Influence of usage time on exposure of snus users to nicotine, NNN and NNK from snus pouches
Nathan Gale, Helena Digard, Kevin McAdam and Justine Williamson
British American Tobacco, Group Research and Development, Regents Park Road, Southampton, SO15 8LT, United Kingdom

INTRODUCTION

Measuring the amount of constituents extracted by snus consumers during use is a valuable step in estimating exposure to tobacco constituents. A factor potentially influencing the extent of the exposure is the length of time that individual consumers keep snus pouches in their mouths during usage. Several studies from Sweden established that, on average, use of pouched snus extends from approximately 30 minutes to just less than 120 minutes. The majority of this study therefore attempted to quantify the importance of using the pouch for a shorter duration.

In another study, methanol was added to 20 pouches. Samples were collected for both the wet and dry basis. The samples were then analyzed for nicotine, NNN and NNK using a modified analytical programme. The highest amount of nicotine was found in the pouches that were emptied after 5 minutes of usage, whereas the dry pouches contained the highest concentration of NNN and NNK. These results indicate that the use of pouches can cause a significant amount of both nicotine and nitrosamines to be transported to the consumer.

METHODS – Calculation of Exposure

At each timepoint (up to 84 minutes from the moment of first use) of each duration of a) nicotine, b) NNK and c) NNN, the concentration of each of these constituents was measured.

RESULTS

Table 1. Descriptive statistics for used pouches analysed in the study.

<table>
<thead>
<tr>
<th>Constituent (units)</th>
<th>Mean Amount</th>
<th>Standard Deviation</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Number of pouches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nicotine (mgn)</td>
<td>10.05</td>
<td>1.65</td>
<td>0.83</td>
<td>12.91</td>
<td>70</td>
</tr>
<tr>
<td>NNK (mg)</td>
<td>0.27</td>
<td>0.06</td>
<td>0.12</td>
<td>0.67</td>
<td>70</td>
</tr>
<tr>
<td>NNN (mg)</td>
<td>4.04</td>
<td>0.62</td>
<td>2.76</td>
<td>6.32</td>
<td>70</td>
</tr>
</tbody>
</table>

 CONCLUSIONS

The findings are consistent with those from recent pharmacokinetic studies which have indicated that the key to reducing snus-related toxicity is to reduce exposure time. The findings are consistent with those from recent pharmacokinetic studies which have indicated that the key to reducing snus-related toxicity is to reduce exposure time.

ACKNOWLEDGEMENT

This study was funded by British American Tobacco.

REFERENCES


Poster P05-1 presented at 2012 SRNT 18th Annual Meeting, March 13-16, Houston, Texas, USA. 
This study was entirely funded by British American Tobacco

For Excellent Users to Nicotine, NNN and NNK from Snus Pouches

Digard, Digard, Digard, For Exposure

The use of pouches can cause a significant amount of both nicotine and nitrosamines to be transported to the consumer. The findings are consistent with those from recent pharmacokinetic studies which have indicated that the key to reducing snus-related toxicity is to reduce exposure time.

Figure 1: Fitted line plots of individual values for % transfer after each usage duration of a) nicotine, b) NNK and c) NNN.

Figure 2: 1st order kinetic plots of mean remaining percentage for a) nicotine, b) NNK and c) NNN.

Figure 3: a) and b) show that a first order kinetic file the experimental data. The rate constant (k) for nicotine was found to be 0.203 min⁻¹, whereas the rate constant for NNK was found to be 0.009 min⁻¹. This is consistent with the expected lower rate constant for NNK.

Figure 4: The data is set for a specific time point for each constituent, and the time point is chosen such that the cumulative exposure is equal.

Table 1: Descriptive statistics for used pouches analysed in the study.

<table>
<thead>
<tr>
<th>Constituent (units)</th>
<th>Mean Amount</th>
<th>Standard Deviation</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Number of pouches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nicotine (mgn)</td>
<td>10.05</td>
<td>1.65</td>
<td>0.83</td>
<td>12.91</td>
<td>70</td>
</tr>
<tr>
<td>NNK (mg)</td>
<td>0.27</td>
<td>0.06</td>
<td>0.12</td>
<td>0.67</td>
<td>70</td>
</tr>
<tr>
<td>NNN (mg)</td>
<td>4.04</td>
<td>0.62</td>
<td>2.76</td>
<td>6.32</td>
<td>70</td>
</tr>
</tbody>
</table>