# GC-MS Analysis of Matchless Blue 18mg

Report Number: K553a

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08 Jan 2015

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prepared for FTA Agency, Bromsgrove

# 1 Description

2 x 10 ml bottle containing nicotine solution was supplied by the customer for analysis. As part of their due diligence the sample was tested by GC-MS to confirm the components currently found within the Nicotine Solution formulation.

Solutions of this type can be used in an electronic cigarette which replicates the action of smoking, producing a tobacco aromatized smoke, which when inhaled quickly delivers the nicotine to the lung.

The Electronic Cigarette does not emit a tarry smoke, or produce an ash deposit. Such products offer various nicotine concentrations including 'zero' nicotine levels, and may be used to wean the smoker off 'cigarette smoking' in a controlled manner.

# 2 Samples

The sample detailed below were submitted for GC-MS analysis using LPD in house developed method for analysis of nicotine solutions.

**Table 1**– Samples received

| LPD REF | Sample Labelled |
|---|---|
| **MATCHLESS BLUE** | **MATCHLESS BLUE E-Cig Liquid 10ml**<br>18mg nicotine – medium strength |

# 3 Methodology / Apparatus

**Table 2– Summary of GC-MS Parameters used for liquid injection**

| | |
|---|---|
| Instrument | Agilent 7820A |
| Detector | Agilent 5977E MSD |
| Carrier Gas | Helium @ 1.0ml/min |
| | 1µL @ Split 1:40<br>TEMPERATURE 260°C |
| Detection | MSD SCAN 40 - 550M/Z<br>TEMPERATURE 230°C |
| Database | NIST11.L |

*The analysis was performed between 22/12/2014 – 24/12/2014, the results obtained relate to the samples as received after suitable sample preparation.*

The identified components in table 3 correspond to peaks identified in the gas chromatogram in figures 1 and 2. The sample Peak identifications (ID) are derived mathe matically by comparing the mass spectra associated with the peaks to a comme rcial library standards. The library match score is a value which on a scale of 1-100 indicates the clo seness of the m atch or t he confidence in the identification. Generally a score above 75 is considered an a cceptable match, 85-95 is considered a very good match and above 95 the match is almost perfect.

Because of the wa y mass spectra are acquired, sampling conditions and instrument variability do not contribu te to the spectra and so library identification is a very good indica tion of the components present . However where there are cl osely related species, library matches can be more difficult.

# 4 Results

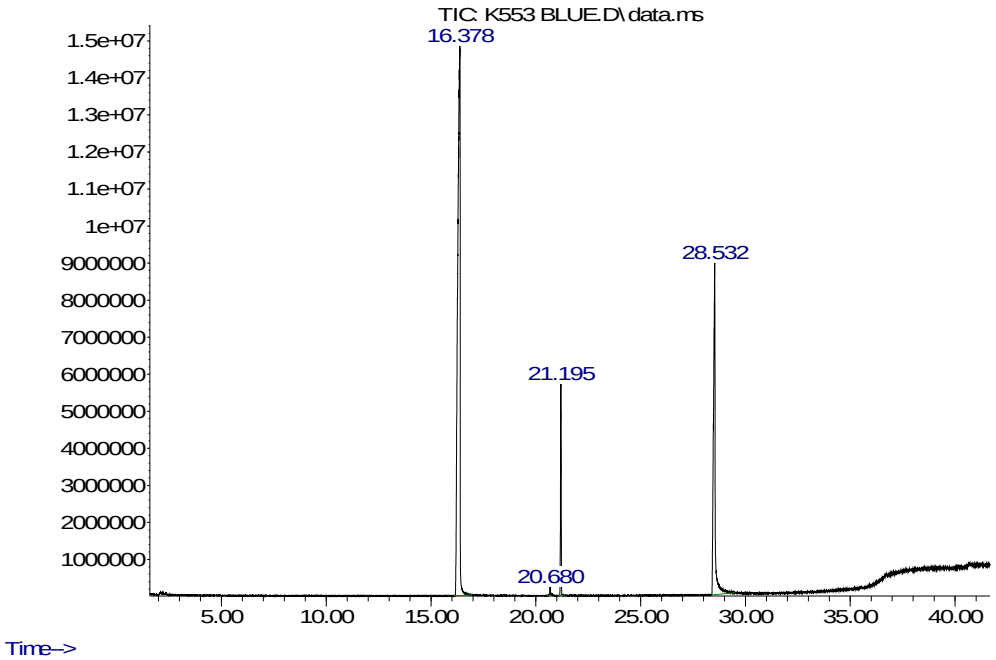


**Table 3 – Table of Compounds Detected in Machless Blue sample**

| PK | RT | Area Pct | Library/ID | CAS | Qual |
|---|---|---|---|---|---|
| 1 | 16.3785 | 65.0581 | Propylene Glycol | 000057-55-6 | 83 |
| 2 | 20.6788 | 0.2657 | 1,2-Cyclopentanedione, 3-methyl- | 000765-70-8 | 93 |
| 3 | 21.1946 | 6.961 | Pyridine, 3-(1-methyl-2-pyrrolidinyl)-, (S)- | 000054-11-5 | 96 |
| 4 | 28.5314 | 27.7152 | Glycerin | 000056-81-5 | 83 |

# 5 Interpretation of GC-MS Results

**Table 4 – Risk Phrases by Component**

| Component | Name | CAS No. | Other Names | Risk Phrases of Pure Compounds in Isolation or comment |
|---|---|---|---|---|
| 1 | Propylene glycol | 57-55-6 | | No Hazards Recognized |
| 2 | 1,2-Cyclopentanedione, 3methyl | 765-70-8 | Maple lactone | R36/37/38 Irritating to eyes, respiratory system and skin |
| 3 | Pyridine, 3-(1-methyl-2-pyrrolidiyl)-, (S)- | 54-11-5 | Nicotine | R25 Toxic if swallowed |
| | | | | R27 Very Toxic in contact with skin |
| | | | | R51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment |
| | | | | R36 Irritating to eyes |
| | | | | R20/21/22 Harmful by inhalation, in contact with skin, and if swallowed |
| | | | | R 11 Highly flammable |
| | | | | R36/37/38 Irritating to eyes, respiratory system and skin |
| 4 | Glycerin | 56-81-5 | Glycerol | No Hazards Recognized |

# 6 Conclusions

The products tested contain the three compounds most commonly found in nicotine E-liquids. Propylene Glycol (CAS No.57-55-6), Nicotine (CAS No.54-11-5) and Glycerin (CAS No.56-81-5).

The GC-MS analysis of the matchless blue detected 1 additional compound as listed in table 3, which relates to a flavour additive called maple lactone.

The basic GC-MS method is primarily a 'Qualitative' tool to identify the volatile chemical species present in an E-liquid.

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End of Report