Vaping Cannabinoid Acetates Leads to Ketene Formation

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Abstract

Potential ketene formation from Δ8-THC acetate, as well as other cannabinoids acetates, CBN acetate and CBD acetate, under vaping conditions was investigated. Ketene was consistently observed in vaped condensates from all three acetates as well as from a commercial delta-8 THC acetate product purchased online.

Methodology & Results

Samples of CBN-OAc and CBD-OAc were synthesized by Dr. Rob Jensen and supplied by FloraWorksTM. The CBN-OAc (99%) and CBD-OAc (95%) were used as received. A commercial formulation containing Δ9-THC-OAc was purchased from HydroHemp in a pre-packaged SICKO™ brand vape cartridge and used at 10 W. The sample contained approximately equimolar amounts of Δ9-THC-OAc and Δ8-THC, in addition to terpenes.

Results

Ketene emission and exposure thresholds. There is a lack of peer-reviewed information concerning user preferences and vaping topography regarding cannabis products. However, it is well-known that dabbing involves large inhalation volumes, approaching full lung capacity (~ 0.005 m³). The 5.0 ppm threshold established by NIOSH for ketene exposure equates to 8.6 mg/m³, using 1 ppm = 1.72 mg/m³. In a 0.005 m³ lung volume, the NIOSH threshold value is thus 0.043 mg ketene. The 0.078 mg yield of ketene obtained from a CBN-OAc dab is therefore above the NIOSH threshold. When the Δ8-THC-OAc sample was dabbed, the amount of ketene produced was lower (0.022 mg).

Introduction

THC acetates are semi-synthetic psychoactive cannabinoids obtained via acetylation of the cannabinoid phenol moiety. The acetylation reaction is analogous to that used for the transformation of morphine to heroin, to afford increased lipophilicity and blood brain barrier permeability. Δ8-THC, an unregulated isomer of Δ9-THC, along with its acetate derivative Δ8-THC-OAc, Figure 1, have become increasingly available, particularly in states where Δ9-THC is illegal. However, there is a lack of published peer-reviewed research concerning the cannabinoid acetates. The health risks of these compounds are currently unknown, despite their potency and ready availability.

Acknowledgements

This work could not have been possible without the support and people of the Portland State Department of Chemistry. Additionally, the funding provided by the NIH grant: R01ES025257

References