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Friday 3<sup>rd</sup> April 2009

**Analysis report of electronic cigarette cartridges for 'intellicig electronic cigarette' company**

Dear Chris

Please find enclosed a report which shows analysis of raw materials glycerol, ethyl maltol, nicotine and finished cartridge products ('Mild' and 'Non-Mild') supplied as of Thursday 19<sup>th</sup> March 2009. In addition to these materials, a sample of cigarette smoke from the cigarette was subjected to LCMS, GCMS and NMR to test for the presence of possible acrolein structures which as of the time of writing we are pleased to report have not been identified.

Starting materials ethyl maltol, glycerol and nicotine were subjected to analysis on NMR and LCMS and we report the purity of materials of:

<b>Compound</b>	<b>Purity</b>
Nicotine	99.82%
Ethyl Maltol	99.15%
Glycerol	99.10%

De-ionised water was analysed for ion conductivity and calculations show this to be over 99% pure.

'Mild' and 'Non-Mild' cartridges were subjected to LCMS and GCMS and were found to be containing materials listed above. In addition, GCMS of 500 ml of smoke from the electronic cigarette was subjected to GCMS and small traces of all starting materials were found in the resultant column. It is our intention from here-in to develop methodology which characterises with accuracy the % composition of each fraction subjected to GCMS.

I can confirm the purity of starting materials together with finished cartridge products.

Steven

Conditions of Nuclear Magnetic Resonance:

400 MHz Avance NMR Machine

Solvent of samples: nicotine (CDCl<sub>3</sub>), ethyl maltol (CDCl<sub>3</sub>), glycerol (D<sub>2</sub>O)

Conditions of Liquid Chromatography Mass Spectrometry

Column: DB5-MS 30m 0.25 i.d. 0.25um (micro metre) film

Carrier Flow: 1.0 ml/min

Injection Volume: 0.2 ul (microlitre) split ratio of 100:1

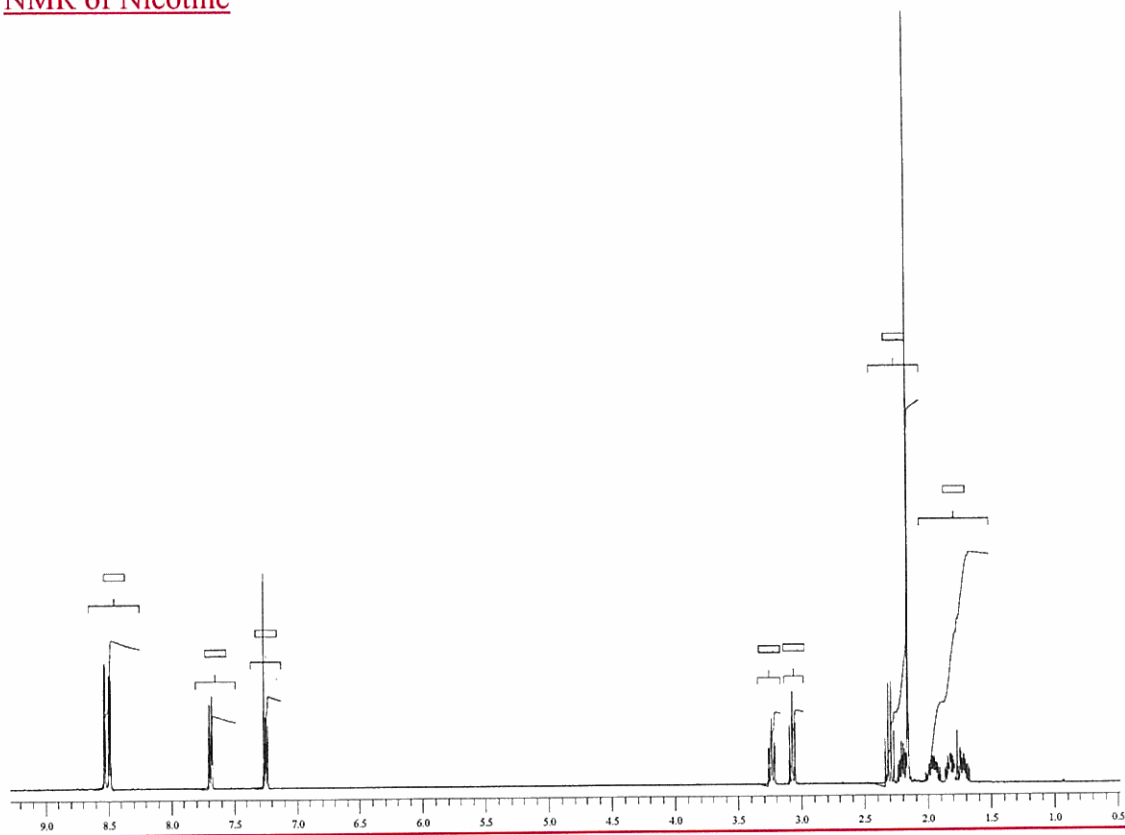
Injection temp: 300oC

GC Programme: 50oC, 1.0 min hold, 10oC/min to 300oC, hold 10 mins

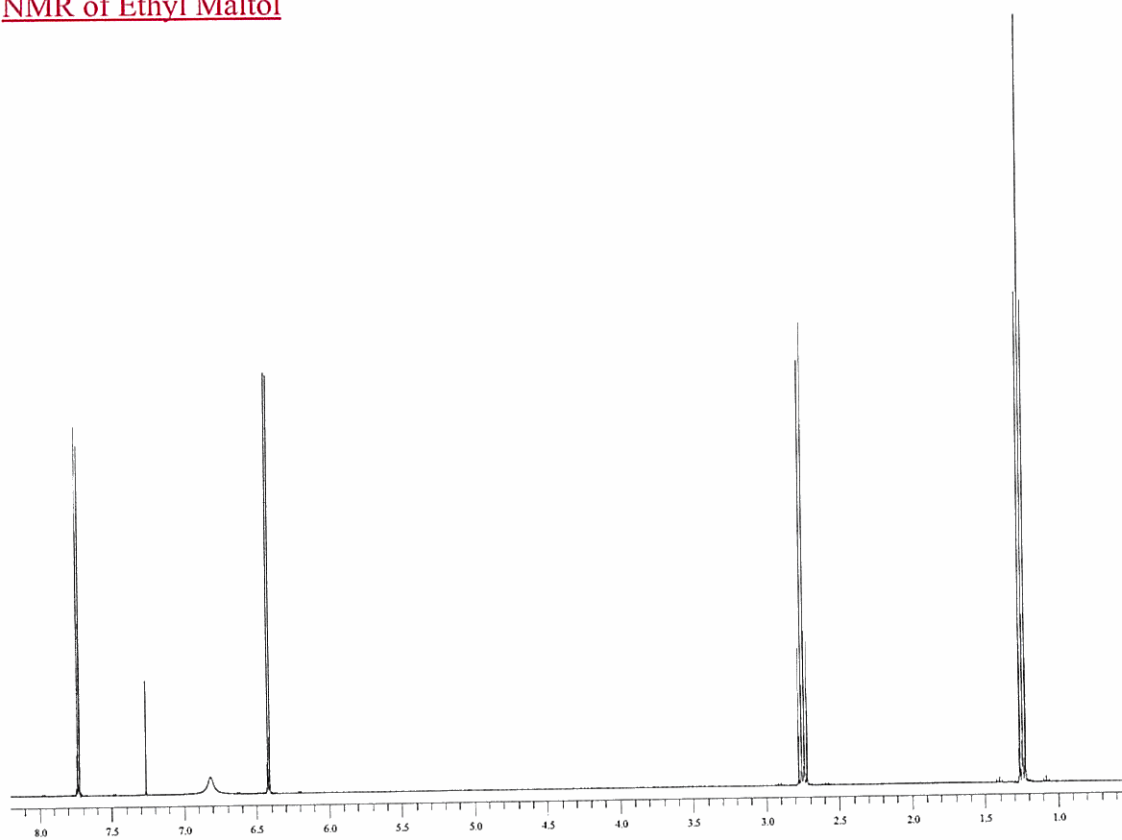
Conditions of Liquid Chromatography Mass Spectrometry

As per LCMS above.

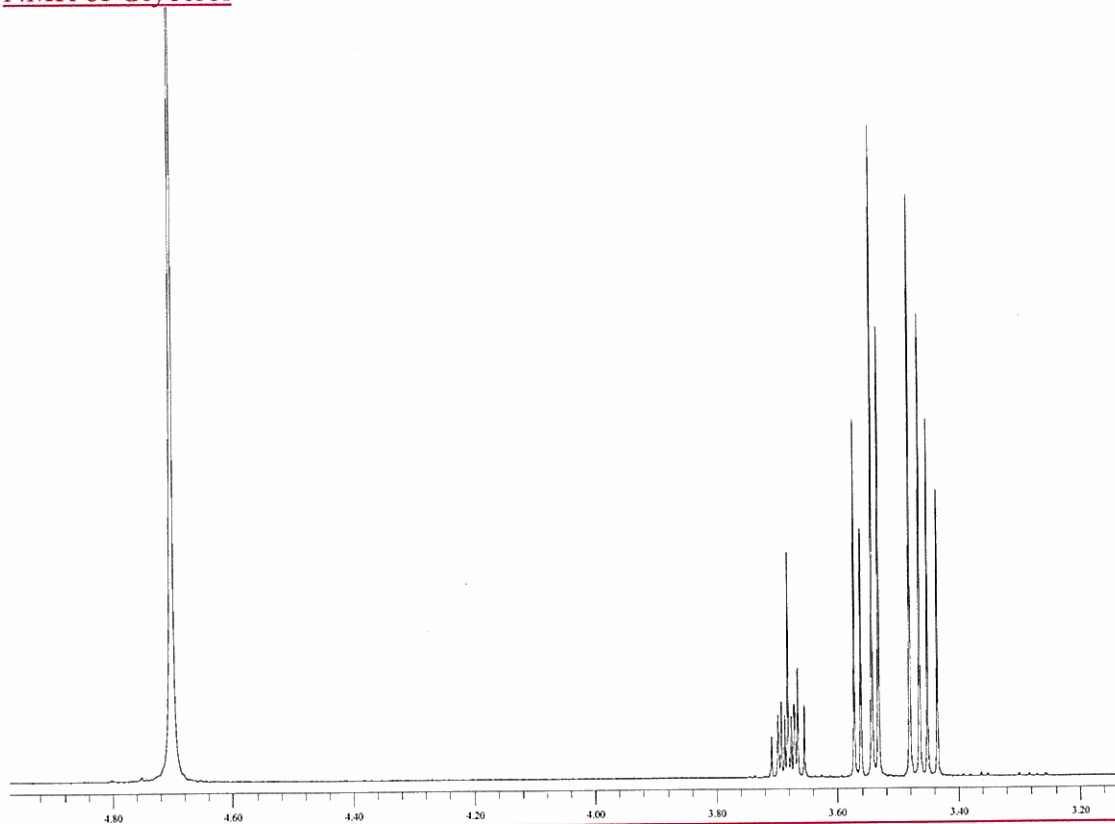
## NMR of Nicotine



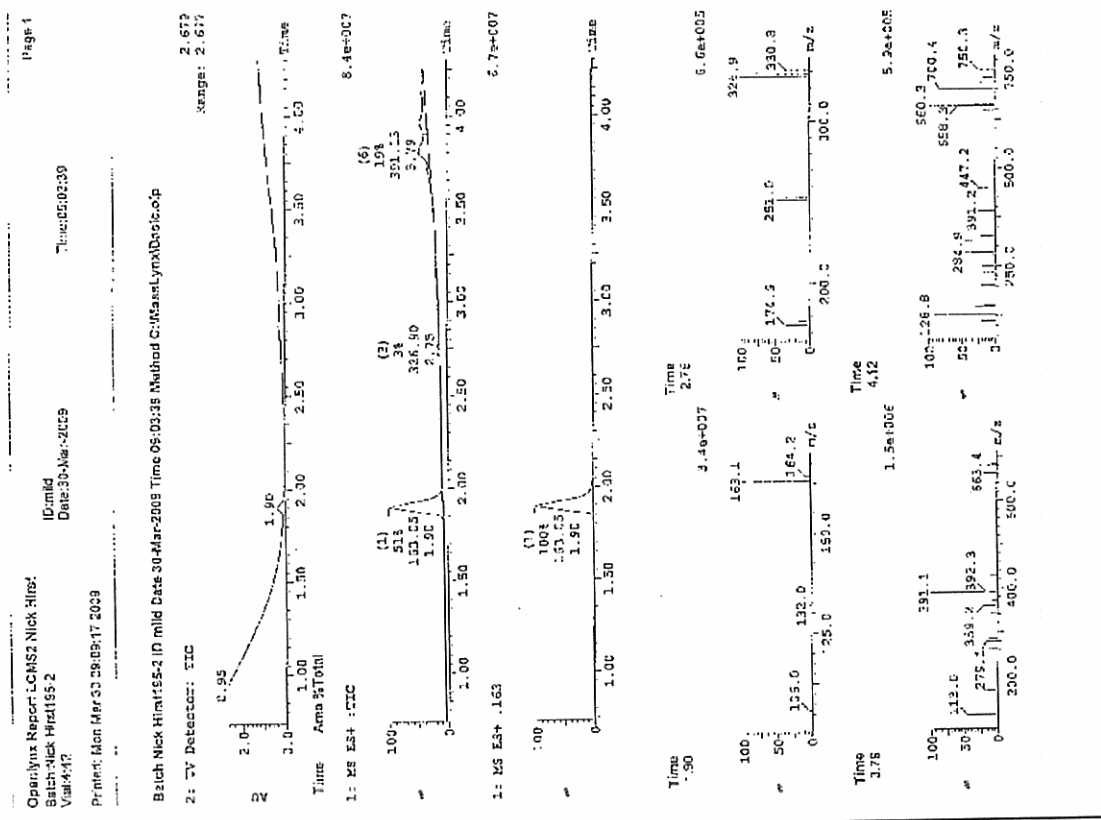
## NMR of Ethyl Maltol



# NMR of Glycerol



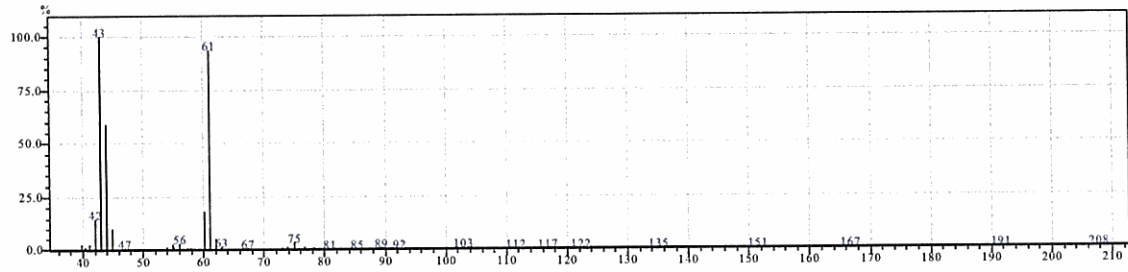
# LCMS of 'Mild' Cartridge



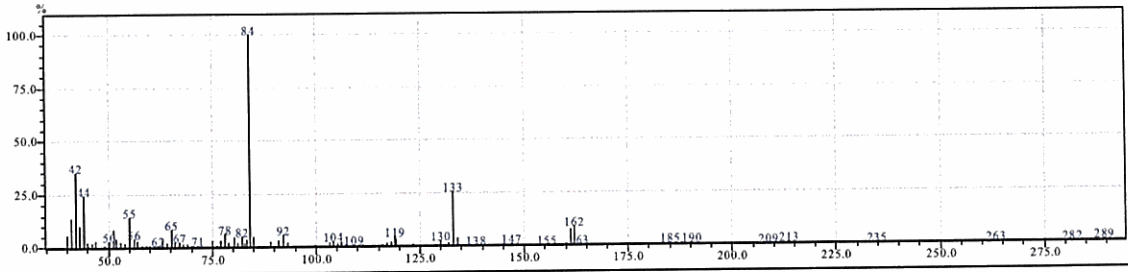
MS peak of 163  $\text{gmol}^{-1}$  confirms the presence of Nicotine



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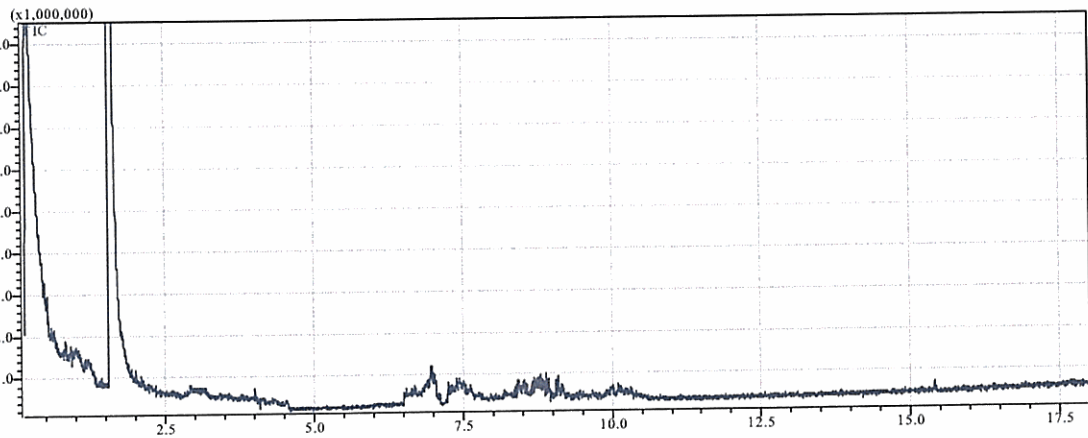


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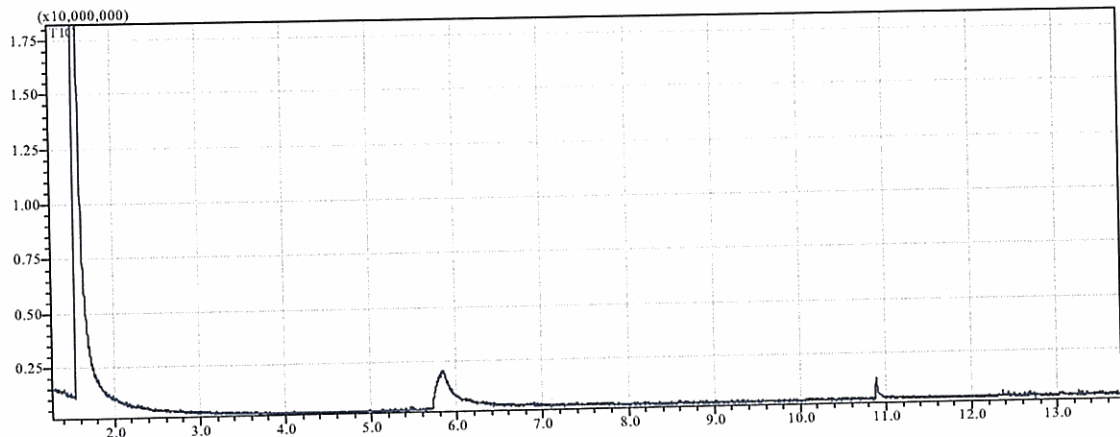
Mild mix – 10mg of sample in 1ml Acetonitrile. Injection vol. 0.2ul with a 1:100 split

GCMS of 'Smoked' Cartridge

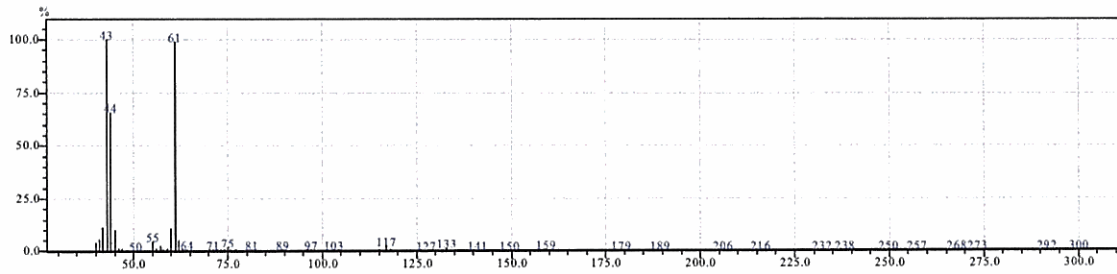


'Smoked' mix – 10mg of sample in 1ml Acetonitrile. Injection vol. 0.2ul with a 1:100 split. 'Smoked' mix was 'Non-Mild' cartridge with 500 ml of smoke dissolved in 1ml Acetonitrile. No clear peaks were recorded at all but inference of spectra suggests the presence of glycerol and nicotine.

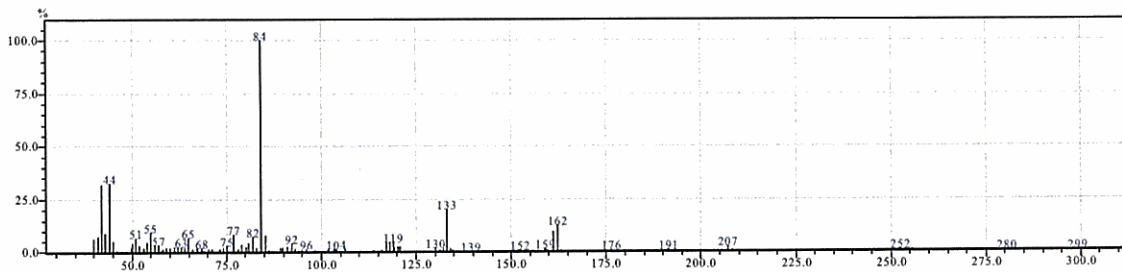
GCMS of 'Non-Mild' Cartridge



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Non-mild mix – 10mg of sample in 1ml Acetonitrile. Injection vol. 0.2µl with a 1:100 split.

**Conclusion**

NMR confirms the purity of nicotine, ethyl maltol and glycerol. Liquid Chromatography Mass Spectrometry indicates the presence of nicotine in ‘Mild’ and ‘Non-Mild’ cartridges. GCMS confirms that nicotine, glycerol and ethyl maltol are present in ‘Mild’ and ‘Non-Mild’ cartridges.