Introduction
Pesticide contamination in cannabis poses a health risk to cannabis users. However, unlike other crops which have maximum allowable pesticide residue levels set by US EPA (called tolerances), no thresholds have been established for pesticide residues on cannabis. The California Department of Pesticide Regulation has been tasked with providing guidance to the California Bureau of Cannabis Control in developing regulations for pesticide testing of cannabis products prior to sale in a dispensary. Health protective pesticide residue thresholds should be determined based on the critical toxicological endpoints for the pesticide and the amount of the cannabis product a person uses.

Goal
- Determine the amounts of cannabis that consumers use.
- This information will be used for deriving health protective thresholds for pesticide residues in cannabis.

Methods
Cannabis use data were sought in the peer reviewed literature and government reports.

Data Sources
- 13 studies from the peer reviewed literature and one government source provided use rates in grams per day. Others provided qualitative information.
- Use rates probably primarily to smoking flowers.
- Studies were mainly surveys with self-reported data.
- These surveys inherently include biases, such as recall bias, social desirability bias, and bias from the format of survey questions.

Cannabis Use Trends
- Use rates are highest among young adults, 18 to 26 yrs. [1,2,3]
- Medical use is higher than recreational use. [1,4,5,6,7,8]
- 5% of adults in California used medical cannabis. [1]

References

Cannabis Use Rates

1. Studies with Frequency Distributions

<table>
<thead>
<tr>
<th>Frequency (% Respondents)</th>
<th>0</th>
<th>0.5</th>
<th>1</th>
<th>2</th>
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<tbody>
<tr>
<td>Los Angeles, 2014-15, dispensaries, internet, 18 – 26 yrs. and used 4x in past 30d, 366 responses (21)</td>
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<td>California, 2006, physician evaluation &amp; form at clinic, 1431 responses (26)</td>
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<td>San Francisco, 1997, random residential mailing, 266 responses (17)</td>
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<td>Washington &amp; International, 2013-16, flyers and internet posts w/ weblink, 216 responses (28)</td>
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<td>Arizona, recruited at dispensaries, internet, 367 responses (12)</td>
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<td>Canada, 2011-12, recruited at dispensaries, internet, 475 responses (11)</td>
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<td>United Kingdom, 1998-2002, recruited through patient support groups, 916 responses (13)</td>
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2. Studies with Estimates of Average Use

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<th>Consumption Rate (µg/kg body weight/day)</th>
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<tr>
<td>Action Level for Edible Cannabis Products (µg/kg cannabis product)</td>
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Approaches for Deriving Pesticide Thresholds

Edible Cannabis Products
Thresholds for pesticide residues in edible cannabis products, called “Action Levels”, can be derived using the equation below. This calculation involves a cannabis product consumption rate and reference doses, which specify an amount of a chemical that is unlikely to have adverse health effects.

Inhalable Cannabis Products
No established methods exist to estimate the health risks of inhaling pesticides through smoking cannabis. One possible approach could be to use inhalation toxicity data and a default inhalation rate.

Conclusions
- A cannabis use rate is critical for assessing potential health risks from pesticides in cannabis products.
- Average smoking rates: 0.07 to 3 grams per day.
- High end smoking rates: 0.9 to 4+ grams per day.
- Young adults and medicinal users have highest use rates.
- Frequent detections of pesticide residues in cannabis underscore the need for methods to address pesticide exposure from smoking cannabis.

References