More on the False Negative Rate for EMIT Cannabinoids

To the Editor:

We have been following with interest recent reports of false negative EMIT cannabinoid results (1,2). Our laboratory encountered similar problems in two New York City drug abuse proficiency survey samples. Samples 49N2 (February 1989) and 49T5 (August 1989) were spiked at 133 and 150 ng/mL respectively. Both yielded negative cannabinoid EMIT results when tested with the 100-ng/mL cutoff assay kits. Analysis of the two samples by fluorescence polarization immunoassay (FPIA) gave positive cannabinoid results at levels greater than 100 ng/mL. GC/MS quantitation yielded values of 108 and 171 ng/mL for 49N2 and 49T5 respectively (Table I). While this evaluation is inadequate to make general statements on false negative rate for EMIT cannabinoid assay, it does support previous observations that problems exist.

Table I. Summary of the Original Testing Data

<table>
<thead>
<tr>
<th>Sample (date)</th>
<th>Target concentration</th>
<th>EMIT result (100 ng/mL)</th>
<th>FPIA (ng/mL)</th>
<th>GC/MS (ng/mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>49N2 (2/89)</td>
<td>133 ng/mL</td>
<td>negative (600/614)*</td>
<td>108 (TDx)</td>
<td>108</td>
</tr>
<tr>
<td>49T5 (8/89)</td>
<td>150 ng/mL</td>
<td>negative (594/601)*</td>
<td>131 (ADx)</td>
<td>171</td>
</tr>
</tbody>
</table>

* A-absorbance values of sample/low calibrator

Recently SYVA modified its cannabinoid calibrator formulation. The new calibrators utilize 11-nor-\(\Delta^4\)-THC-9-carboxylic acid to distinguish between positive and negative samples at the 100-ng/mL level. The previous material utilized 11-nor-\(\Delta^6\)-THC-9-carboxylic acid. The second change in the formulation is that SYVA no longer adds surfactant to the calibrators.

We were curious to gauge the performance of SYVA's new calibrators. We had saved the original proficiency samples and decided to reanalyze them by EMIT, FPIA, and GC/MS. Table II summarizes the data obtained when these samples were reanalyzed in October.

Table II. Summary of Data Obtained in October 1989

<table>
<thead>
<tr>
<th>Sample (date)</th>
<th>EMIT result ((\Delta^4) calibrator)</th>
<th>EMIT result ((\Delta^6) calibrator)</th>
<th>FPIA (ng/mL)</th>
<th>GC/MS (ng/mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>49N2 (10/89)</td>
<td>negative (601/639)*</td>
<td>negative (611/620)*</td>
<td>101 (ADx)</td>
<td>89</td>
</tr>
<tr>
<td>49T5 (10/89)</td>
<td>negative (617/639)*</td>
<td>positive (652/620)*</td>
<td>140 (ADx)</td>
<td>163</td>
</tr>
</tbody>
</table>

* A-absorbance values of sample/low calibrator

The urine samples were stored under refrigeration in plastic containers. While some cannabinoid degradation occurred during this storage, it was less than we had anticipated.

The data from sample 49T5 demonstrates a significant improvement in the EMIT performance. The sample gave a strong positive EMIT result with the new calibrator (containing \(\Delta^4\)-carboxy THC without surfactant). This is in sharp contrast to the false negative result obtained on the same sample with the earlier calibrator (containing \(\Delta^4\)-carboxy THC and a surfactant). The result obtained for sample 49N2 is more ambiguous because its cannabinoid concentration decreased during storage to a level near the assay’s 100-ng/mL cutoff value. Although this sample yielded a negative EMIT result, this result cannot be considered significant; thus, it should not be classified as a false negative result.

In summary, we confirm the observations of false negative EMIT cannabinoid results with SYVA's earlier \(\Delta^4\)-carboxy THC calibrators. We note a significant improvement with the new \(\Delta^4\)-carboxy THC calibrator. However, more data is needed to assess the reliability of the new EMIT calibrator formulation with respect to its potential for yielding false negative results.

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References