Anatune Ltd
Wellbrook Court, Girton Road, Cambridge,
CB3 0NA, UK
+44 (0) 1223279210
enquiries@anatune.co.uk
www.anatune.co.uk

THERMAL DESORPTION (TD)-SIFT-MS: A NEW APPROACH TO BREATH ANALYSIS

Mark Perkins, Anatune Ltd.

INTRODUCTION

In early 2019, Syft Technologies introduced thermal desorption (TD)-SIFT-MS, through integrating GERSTEL's TDU system with their Voice200*ultra* SIFT-MS. This allows for simultaneous desorption and analysis, giving faster throughput and temperature resolved concentration profiles. One area where this will be of significant benefit is breath analysis.

Anatune first exhibited TD-SIFT-MS at the IABR Breath Summit 2019 as a fast, sensitive alternative for breath analysis.

To demonstrate the ease, and speed of analysis – after eating a mint sweet – I loaded six Tenax TA thermal desorption tubes with approximately 30 seconds of exhaled breath, over the following 12 minutes. This was followed by automated desorption onto the TD-SIFT-MS, taking less than 30 minutes to complete the entire analysis. Figure 1 shows the TD-SIFT-MS in-situ at the IABR meeting and the results are shown below.

INTRUMENTATION

Autosampler: Single Head MPS RoboticPro
SIFT-MS: Voice200*ultra* with Thermal Desorption Inlet. Helium carrier gas

Figure 1: TD-SIFT-MS at IABR Breath Summit 2019

RESULTS

Figures 2 and 3 show the desorption profiles for Tubes 1 and 6 with peaks for both the flavour compounds and endogenous breath markers. Water loss (not to scale) can also be seen in the plots. Menthol response was determined from the area under peak and this was normalised using the related acetone peak. As the total flow through, and hence loading onto the tubes, was not controlled, the relatively constant level of breath acetone, over the timeframe of the test, was used as a measure of total loading – effectively acting as an internal standard. Figure 4 shows the loss of menthol, over time, clearly fitting to an exponential type decay.

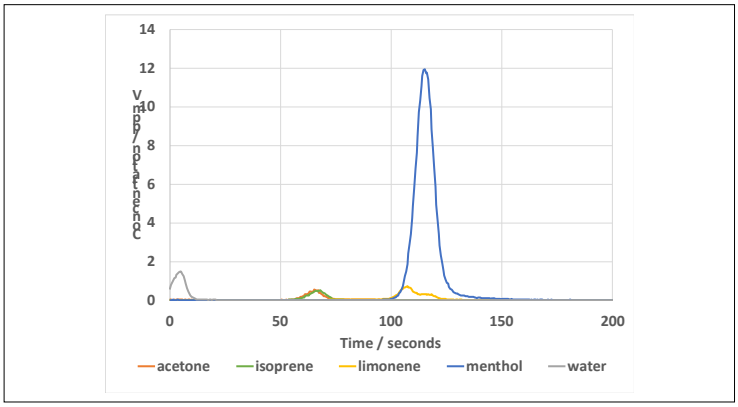

Figure 2: Desorption profile for Tube 1

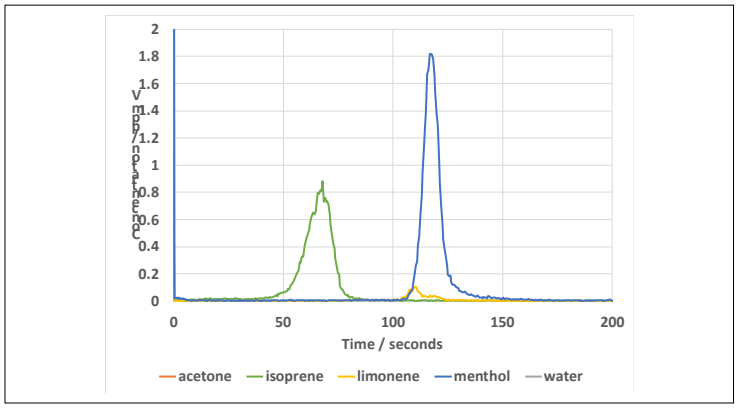

Figure 3: Desorption profile for Tube 6

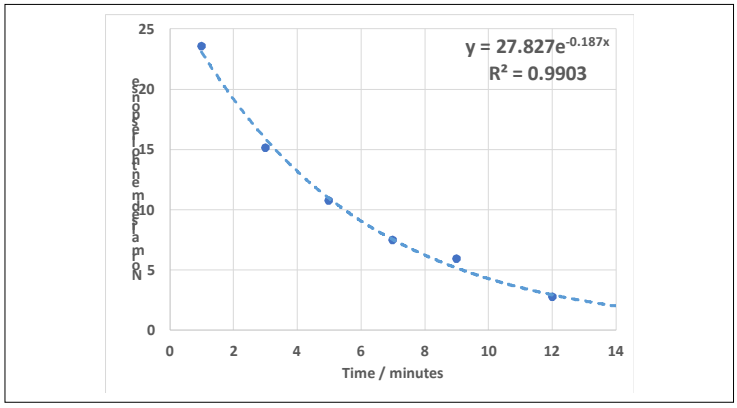

Figure 4: Menthol response normalised to acetone response

CONCLUSIONS

The preliminary results above show that TD-SIFT-MS has the potential to significantly enhance breath analysis, particularly for large cohort studies, thanks to the automated high throughput capability, sensitivity, extra specificity and compound resolution … and is easy enough to use live at a conference Vendor Exhibition!