Introduction

In recent years, various new aspects in the context of hair analysis for cannabinoids arose which have to be considered when analyzing hair samples and interpreting the results [1]. In this context, a compound often analyzed as a plausibility check is cannabidiol (CBD). In analogy to THC, this analyte is not produced by the cannabis plant but derives from decarboxylation of a biogenetic precursor, cannabidiolic acid (CBDA). So far, the presence of CBD in hair samples has not been investigated.

Applying methanolic extraction and LC-MS/MS for the analysis of CBD in hair samples, the analyte could not be detected in numerous hair samples [2]. This observation could be explained on the one hand by the fact that much of the seized marijuana does not contain relevant amounts of CBD. However, another explanation could be that, similar to THCA-A, much of the analyte might be present in the form of CBDA in hair. If the second would be the case, this may lead to the same analytical issues encountered with THCA-A and THC.

The aim of the present study was to develop a method for the sensitive detection of CBDA and CBD in hair and to assess, if CBDA is present in THC positive hair samples in relevant amounts.

Methods

LC-MS/MS

An LC-MS/MS method covering CBDA, CBD, THCA-A, and THC was validated according to the guidelines of the GTFCh [3].

Gradient:

```
Time % B
0 - 1 min 20
1 - 2 min 60
2 - 6 min 100
6.7 - 7.6 min 10
7.5 - 7.6 min 10
7.6 - 10 min 10
```

Column: Kinetex 2.6 µm XB-C

Shimadzu Nexera X2

SCIEX QTRAP 5500

**Results and discussion**

**Authentic samples**

<table>
<thead>
<tr>
<th>Sample</th>
<th>Length [cm]</th>
<th>THC-Δ[13] [pg/mg]</th>
<th>THC [pg/mg]</th>
<th>CBDA [pg/mg]</th>
<th>CBD [pg/mg]</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>17.0</td>
<td>&lt; LOQ</td>
<td>&lt; LOQ</td>
<td>n.d.</td>
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</tr>
<tr>
<td>#2</td>
<td>11.0</td>
<td>&lt; LOQ</td>
<td>&lt; LOQ</td>
<td>&lt; LOQ</td>
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</tr>
<tr>
<td>#3</td>
<td>11.0</td>
<td>119</td>
<td>12</td>
<td>66</td>
<td>41</td>
</tr>
<tr>
<td>#4</td>
<td>36.0</td>
<td>&lt; LOQ</td>
<td>12</td>
<td>&lt; LOQ</td>
<td></td>
</tr>
<tr>
<td>#5</td>
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<td>1018</td>
<td>37</td>
<td>370</td>
<td></td>
</tr>
<tr>
<td>#6</td>
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<td>796</td>
<td>66</td>
<td>41</td>
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<tr>
<td>#7</td>
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<td>29</td>
<td>&lt; LOQ</td>
<td>&lt; LOQ</td>
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</table>

**External contamination**

<table>
<thead>
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<th></th>
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<tr>
<td>3</td>
<td>&lt; LOQ</td>
<td>&lt; LOQ</td>
<td>36</td>
<td>54</td>
</tr>
</tbody>
</table>

**Validation**

The method was successfully validated according to the guidelines of the GTFCh.

**Lower limit of quantification:**

- CBDA: 9 pg/mg
- CBD: 15 pg/mg
- THCA-A: 14 pg/mg
- THC: 19 pg/mg

**Linearity:**

- CBDA: 10 - 1000 pg/mg
- CBD: 20 - 1000 pg/mg
- THCA-A: 10 - 1000 pg/mg
- THC: 20 - 1000 pg/mg

**References**


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