
3.1 INSTRUMENTATION 34-35
3.2 PROCEDURE FOR METHOD VALIDATION 35-36
3.3 CALIBRATION STANDARDS 37
3.4 INTERNAL STANDARD 37
3.5 EXTERNAL STANDARD 38
<table>
<thead>
<tr>
<th>Section</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.6 SAMPLE COLLECTION</td>
<td>38-39</td>
</tr>
<tr>
<td>3.7 INTERNAL STANDARD PREPARATION</td>
<td>39</td>
</tr>
<tr>
<td>3.8 SAMPLE PREPARATION</td>
<td>39</td>
</tr>
<tr>
<td>3.9 EXPERIMENTAL PROCEDURE</td>
<td>40</td>
</tr>
<tr>
<td>CHAPTER 4</td>
<td></td>
</tr>
<tr>
<td>4.0 RESULT AND DISCUSSION</td>
<td></td>
</tr>
<tr>
<td>4.1 CALIBRATION CURVE</td>
<td>42-44</td>
</tr>
<tr>
<td>4.2 LINEARITY STUDY</td>
<td>45</td>
</tr>
<tr>
<td>4.3 SELECTIVITY AND SPECIFICITY</td>
<td>46-47</td>
</tr>
<tr>
<td>4.4 ACCURACY</td>
<td>48-50</td>
</tr>
<tr>
<td>4.5 PRECISION</td>
<td>51-52</td>
</tr>
<tr>
<td>4.6 LIMIT OF DETECTION</td>
<td>53-54</td>
</tr>
<tr>
<td>4.7 LIMIT OF QUANTIFICATION</td>
<td>54</td>
</tr>
<tr>
<td>4.8 ROBUSTNESS</td>
<td>55-58</td>
</tr>
<tr>
<td>4.9 ANALYSIS OF ETHANOL POST MORTEM BLOOD</td>
<td>59-67</td>
</tr>
<tr>
<td>SAMPLE</td>
<td></td>
</tr>
<tr>
<td>CHAPTER 5</td>
<td></td>
</tr>
<tr>
<td>5.0 CONCLUSION</td>
<td>68</td>
</tr>
<tr>
<td>REFERENCE</td>
<td>69-73</td>
</tr>
</tbody>
</table>
List of Figure

Figure 1  Blood Components
Figure 2  Ethyl Alcohol @ ethanol structural formula
Figure 3  Oxidative pathways of alcohol metabolism
Figure 4  Schematic representation of the phases of the headspace in the vial
Figure 5  Chromatograms for ethanol for blood sample spiked with (A) 0.08% (or 80 mg/dl); and (B) 0.20% (or 200 mg/dl).
Figure 6  Spectrums for ethanol for blood sample spiked with (a) 0.08% (or 80 mg/dl); and (b) 0.20% (or 200 mg/dl).
Figure 7  Calibration curve for ethanol with six calibration levels 0.04%, 0.05%, 0.08%, 0.10%, 0.20% and 0.30%.
Figure 8  Chromatograms of five volatile compounds analysed by Gas Chromatography with headspace sampling technique
Figure 9  Chromatogram of Blood sample
Figure 10 Chromatogram for ethanol-40 (40mg/dl)
Figure 11 Chromatogram for ethanol -80 (80mg/dl)
Figure 12 Chromatogram and Mass Spectra for Blank
Figure 13 Chromatogram and Mass Spectra for 0.025% @ 25mg/dl
Figure 14 Chromatogram and Mass Spectra for 0.05% @ 50mg/dl
Figure 15 Chromatogram and Mass Spectra for 0.08% @ 80 mg/dl
Figure 16 Chromatogram and Mass Spectra for 0.10% @ 100 mg/dl
Figure 17 Chromatogram and Mass Spectra for 0.20% @ 200 mg/dl
Figure 18 Chromatogram and Mass Spectra for 0.30% @ 300 mg/dl
Figure 19 Calibration Curve for ethanol standards
List of Table

Table 1  Road traffic Fatalities involving alcohol (% of all road traffic fatalities)
Table 2  Reduced BAC level and decline in road traffic collision.
Table 3  Stages of Alcohol Intoxication
Table 4  GC Instrumentation Parameter
Table 5  Parameters of calibration curve for standard ethanol
Table 6  Result of recovery testing on six standard ethanol solution
Table 7  Result on the evaluation of accuracy of the method.
Table 8  Precision result for low, medium and high ethanol concentration
Table 9  Result of ten blank sample for LOD determination
Table 10  Result of fortified ethanol concentration from 40 mg/dl to 300mg/dl in six replicates
Table 11  Summary of result obtained from analysis of 50 sample (January – March)
Determination of ethanol in post mortem blood has become one of the important tool in medico legal investigation. The concentration of the ethanol upon dead in a person or alive has legal complication if it is more than permitted level. In Malaysia the level of Blood Alcohol Concentration (BAC) permittable according Road Traffic Act 1987 is 0.08g/100ml of blood. Nonetheless the determination of ethanol concentration in fresh blood obtained from alcohol consumer post no significant problem whereas when the blood is obtained from dead person or post-mortem blood it validity is in questioned. Accurate interpretation of blood ethanol concentration at the time of death is a difficult task to obtain due to time and other environmental factor. A reliable and rapid method is required to overcome the difficultness of the analysis. Gas Chromatography Mass Spectrometry assisted with Headspace sampling has given a new way for accurate and rapid analysis with simple procedure. Validation on the method of determination concentration of ethanol in post-mortem blood using iso-propanol as the internal standard was conducted. The validation parameter obtained indicate that iso-propanol is suitable to be used as internal standard. The validated protocol was followed to analysis 50 post-mortem blood sample obtain from Forensic Medicine Department upon autopsy. Result obtained relates that the quantification of ethanol in post-mortem blood can be conducted with high accuracy and specificity.
Abstrak

Pengukuran kepekatan etanol dalam darah yang diperolehi semasa bedah siasat telah menjadi salah faktor penting dalam penyiasatan pegawai polis. Kepekatan etanol dalam darah pada seseorang yang hidup atau mati mempunyai komplikasi undang-undang jika ia adalah lebih daripada paras yang dibenarkan atau ditetapkan. Di Malaysia tahap kandungan alcohol dalam darah yang ditetapkan dalam Akta ‘Road Traffic Act’ 1987 adalah 0.08g/100ml. Penentuan kepekatan etanol dalam darah seorang yang hidup adalah tidak sukar atau kurang dipertikaikan namun kepekatan alcohol dalam darah yang diperolehi daripada seseorang yang telah mati menghadapi sedikit kesukaran dalam menentukan kesahihan kepekatan etanol yang diperolehi. Ia juga sering dipersoalkan atas factor-faktor luaran yang mana kandungan etanol darah boleh disebabkan oleh mekanisma pencernaan glukosa kepada ethanol. Oleh yang demikian tafsiran yang tepat amatlah diperlukan untuk menentukan kepekatan etanol darah pada masa kematian adalah kepekatan yang sebenarnya dan ini merupakan satu tugas yang sukar. Sehubungan dengan itu satu kaedah yang boleh dipercayai dan pantas diperlukan untuk mengatasi kesukaran dalam penganalisaan ini. Teknik yang dimaksudkan ialah “Gas Chromatography Mass Spectrometry” dibantu dengan persampelan ‘headspace’ telah memberikan nafas baru untuk analisis yang tepat dan cepat dengan prosedur yang mudah. Validasi kepada kaedah penentuan kepekatan etanol dalam darah bedah siasat menggunakan iso-propanol sebagai piawai dalaman telah dijalankan. Parameter validasi yang diperolehi menunjukkan bahawa iso propanol sesuai untuk digunakan sebagai piawai dalaman. Protokol disahkan dan digunakan untuk analisis 50
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