

# Screening *Cannabis* for Meaningful Mycotoxins and their metabolites using high-resolution mass spectrometry

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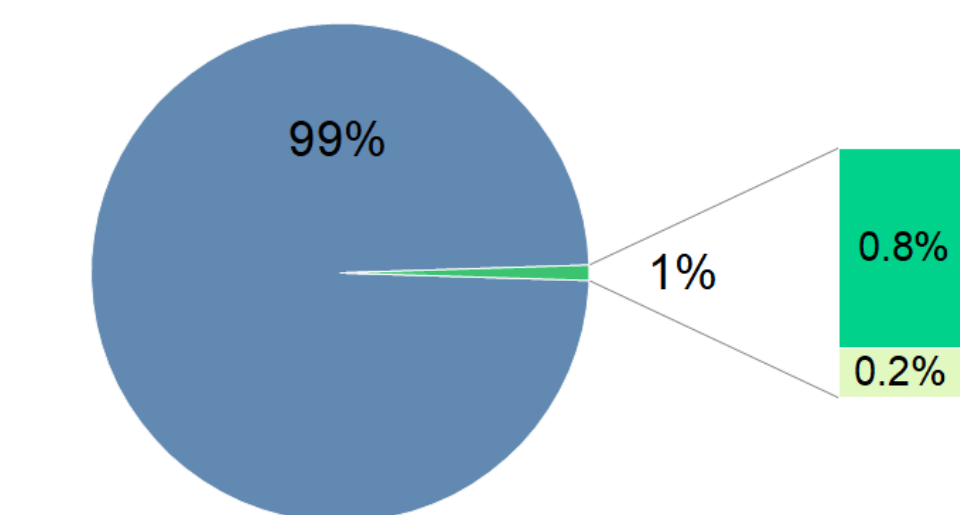
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## What are mycotoxins ?

Several hundred different mycotoxins have been identified, but the most commonly observed mycotoxins that present a concern to human health and livestock include **afatoxins, ochratoxin A, patulin, fumonisins, zearalenone and nivalenol/deoxynivalenol**. Mycotoxins appear in the food chain as a result of mould infection of crops both before and after harvest. Exposure to mycotoxins can happen either directly by eating infected food or indirectly from animals that are fed contaminated feed, in particular from milk.



■ Other mycotoxins  
■ Aflatoxins (B1, B2, G1, G2)  
■ Ochratoxin A



The 5 mycotoxins that are typically the subject of Cannabis testing only make up 1% of the number of known mycotoxins



Figure 1. The number of known mycotoxins vs. the 5 mycotoxins that are commonly the focus of Cannabis testing.

## How do we test for mycotoxins ?

	Pros	Cons
<b>ELISA</b>	<ul style="list-style-type: none"> <li>• Cost</li> <li>• Speed</li> </ul>	<ul style="list-style-type: none"> <li>• Background interferences</li> <li>• Sensitivity</li> </ul>
<b>Immunoaffinity column chromatography with fluorometry</b>	<ul style="list-style-type: none"> <li>• Sensitive</li> </ul>	<ul style="list-style-type: none"> <li>• Extra capital expense</li> <li>• Cost of consumables</li> </ul>
<b>LC-MS/MS</b>	<ul style="list-style-type: none"> <li>• More Sensitive</li> <li>• Wider range of compounds</li> </ul>	<ul style="list-style-type: none"> <li>• Upfront cost</li> </ul>

## 100 Cannabis samples that failed microbial testing requirements screened for the presence uncommonly tested for mycotoxins and their metabolites

### Initial suspect screening results

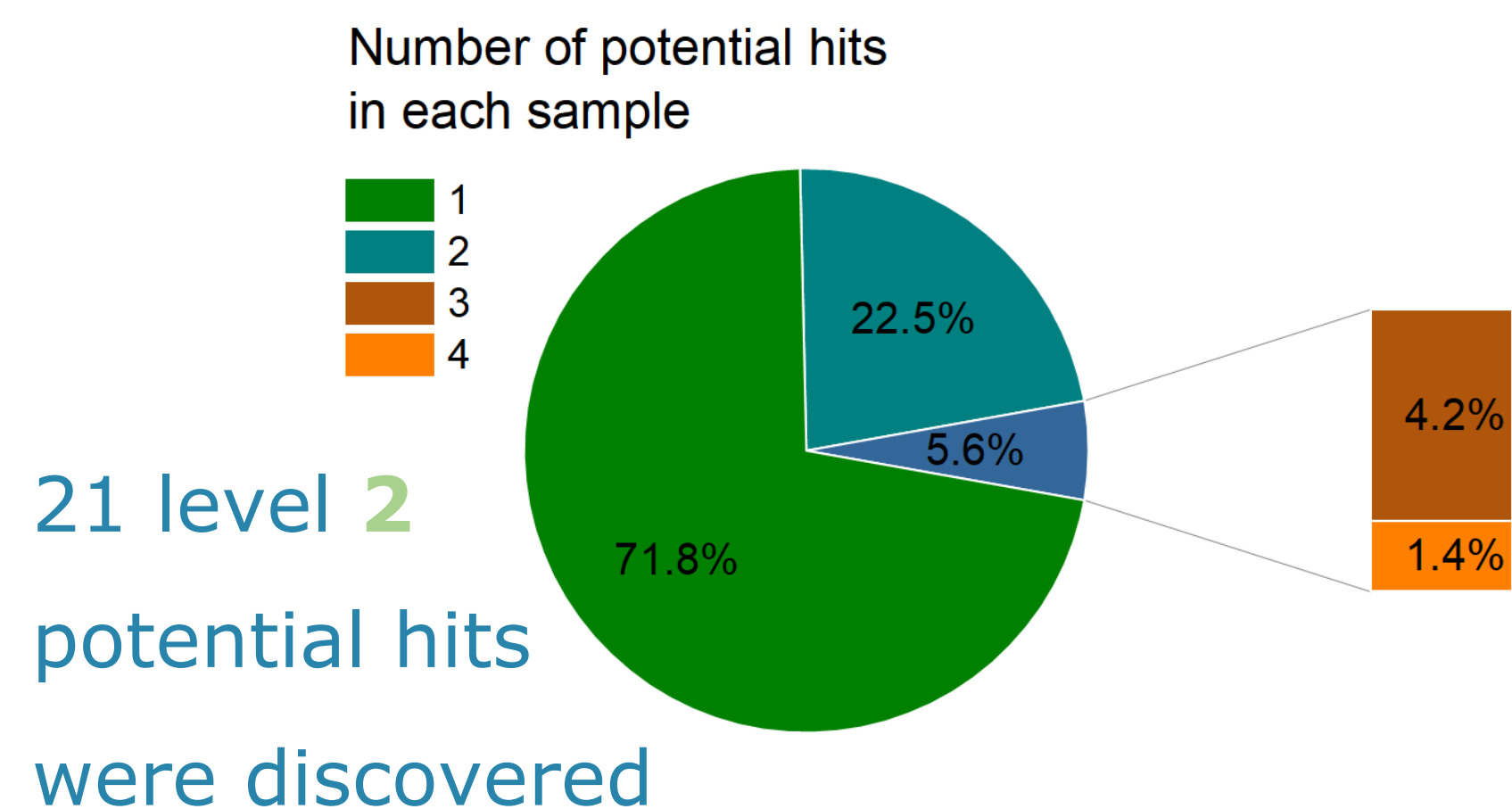


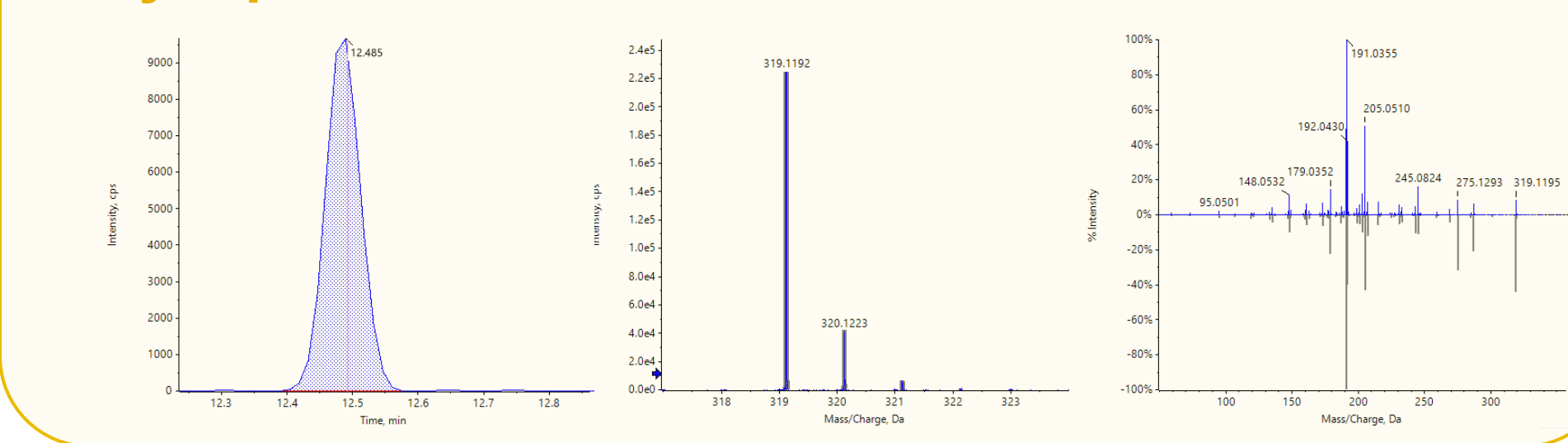
Figure 2. The total number of potential identifications in each sample.

### Comparing the suspect screening results to reference standards

Table 1. Current results after purchasing available standards.

Component name	Potential hits	Average MS <sup>1</sup> error (ppm)	Average MS/MS Library Score (Fit)	Confidence	Next Steps
15-hydroxyculmorone	9	-0.8	85	Level 2	Find a standard
Agistatin D	1	-2.1	70	Level 2	Reacquire for better MS/MS spectra
Cycloheximide	9	-0.3	79	Level 3	Reacquire for better MS/MS spectra
Deepoxy-deoxynivalenol	4	-0.7	96	Level 3	Reacquire for better MS/MS spectra
Macrosporin	2	0.1	70	Level 2	Find a standard
Mycophenolic acid	1	0.1	99	Level 1	Orthogonal method
Orsellinic acid	42	-0.4	92	Level 1	Orthogonal method

### Mycophenolic acid



### Orsellinic acid

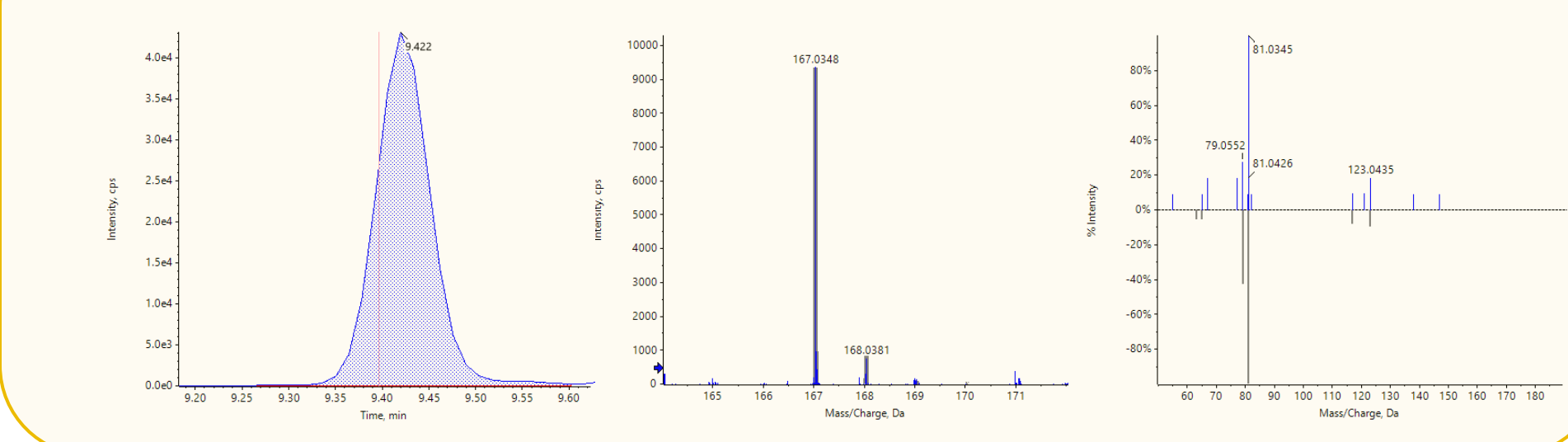


Figure 3. Example MS/MS spectrums of level 1 compounds identified.

## Methods

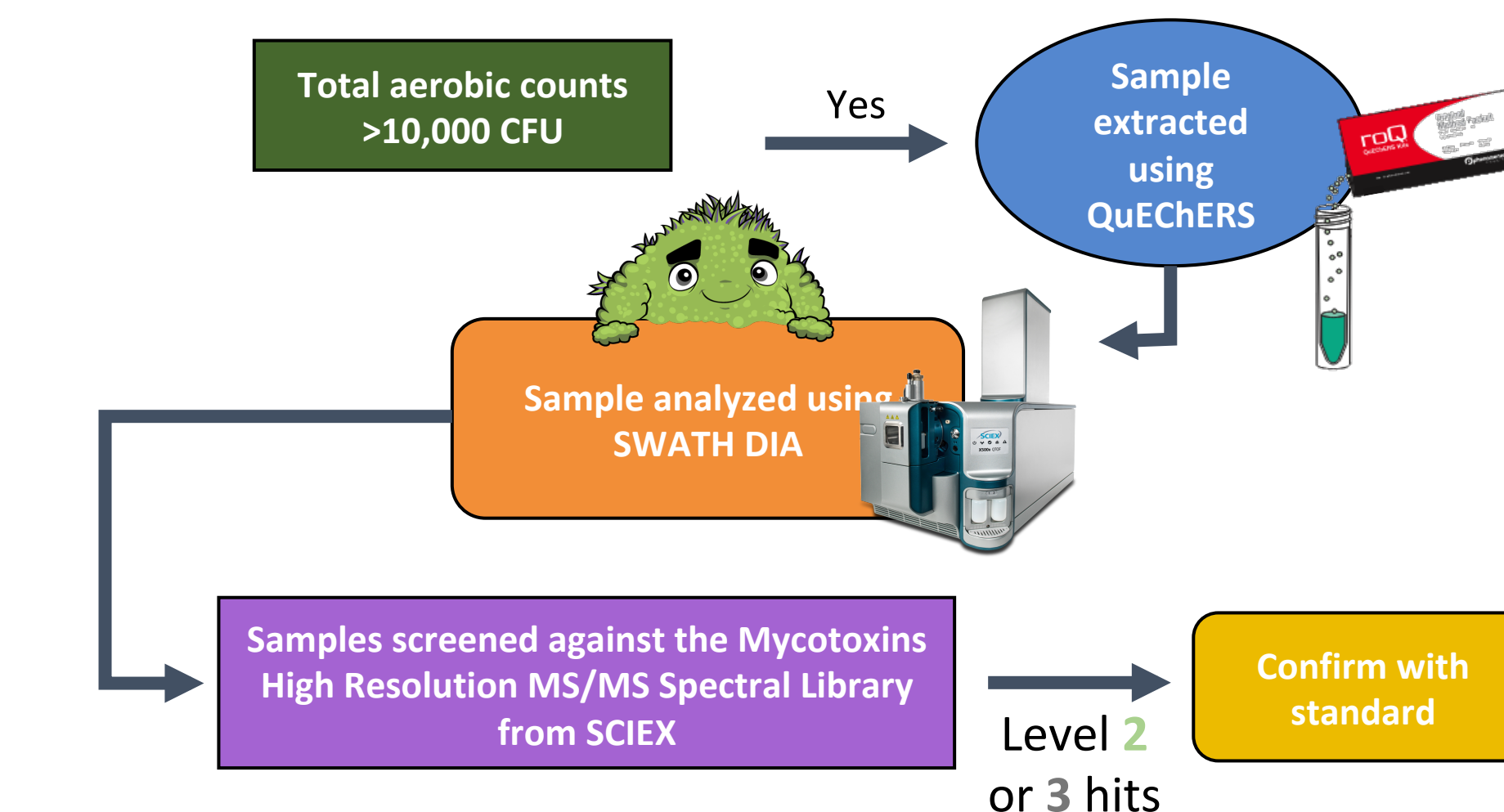


Figure 4. Suspect screening workflow used to analyze samples.

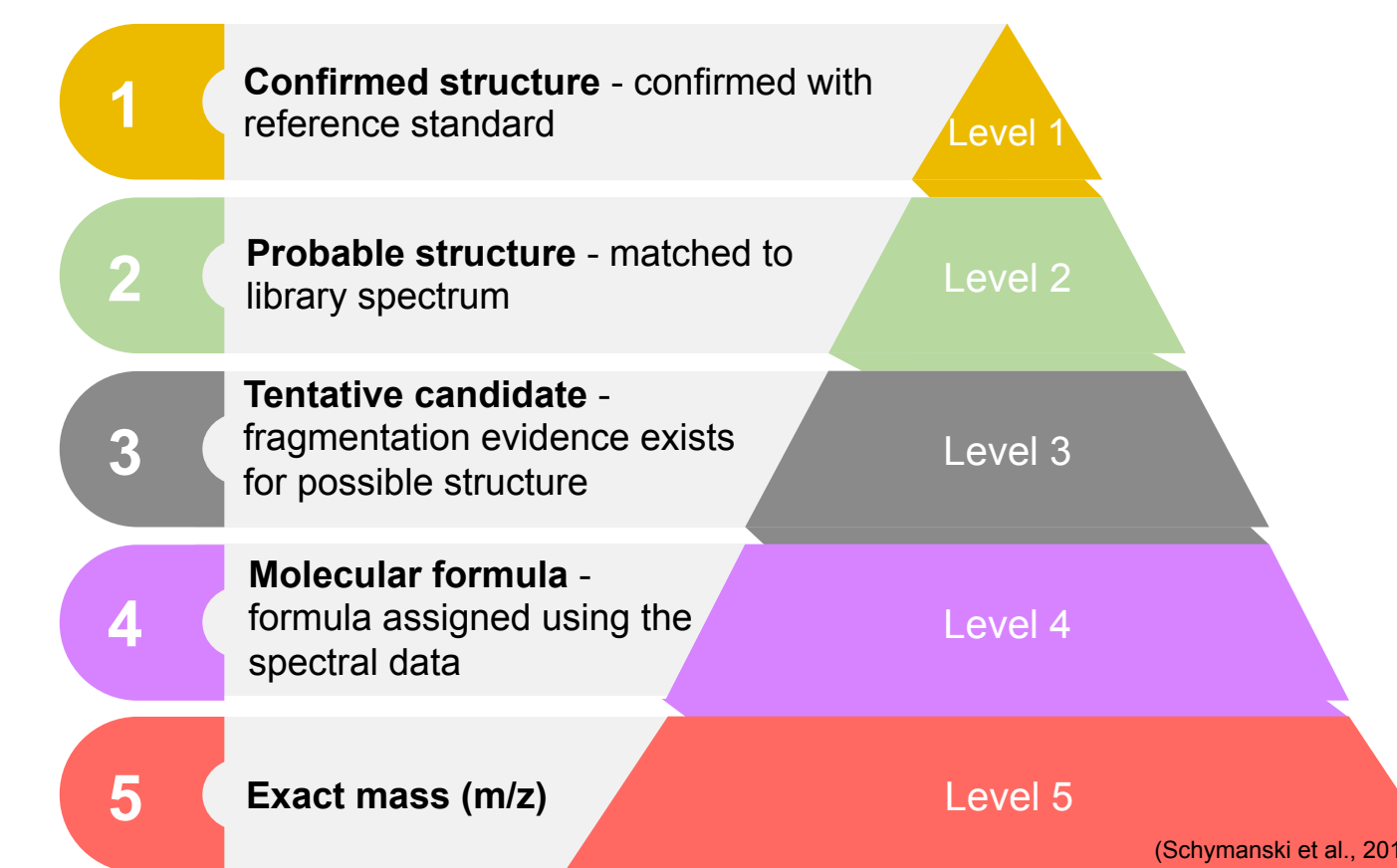
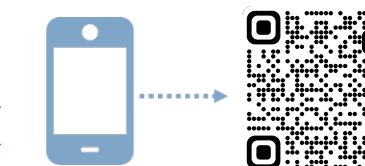


Figure 5. Identification confidence levels in high resolution mass spectrometric analysis.

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