Cannabis Emissions and Predicted Ozone in Santa Barbara County

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Disclaimer

• All articles, reports, and presentations represent the opinions and views of the author and sponsors had no influence on results or conclusions.

• NSF participation did not involve the manufacture, import, possession, use or distribution of cannabis.

• All results presented here are publicly available and can be provided upon request - Vizuete@unc.edu
Can the cultivation of cannabis result in regional ozone increases?

S.B. County air quality model predictions say No.

Potential Regional Air Quality Impacts of Cannabis Cultivation Facilities in Denver, Colorado
Chi-Tsan Wang, Christine Wiedinmyer, Kirsti Ashworth, Peter C. Harley, John Ortega, Quazi Z. Rasool, and William Vizuete

Submitted on 20 May 2019
Atmospheric Chemistry and Physics
Cannabis has no impact on ozone

<table>
<thead>
<tr>
<th>Model Scenario</th>
<th>Santa Barbara County BVOC emissions (tons/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current baseline of BVOC from all plants in Santa Barbara County</td>
<td>39,042</td>
</tr>
<tr>
<td>Model: Add 5 tons BVOC to simulate addition of Cannabis Industry</td>
<td>39,047</td>
</tr>
<tr>
<td>Maximum Change in PPB on Worst Day Due to Addition of Cannabis Industry in SBC</td>
<td>No predicted Impact</td>
</tr>
</tbody>
</table>
More Conservative Emissions
Still no impact on ozone

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<tr>
<td>Current baseline of BVOC from all plants in SBC</td>
<td>39,042</td>
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<tr>
<td>Conservative Model: Add 50 tons BVOC (very high estimate) to simulate addition of cannabis industry</td>
<td>39,092</td>
</tr>
<tr>
<td>Maximum Change in PPT on Worst Day Due to Addition of Cannabis Industry in SBC</td>
<td>0.6% (.297 ppb)</td>
</tr>
</tbody>
</table>
Cannabis emit less terpenes than Pine Trees

Emission Rate (ug/C/hr)
Air quality model

- Developed by Ramboll and UNC
- CAMx version 6.1
- June 15- Sep 15, 2011
- 12x12 km horizontal resolution
- Emissions developed by EPA
- Obtained from Intermountain West Data Warehouse.
Model Resolution
Hourly Ozone Increase

5 tons/year
Carpinteria
Ozone in 2011 summer Jun 20 - Sep 15

50 tons/year
Carpinteria
Ozone in 2011 summer Jun 20 - Sep 15

2088 Simulated Hours
Monoterpene Non-toxic

- Acute short term inhalation (limonene, α-terpineol, and α- and β-pinene) is ~106 ppm (106,000 ppb)
  - Santa Barbara County .25-.8 ppb (model)
  - Denver CO - 0.4 – 0.8 ppb (measured)
  - Amazon Rain forest – 2-4 ppb isoprene
  - Peeling an orange - ~100 ppb Limonene
  - Saw Mills – ~50-100 ppm of α-pinene
Ozone 2008 NAAQS Nonattainment areas in California (USEPA, 2019)

Santa Barbara County

75 ppb

8-hour Ozone Classification
- Extreme
- Severe 15
- Serious
- Moderate
- Marginal