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SUPERIOR COURT OF ARIZONA

MARICOPA COUNTY

DREAM STEAM, LLC, an Arizona limited liability company; VERDE DISPENSARY, INC., an Arizona corporation, Plaintiffs, v. O.PEN VAPE, LLC, a Colorado limited liability company; AZ OPEN, LLC, an Arizona limited liability company; CATALINA HILLS BOTANICAL CARE, INC., an Arizona corporation; ORGANA LABS, a Colorado company; STEVE COTTRELL and JANE DOE COTTRELL, husband and wife; JOHN AND JANE DOES 1-10; ABC PARTNERSHIPS I-X; DEF LIMITED LIABILITY COMPANIES I-X; and XYZ CORPORATIONS I-X, Defendants.	No. CV2016-091384 **FIRST AMENDED COMPLAINT** **(Defamation, Intentional Interference with Contract and with Business Relationships, False Light Invasion of Privacy, and Unfair Competition)** (Assigned to the Honorable Daniel J. Kiley)

For Plaintiffs' First Amended Complaint against the above-captioned Defendants (collectively, "O.pen"), Plaintiffs Dream Steam, LLC and Verde Dispensary, Inc. ("Verde") (collectively, "Dream Steam" or "Plaintiffs") allege and state as follows:

INTRODUCTION

1. Defendants collectively are a vaporizer business that make and sell O.pen Vape products. O.pen orchestrated a campaign of blatantly false advertising about competitors to deliberately distract consumers from the unnatural, dangerous additive O.pen uses in its products. ***O.pen's products contain an additive that produces carcinogen levels nearly as high as cigarettes***. That additive is polyethylene glycol ("PEG"). To distract and mislead consumers, O.pen systematically defames competing companies, like Dream Steam, while proclaiming the safety of its own dangerous products (collectively, "O.pen False Attack Campaign").

2. O.pen has even ***covertly created and used fake news organizations*** to spread many of these false statements across the country. O.pen spread these lies under the façade of news, while hiding its identity from the public. And its spent thousands of dollars to hide its identity in this litigation for an entire year—until two courts compelled its disclosure. O.pen has conducted itself like the tobacco companies of yesteryear, perpetrating an extensive campaign of misinformation in the marketplace, while endangering consumers and harming competitors. Dream Steam stands against O.pen to protect itself and consumers alike to reveal and stop O.pen's lies and dangerous ingredient.

3. A new peer-reviewed study tested commonly used vaporizer oil thinning agents, including PEG, the agent used by O.pen. The study alarmingly found that one vaporized puff of O.pen's thinning agent, PEG, ***contains almost the same level of the carcinogen, formaldehyde, as found in an entire cigarette***. The 2017 study further found that PEG also produces high levels of acetaldehyde, another known carcinogen. See William D. Troutt, NMD, and Matthew D. DiDonato, PhD, Medical Marijuana Research Institute, Carbonyl Compounds Produced by Vaporizing Cannabis Oil Thinning Agents, The Journal of Alternative and Complementary Medicine. Attached as Exhibit 1.

4. Thus, while selling dangerous products, O.pen has orchestrated a campaign of blatantly false advertising, misleading the public about the safety of its own products, while defaming Dream Steam's all natural medical vaporizer products. O.pen's illicit campaign of lies must be stopped, and consumers need to know the truth about O.pen's products.

PARTIES, JURISDICTION, AND VENUE

5. Dream Steam, LLC is a limited liability company formed in Arizona and located and doing business in Maricopa County, Arizona.

6. Verde Dispensary, Inc. is an Arizona nonprofit corporation located and doing business in Maricopa County, Arizona.

7. O.pen Vape, LLC is a limited liability company formed in Colorado and doing business in Maricopa County, Arizona.

8. AZ Open, LLC is a limited liability company formed in Arizona and doing business in Maricopa County, Arizona.

9. Catalina Hills Botanical Care, Inc. ("Catalina Hills") is an Arizona corporation doing business in Maricopa County, Arizona.

10. Organa Labs is a company doing business in Maricopa County, Arizona.

11. Steve Cottrell ("Cottrell") and Jane Doe Cottrell are husband and wife, and they are and at all relevant times were residents of Arizona. Cottrell is an owner, officer, and/or agent of each of the other Defendants. Jane Doe Cottrell at all relevant times was the spouse of Defendant Steve Cottrell. She is named as a Defendant because the acts of Defendant Steve Cottrell were performed for the benefit of their marital community, thereby rendering the spouse and marital community of Defendant liable for such conduct.

12. Defendants John and Jane Does 1-10 are fictitious persons who are individuals engaged in the actionable conduct stated herein.

13. Defendants ABC Partnerships I-X, DEF Limited Liability Companies I-X, and XYZ Corporations I-X are fictitious entities who are responsible for the actionable conduct stated herein. When the true names of said fictitious persons and/or entities become known to Plaintiffs, Plaintiffs will amend their pleadings to reflect same.

14. Each of the Defendants are employees, agents, and/or co-conspirators with each of the other Defendants. Each of the Defendants were, at the time of events complained of herein, acting within the course and scope of their employment, agency, and/or pursuant to their conspiracy.

15. The actionable conduct stated herein took place in Maricopa County, Arizona, and/or Defendants directed their actionable conduct toward customers or potential customers of Plaintiffs in Maricopa County, such that jurisdiction and venue are proper in this Court.

GENERAL ALLEGATIONS

Dream Steam's Products

16. Dream Steam provides a cannabis extraction system, which includes the sale of portable vaporizer pens with medical marijuana oil ("Vape Pens"). Dream Steam Vape Pens heat the product high enough to turn it to vapor but below the temperature that would burn it. Dream Steam is based in Arizona.

17. In Arizona, Dream Steam operates with its distribution partner, Verde Dispensary, an Arizona licensed medical marijuana cultivator, producer, and dispensary. Dream Steam Vape Pen cartridges contain up to just two ingredients: 1) extracted and refined cannabis oil; and 2) refined, fractionated coconut oil. To be precise, the refined and fractionated coconut oil is only a fraction of coconut oil, called medium-chain triglycerides ("MCT" or "MCTs").

18. Clinical studies have demonstrated that MCTs have no harmful adverse effects when inhaled. MCTs have a drastically different composition than coconut oil. For example, they have: a different chemistry, different burn temperatures, different viscosity, and drastically different uses. [See, e.g., Handbook of Pharmaceutical Excipients, 6th Ed., 2009, MCTs and Coconut Oil, at 429-31 & 184-185.] MCT is "used in a variety of pharmaceutical formulations, including oral, parenteral, and topical preparations." [Id. at 429, § 7.]

19. According to the Handbook of Pharmaceutical Excipients, MCT is "generally regarded as ***essentially nontoxic and nonirritant material***." [Id. at § 14.] Further, in acute toxicology studies in both humans and animals, "***no irritant or other adverse reactions*** have been observed…." [Id.] "Similarly, chronic toxicology studies in animals have shown ***no harmful adverse effects*** associated with medium-chain triglycerides ***following inhalation*** or intraperitoneal, oral, and parenteral administration." [Id.]

20. For comparison, the U.S. government has also determined safe inhalation levels of oil mist in the workplace for various oils. For example, OSHA and the Centers for Disease Control ("CDC") provide that vegetable oils (unfractioned, more complex and viscous than MCTs) can be safely inhaled at levels of 5-15 mg per cubic meter over an entire eight-hour work day. [OSHA, Vegetable Oil Mist, Exposure Limits; OSHA Table Z-1 Limits for Air Contaminants, at 16; CDC, Vegetable Oil Mist.] These oil inhalation levels are far greater than any alleged oil inhalation from a Dream Steam Vape Pen.

Defendants Orchestrated a Campaign of False Statements about Dream Steam and Dream Steam's Products

21. Though Dream Steam's products do not harm consumers, and not a single reported case of any such incident exists, O.pen created a national marketing campaign making such false statements.

22. O.pen created and executed the O.pen False Attack Campaign about MCT generally and Dream Steam specifically. O.pen executed this campaign of false statements through its national entities (Defendants O.pen Vape and Organa Labs) and through its distribution network in individual states, including Arizona (Defendants AZ Open, Catalina Hills, and Cottrell). Together, Defendants executed the O.pen False Attack Campaign against Dream Steam.

23. For example, nationally, in 2015, the O.pen False Attack Campaign included false statements about the purported danger of the natural thinning agent, coconut oil. The campaign included an "Open Discussion" flyer on vaporizer excipients (thinning/delivery agents), wherein O.pen makes false statements about coconut oil, while also proclaiming the safety of PEG, O.pen's thinning ingredient. Attached as Exhibit 2.

24. In its flyer, O.pen falsely claims that "studies suggest that vaporizing coconut oil contributes to lipoid pneumonia." O.pen cited two purported "studies" in support of that false statement, which do not support it. First, the two cited articles are not studies. They are both merely reviews of lipoid pneumonia and are titled as reviews: a case review and a historical review.

25. Second, the two reviews do not involve vaporization of oil or discuss coconut oil in any regard. On the contrary, the reviews merely discuss cases where aspiration (intake into the lungs) of extensive volumes of oil have apparently lead to lipoid pneumonia. The reviews highlight that lipoid pneumonia is extremely rare and typically requires high volumes of oil inhalation. Indeed, as discussed in one of the reviews, a commonly found case (in this very uncommon condition) appears to be when so-called "fire-eaters" who swallow and spit fire in circus shows accidentally aspirate large volumes of petroleum into their lungs.

26. These reviews have no discussion of the aspiration of oil in vapor form. There is no discussion of whether aspirating certain types of oil like coconut oil have different risks than other oils. There is no discussion of vaporization of coconut oil or MCT (the fractionated and far less viscous portion of coconut oil).

27. O.pen's extrapolation that coconut oil causes lipoid pneumonia is like proclaiming a 12-ounce bottle of water causes drownings. It is simply false, and it is intended to mislead consumers.

28. Making its false representations worse, in its flyer, O.pen also proclaimed that PEG is the "safest known vape carrier." This representation is also false, as discussed further below.

29. O.pen also executed its False Attack Campaign directly at Dream Steam, beginning in early 2015. O.pen systematically asserted false statements about Dream Steam products on its fake news organization.

30. O.pen owns and operates ganjagossip.com and the Ganga Gossip Facebook page ("Facebook"), which it uses to disburse misinformation and lies under the façade of news. O.pen spread defamatory statements while intentionally concealing its identities in both forums. O.pen even used an agent to register and maintain the domain name without disclosing its ownership of the website domain. After Plaintiffs filed this suit, O.pen spent thousands of dollars to hide its identify from Plaintiffs, also forcing Plaintiffs to spend thousands of dollars to try to uncover Defendants' identities. Only after extensive litigation and orders from this Court and the Court of Appeals was the identity and ownership revealed. Cottrell is personally listed as the registrant of both ganjagossip.com and the Facebook page.

31. On its Facebook page, Ganja Gossip references its domain, ganjagossip.com, and it proclaims:

> We call it like we see it! Only factual statements regarding the cannabis industry across the country! [Facebook About Page, Exhibit 3.]

32. As of March 2016, the page had 6666 "likes" indicating its substantial following.

33. Though Ganja Gossip claims to truthfully report "factual statements," its actions demonstrate otherwise. Ganja Gossip portrays itself as an internet blog, but it is actually a fake news organization or a fake blog (a/k/a "flog").

34. Through its flog, O.pen asserted false, deceptive, and misleading statements about Dream Steam products with the intent to harm Dream Steam's business and bolster certain other products. Over approximately one year, O.pen made the following defamatory statements on its flog, among other false statements:

a. **March 5, 2015**: HEALTH ALERT. Be careful Vaping oils from plant based oils such as Coconut oil, Vegetable glycerin these products contain high carbon triglycerides. Why is this an issue? Products like this can cause ELP Exogenous Lipoid Pneumonia Be careful what you Vape and remember It's what inside that counts! [3/5/15 Facebook, Exhibit 4.]

b. **June 22, 2015**: OH My!! Stay away from Coconut Oil in Vaporizing cartridges! 3 cases of ELP (Exogenous Lipoid Pnemonia) [SIC] confirmed in Arizona from a certain vaporizing cartridges. [6/22/15 Facebook post, Exhibit 5.]

c. **August 27, 2015**: Please be careful of vaporizing coconut oil. Its toxic and is proven to cause Lipoid Pneumonia. Vaporizing pens like Bhang and ***Dream Steam*** in Arizona are peddling this poison. Please medicate responsibly and don't harm yourself. [8/27/15 Facebook post, Exhibit 6.]

d. **December 8, 2015**: This product is present in 3 companies products in Arizona. 1. ***Dream Steam*** 2. Timeless Vapes 3. The Clear. Cautious when medicating with these products. [Sharing article by Al Jazeera America entitled "While the FDA has determined that diacetyl is safe to eat, it can be extremely harmful when inhaled. Artificial flavoring in e-cigarettes linked to lung disease, study says."] [12/8/15 Facebook post, Exhibit 7.]

e. **December 25, 2015**: This product is very dangerous and causes people to get sick! [While displaying a ***Dream Steam ad*** and photo.] [12/25/15 Facebook post, Exhibit 8.]

f. **February 7, 2016**: Coconut Oil Vaporizer poisons another in Arizona!!! Careful out there Coconut Oil is Toxic when vaporized. [2/7/16 Facebook post, Exhibit 9.]

Comments [to O.pen's Facebook post]:

By Lisa Quiroz: What do you mean?

By Terry Jackson: I looked all over news feeds and found nothing about this can you please post the link.

By DaShelle T. Frazier: Link to the story? Name of product they used? I don't see anything on the newswires.

By Ganja Gossip: Products in Arizona & California are The Clear, The Bhang Stik & ***Dream Steam*** all use Coconut oil. Coconut Oil is a High Carbon Triglyceride and causes Exogenous Lipoid Pneumonia. Coconut oils is a plant fat. So vaporizing a plant fat is terrible for you. Below you will see several studies done on current products in the market. These studies show the only safe carrier to be PEG. Be careful out there just because a product has cannabis in it doesn't mean its Safe.

[2/7/16 Facebook Comment, Exhibit 10 (also listing eight articles; none of the articles reference anyone from Arizona being harmed by a Dream Steam product or any other cannabis, coconut oil, or MCT vape product).]

35. Meanwhile, on the Facebook page, O.pen covertly promoted O.pen's own products, thereby revealing its true purpose: to harm the sales of Dream Steam and other competitors, while promoting its own sales.

36. O.pen proclaims its statements are facts and purports to be acting for public safety, yet it spreads false statements to thousands of people—targeting Dream Steam and promoting its own products. While its purpose and affiliation are now obvious, O.pen always concealed its identity from the public on both Facebook and its website. On Facebook, it identifies only its ganjagossip.com website name. [Exhibit 3.] And it uses a domain agent for its website domain registration, to conceal its identity on its website.

37. O.pen's statements about Dream Steam are false and misleading. Dream Steam sells thousands of Vape Pen cartridges each month in Arizona without any of the patient issues falsely claimed by O.pen.

38. Dream Steam products are not toxic or poisonous and do not cause lipoid pneumonia. No Dream Steam product has ever been reported to cause lipoid pneumonia or poison a patient. Vaporizing MCT has never been proven to cause lipoid pneumonia or suspected to cause it in any reported case.

39. Dream Steam products do not and never have contained whole coconut oil. Some Dream Steam products use only MCT as its natural thinning agent.

40. Dream Steam does not use any artificial flavor, including diacetyl.

41. There is no reported case in Arizona or any other state—let alone three cases—of someone being poisoned by vaporizing with coconut oil or MCT.

42. Dream Steam has not received any reports of any patient getting sick from Dream Steam products.

43. There are no studies showing that vaping with coconut oil or MCT causes or has caused lipoid pneumonia.

44. There are no studies showing vaping the appropriate dosages of any cannabis products causes lipoid pneumonia.

45. Defendants have orchestrated a campaign of blatantly false advertising against Dream Steam's all natural medical vaporizer products. All of O.pen's identified statements are patently false.

46. O.pen carefully enacted and executed its marketing campaign to attack one of Dream Steam's natural ingredients, as well as Dream Steam specifically.

47. Defendants statements are false, misleading, and deceptive. They deceive consumers, and they have caused and will continue to cause immediate and irreparable injury to Dream Steam, as well as to consumers. These false statements by Defendants were intentionally designed to hurt Plaintiffs' business, damage Plaintiffs' reputation, and resulted in financial harm to Plaintiffs.

O.pen's Dangerous Products

48. While defaming Dream Steam's products, O.pen has sold products with a dangerous ingredient.

49. A new peer-reviewed study tested commonly used vaporizer oil thinning agents, including the agent used by O.pen, PEG. The study found that one puff of PEG contains almost the same level of the carcinogen, formaldehyde, as found in just one cigarette. The study further found that PEG also contained high levels of acetaldehyde, another known carcinogen. See William D. Troutt, NMD, and Matthew D. DiDonato, PhD, Medical Marijuana Research Institute, Carbonyl Compounds Produced by Vaporizing Cannabis Oil Thinning Agents, The Journal of Alternative and Complementary Medicine, Exhibit 1.

50. The Study's abstract with its conclusions is as follows:

> ***Objective***: Cannabis use has increased in the United States, particularly the use of vaporized cannabis oil, which is often mixed with thinning agents for use in vaporizing devices. E-cigarette research shows that heated thinning agents produce potentially harmful carbonyls; however, similar studies have not been conducted (1) with agents that are commonly used in the cannabis industry and (2) at temperatures that are appropriate for cannabis oil vaporization. The goal of this study was to determine whether thinning agents used in the cannabis industry produce potentially harmful carbonyls when heated to a temperature that is appropriate for cannabis oil vaporization.
>
> ***Design***: Four thinning agents (propylene glycol [PG], vegetable glycerin [VG], polyethylene glycol 400 [PEG 400], and medium chain triglycerides [MCT]) were heated to 230C and the resulting vapors were tested for acetaldehyde, acrolein, and formaldehyde. Each agent was tested three times.
>
> ***Setting/Location***: Testing was conducted in a smoking laboratory.
>
> ***Outcome Measures***: Carbonyl levels were measured in micrograms per puff block.
>
> ***Results***: Analyses showed that PEG 400 produced significantly higher levels of acetaldehyde and formaldehyde than PG, MCT, and VG. Formaldehyde production was also significantly greater in PG compared with MCT and VG. Acrolein production did not differ significantly across the agents.
>
> ***Conclusions***: PG and PEG 400 produced high levels of acetaldehyde and formaldehyde when heated to 230C. Formaldehyde production from PEG 400 isolate was particularly high, with one inhalation accounting for 1.12% of the daily exposure limit, nearly the same exposure as smoking one cigarette. Because PG and PEG 400 are often mixed with cannabis oil, individuals who vaporize cannabis oil products may risk exposure to harmful formaldehyde levels. Although more research is needed, consumers and policy makers should consider these potential health effects before use and when drafting cannabis-related legislation.

51. The study further found that ***the amount of formaldehyde in O.pen's PEG ingredient was "more than 226 times higher than that produced by MCT.***"

52. In addition, the study warns that the results suggest that consumers of products that use PEG "potentially expose themselves to health risks when using such products, as formaldehyde inhalation has been linked to increased incidence of myeloid leukemia and nasopharyngeal cancer."

53. Contrary to O.pen's false statement, its ingredient PEG is clearly not the "safest known vape carrier."

FIRST CLAIM FOR RELIEF

(Defamation and Defamation Per Se)

54. Plaintiffs reallege and incorporate by reference the claims, facts and allegations set forth in the paragraphs above, as if set forth fully herein.

55. Defendants have made defamatory statements in both libelous (written) and slanderous (verbal) from against Plaintiffs.

56. Defendants published the false statements concerning Plaintiffs to third parties via flyers, verbal statements, and the Internet, intentionally posting such statements on their Facebook page, which was accessible to third-party Facebook users without password protection.

57. Defendants' false statements were made with full knowledge of their falsity and/or with reckless disregard as to their falsity.

58. Defendants made these false and defamatory statements with the intent to damage Plaintiffs' reputation and economic interests in the medical marijuana industry, which they succeeded in doing. The false and defamatory statements made by Defendants about Plaintiffs therefore constitute defamation per se, such that general damages are presumed as a matter of law.

59. Defendants' false statements impeached Plaintiffs' reputation, thereby bringing Plaintiffs into disrepute, contempt and ridicule in the industry.

60. These false and defamatory statements injured Plaintiffs in its business.

61. As a direct and proximate cause of Defendants' false and defamatory statements, Plaintiffs have sustained, and continue to sustain, immediate and irreparable harm and injury including, but not limited to, damage to reputation, losses of revenues, lost profits, loss of goodwill, loss of business relationships with customers and future business prospects, and loss of competitive business advantage, opportunity and/or expectancy.

62. In making these false and defamatory statements about Plaintiffs, Defendants acted maliciously, willfully, wantonly and unlawfully, such that punitive damages are appropriate in addition to actual damages.

SECOND CLAIM FOR RELIEF

(Intentional Interference with Contract and with Business Relations)

63. Plaintiffs reallege and incorporate by reference the claims, facts and allegations set forth in the paragraphs above, as if set forth fully herein.

64. Valid contracts and business relations existed and exist between Dream Steam and dispensaries.

65. Defendants knew of these contracts and business relations.

66. Defendants intentionally interfered with these contracts and business relations.

67. Defendants' conduct was improper and without justification.

68. As a proximate and direct result of Defendants' intentional interference with the contracts and business relations, Plaintiffs have sustained damages in an amount to be proven at trial.

69. Defendants' conduct was malicious and in reckless disregard of the rights of Plaintiffs, and punitive damages in an amount to be determined by a jury should be awarded against them to punish their wrongdoing and to deter and prevent them and others from acting in a similar manner in the future.

THIRD CLAIM FOR RELIEF

(False Light Invasion of Privacy)

70. Plaintiffs reallege and incorporate by reference the claims, facts and allegations set forth in the paragraphs above, as if set forth fully herein.

71. Defendants' false and defamatory statements about Plaintiffs placed Plaintiffs in a false light before the public.

72. Defendants' false statements are and would be highly offensive to a reasonable person.

73. Defendants' false statements were made with full knowledge of their falsity and/or with reckless disregard as to their falsity.

74. As a direct and proximate cause of Defendants placing Plaintiffs in a false light before the public, Plaintiffs have sustained damages in an amount to be proven at trial.

FOURTH CLAIM FOR RELIEF

(Unfair Competition under Arizona Law)

75. Plaintiffs reallege and incorporate by reference the claims, facts and allegations set forth in the paragraphs above, as if set forth fully herein.

76. The acts and conduct of Defendants as alleged above in this Complaint constitute product disparagement and unfair competition pursuant to the laws of the State of Arizona.

77. Defendants' acts and conduct as alleged above have damaged and will continue to damage Plaintiffs, including in the form of pecuniary loss and general decline in business, and have resulted in an illicit gain of profit to Defendants in an amount that is unknown at the present time.

DEMAND FOR JURY TRIAL

78. Plaintiffs hereby request a trial by jury.

PRAYER FOR RELIEF

WHEREFORE, Plaintiffs demand judgment against Defendants as follows:

A. For a preliminary and permanent injunction compelling Defendants to remove from the Internet and stop all distribution of false and defamatory material pertaining to Plaintiffs and their products;

B. For a preliminary and permanent injunction compelling Defendants to remove from the Internet and stop all distribution of false statements about the safety of PEG;

C. For a preliminary and permanent injunction enjoining Defendants from publishing any false and defamatory material to any third party;

D. General and special damages to be proven at trial;

E. Punitive damages, in an appropriate amount, to be determined by a jury;

F. Plaintiff's reasonable attorneys' fees and costs associated with bringing this complaint;

G. Post judgment interest in accordance with the laws of Arizona; and

H. Any and all further relief that this court deems just and proper.

RESPECTFULLY SUBMITTED this 4th day of April, 2017.

WHITE BERBERIAN PLC

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ORIGINAL of the foregoing e-filed this 4th day of April, 2017 with:

AZ Turbo Court
Maricopa County Superior Court

COPY of the foregoing e-mailed
this 4th day of April, 2017, to:

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Exhibit 1

THE JOURNAL OF ALTERNATIVE AND COMPLEMENTARY MEDICINE
Volume 00, Number 00, 2017, pp. 1–6

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JACM

ORIGINAL ARTICLE

Carbonyl Compounds Produced by Vaporizing Cannabis Oil Thinning Agents

William D. Troutt, NMD, and Matthew D. DiDonato, PhD

Abstract

Objective: Cannabis use has increased in the United States, particularly the use of vaporized cannabis oil, which is often mixed with thinning agents for use in vaporizing devices. E-cigarette research shows that heated thinning agents produce potentially harmful carbonyls; however, similar studies have not been conducted (1) with agents that are commonly used in the cannabis industry and (2) at temperatures that are appropriate for cannabis oil vaporization. The goal of this study was to determine whether thinning agents used in the cannabis industry produce potentially harmful carbonyls when heated to a temperature that is appropriate for cannabis oil vaporization.

Design: Four thinning agents (propylene glycol [PG], vegetable glycerin [VG], polyethylene glycol 400 [PEG 400], and medium chain triglycerides [MCT]) were heated to 230°C and the resulting vapors were tested for acetaldehyde, acrolein, and formaldehyde. Each agent was tested three times.

Setting/Location: Testing was conducted in a smoking laboratory.

Outcome measures: Carbonyl levels were measured in micrograms per puff block.

Results: Analyses showed that PEG 400 produced significantly higher levels of acetaldehyde and formaldehyde than PG, MCT, and VG. Formaldehyde production was also significantly greater in PG compared with MCT and VG. Acrolein production did not differ significantly across the agents.

Conclusions: PG and PEG 400 produced high levels of acetaldehyde and formaldehyde when heated to 230°C. Formaldehyde production from PEG 400 isolate was particularly high, with one inhalation accounting for 1.12% of the daily exposure limit, nearly the same exposure as smoking one cigarette. Because PG and PEG 400 are often mixed with cannabis oil, individuals who vaporize cannabis oil products may risk exposure to harmful formaldehyde levels. Although more research is needed, consumers and policy makers should consider these potential health effects before use and when drafting cannabis-related legislation.

Keywords: cannabis oil, cannabis vaporization, cannabis thinning agents, carbonyl production

Introduction

In the twenty years since California became the first state to legalize medical cannabis, an additional 28 states and the District of Columbia have passed laws permitting cannabis use for medicinal purposes, and eight states have legalized adult use. Consequently, cannabis use in the United States has increased significantly. A study sponsored by the National Institute on Alcohol Abuse and Alcoholism estimated that 9.5% of American adults used cannabis in 2013, up from 4.1% in 2002,[1] and a recent Gallup poll found that 13% of adults in the United States currently use cannabis.[2] Over time, it is likely that more adults will use cannabis, as national polls show that 84% of Americans believe that cannabis should be legalized medicinally[3] and 58% support national adult use legalization.[4]

Given this rapid increase in cannabis use, it is important to examine potential medical and health-related issues. Studies show that as much as 86% of medical cannabis consumers rate smoking as the preferred method of cannabis use.[5,6] Therefore, one issue concerns the effect of inhaled cannabis on respiratory function and health. Some research shows that cannabis smoke contains carcinogenic compounds that are similar to those of tobacco smoke, with some compounds in

Medical Marijuana Research Institute, Tempe, AZ.

greater quantities than those produced by tobacco,[7,8] although studies examining the links between cannabis use and lung cancer are inconclusive.[9–15] Some frequent cannabis smokers also experience respiratory issues such as coughing, wheezing, increased sputum production, dyspnea, pharyngitis, and exacerbation of asthma.[11,16–19]

Due to these issues, cannabis vaporization is becoming more widespread as a potentially safer alternative to smoking. Vaporization is the process of heating cannabis to a temperature at which the plant's chemical compounds boil, creating an aerosol that can be inhaled. Because the cannabis is not heated to the point of combustion, fewer carcinogens and irritants are produced. Compared with smoking, vaporization is associated with fewer respiratory issues in cannabis users,[17] which some researchers suggest is a result of lower exposure to toxic substances.[17,20,21] In addition, Abrams et al.[22] found that the amount of inhaled carbon monoxide was significantly lower for vaporized cannabis compared with cannabis that was smoked.

Although several cannabis-derived products can be vaporized, cannabis oil is quickly increasing in popularity. In Colorado, for example, the sale of prefilled cannabis oil cartridges (a product that is exclusively vaporized) increased by 163% from February 2015 to February 2016,[23] and in Washington State sales doubled from June 2015 to September 2015.[24] For the oil to be vaporized and inhaled, cannabis oil cartridges are typically connected to a vaporizing device that contains a heating element and a disposable or rechargeable power source, such as a battery. These devices generally require the cannabis oil to flow easily from the cartridge to the heating element to enable vaporization. However, when extracted and refined from the plant material, cannabis oil is very viscous and does not easily flow. Therefore, in a practice borrowed from the e-cigarette industry, many cannabis oil manufacturers combine the oil with thinning agents to improve flow.

Within the context of e-cigarette use and its related health effects, studies have shown that many of the toxic chemicals found in e-cigarette aerosols are produced by the thermal decomposition of thinning agents. Researchers have primarily examined propylene glycol (PG), a petroleum-based liquid, and vegetable glycerin (also called glycerol; VG), a sugar derived from plant oils, as these are the thinning agents that are the most commonly used in the e-cigarette industry. Both of these agents are generally recognized as safe by the Food and Drug Administration (FDA) for use in food, and both are commonly used in foods, pharmaceuticals, and cosmetics. However, research shows that these substances may not be safe to use when they are inhaled as a vapor: When heated to temperatures that are commonly reached by e-cigarette devices, PG and VG produce aerosols that contain carbonyls such as formaldehyde, acetaldehyde, and acrolein.[25–33] Although studies show that e-cigarettes generally produce carcinogenic compounds in amounts that are lower than traditional cigarettes, increased vaporization temperatures and some characteristics of the vaporization devices (e.g., type of heating element) can result in carbonyl production that exceeds that of cigarette use.[27]

The production and inhalation of compounds produced by heated thinning agents may be problematic, as these compounds pose potential health risks. The International Agency for Research of Cancer (IARC) classifies formaldehyde as a Group 1 Agent, which is a compound that is known to be carcinogenic.[34] California Proposition 65 also identifies formaldehyde as a known cancer-causing agent.[35] The American Cancer Society notes that the inhalation of formaldehyde can cause health effects such as watery, burning eyes, burning of the nose and throat, coughing, wheezing, and nausea.[36] Several studies also show an association between formaldehyde exposure and increased incidence of myeloid leukemia[37–40] and nasopharyngeal cancer.[39]

The IARC classifies acetaldehyde as a Group 2B Agent, which is possibly carcinogenic to humans[34] and similar to formaldehyde, California Proposition 65 identifies acetaldehyde as a known cancer-causing agent.[35] Inhalation of acetaldehyde can cause irritation of the nose, throat, and lungs,[41] and in animal models it has been shown to cause cancer of the nasal mucosa and larynx.[42] Acetaldehyde exposure poses additional risks to individuals who are unable to metabolize acetaldehyde due to a variant copy of the ALDH2 gene, such as facial flushing, dermatitis, respiratory conditions such as rhinitis and the exacerbation of asthma bronchoconstriction, and increased risk of cancer of the head, neck, and esophagus.[43]

Although not identified as carcinogenic, the U.S. Environmental Protection Agency has identified acrolein as a substance that, at low levels, causes irritation of the eyes and throat and can damage the lining of the lungs.[44] Abundantly found in cigarette smoke, studies also show that acrolein causes DNA damage and inhibits DNA repair, which suggests that it is a major determinant of lung cancer and lung carcinogenesis.[45,46]

Given the increased incidence of vaporizing cannabis oil, it is important to determine the potential health risks that are associated with inhaling compounds produced by the thermal decomposition of cannabis oil thinning agents. Research focused on the effects of e-cigarette use clearly demonstrates the potential dangers of inhaling vaporized PG and VG. However, these findings may not generalize to the vaporization of cannabis oil for two reasons. First, cannabis oil and e-cigarette liquids may not vaporize at comparable temperatures. Reconciliation with findings from e-cigarette research is challenging, as researchers have generally measured the power of vaporizing devices in watts or volts rather than temperature. However, in one study that measured device temperature, Geiss et al.[26] found that 20 W resulted in significant carbonyl production from PG and VG, which corresponded to temperatures from 225°C to 325°C. The chemical compounds in cannabis, called cannabinoids, vaporize at temperatures ranging from 157°C to 220°C,[47] with combustion beginning at 230°C.[21] Therefore, cannabis oil should be heated to a temperature above 220°C to achieve maximal cannabinoid vaporization but no greater than 230°C to avoid the potential harmful effects of combustion. In the present study, we examined thinning agent aerosols for the presence of carcinogenic compounds when heated at this maximal temperature of cannabis vaporization (230°C).

Second, although carbonyl production from vaporized PG and VG is well documented, less is known about polyethylene glycol 400 (PEG 400) and medium chain triglycerides (MCT), two agents that, in addition to PG and VG, are commonly used in the cannabis industry. PEG 400 is a petroleum-derived compound that is commonly used in the pharmaceutical industry, and MCT is a fatty acid derived from coconut or palm

Table 1. Means and Standard Deviations of Acetaldehyde, Acrolein, and Formaldehyde Production for Each Thinning Agent

	Acetaldehyde		*Acrolein*		*Formaldehyde*	
	M	*SD*	*M*	*SD*	*M*	*SD*
Propylene glycol	232.67	284.35	6.23[a]	6.90	397.00	233.12
Vegetable glycerin	1.88[a]	0.08	2.94[a]	0.27	6.15[a]	0.54
Polyethylene glycol 400	656.33	43.47	5.25[a]	1.22	1486.33	89.95
Medium-chain triglycerides	20.03	1.68	0.74[a]	0.02	6.57[a]	1.76

[a]Value did not reach the limit of quantitation.

oil that is often ingested as food or as a nutritional supplement. Similar to PG and VG, both PEG 400 and MCT are generally recognized as safe for use in food by the FDA; however, the potential health effects of vaporizing these products have not been extensively examined. To our knowledge, Kosmider et al.[31] have conducted the only study that has included an examination of PEG 400. Although they found that PEG 400 did not produce any carcinogenic compounds, only one e-cigarette solution containing PEG 400 was tested. MCT has not yet been tested with regard to its use as a vaporized thinning agent. In addition to PG and VG, in the present study, we examined carbonyl production from the thermal decomposition of PEG 400 and MCT.

Materials and Methods

The thinning agents were tested in a smoking laboratory. To generate the samples for carbonyl testing, an Aspire Atlantis 2 tank was filled with the thinning agent being tested and coupled to an Evolv DNA 200 vaporizer controller containing a nickel coil. The agents were vaporized at 230°C by using a KC Automation KC-5 analytical smoking machine. Each agent was vaporized in 3 blocks of 25 puffs, for a total of 75 puffs per agent. Because standardized parameters for cannabis vaporization experiments have not yet been determined, in the present study, we adopted testing procedures from e-cigarette laboratory experiment standards: Puffs were taken every 30 sec, each for a duration of 4 sec and a volume of 55 mL, by using a square wave profile.[48] All puffs were conducted with the tank oriented in a horizontal position. The devices were weighed both before and after each block of 25 puffs and were allowed to rest for at least 10 min between blocks.

Procedures for the determination of formaldehyde, acetaldehyde, and acrolein were based on the high-performance liquid chromatography carbonyl compound analysis method for mainstream cigarette smoke by CORESTA.[49] Aerosol samples were collected in 35 mL of 2,4-dinitrophenylhydazine (DNPH) trapping solution. A 4 mL aliquot of the impinger trapping solution was removed and quenched with 0.2 mL of pyridine. Analyses were performed by using an Agilent Model 1100 High Performance Liquid Chromatograph that was equipped with an Agilent Model 1100 Ultraviolet Detector operating at 365 nm and a Waters Xterra C18 3.0 × 250 mm column to determine the presence and level of formaldehyde, acetaldehyde, and acrolein for each puff block.

Results

Analysis of variance (ANOVA) was used to make statistical comparisons among thinning agents in their production of carbonyls. Three ANOVAs were conducted: one each with acetaldehyde, acrolein, and formaldehyde as the independent variables. Probability values less than 0.05 served as markers of statistical significance, and hypothesis tests were two sided. SPSS version 23, manufactured by IBM, was used to conduct all analyses.

Carbonyl levels were measured in micrograms per puff block (μg/puff block), resulting in 12 total measurements (3 puff blocks × 4 thinning agents). Descriptive statistics for carbonyl levels produced by each thinning agent are presented in Table 1. PEG 400 produced the greatest levels of formaldehyde and acetaldehyde, followed by PG. VG and MCT produced low levels of formaldehyde and acetaldehyde, including levels that did not reach the limit of quantitation (LOQ) for acetaldehyde (VG only) and formaldehyde (both VG and MCT). None of the thinning agents produced acrolein at levels that reached the LOQ.*

The ANOVA for acetaldehyde revealed a significant effect of thinning agent ($p < 0.01$, $\eta^2 = 0.83$). *Post hoc* Tukey HSD comparisons showed that PEG 400 produced significantly higher levels of acetaldehyde than PG (mean difference = 423.67, $p < 0.05$, $d = 2.58$), MCT (mean difference = 636.30, $p < 0.01$, $d = 28.19$), and VG (mean difference = 654.45, $p < 0.01$, $d = 30.06$). Acetaldehyde production was not significantly different among PG, MCT, and VG.

A similar pattern was found for formaldehyde production. The ANOVA showed a significant overall effect of thinning agent ($p < 0.001$, $\eta^2 = 0.97$). *Post hoc* Tukey HSD comparisons showed that formaldehyde production from PEG 400 was significantly greater than that of PG (mean difference = 1089.33, $p < 0.001$, $d = 6.74$), MCT (mean difference = 1479.76, $p < 0.001$, $d = 32.37$), and VG (mean difference = 1480.18, $p < 0.001$, $d = 32.71$). Formaldehyde production was also significantly greater from PG compared with MCT (mean difference = 390.43, $p < 0.05$, $d = 3.32$) and VG (mean difference = 390.85, $p < 0.05$, $d = 3.35$). MCT and VG did not produce formaldehyde in amounts that were significantly different from each other.

The omnibus test for the ANOVA for acrolein was not significant ($p = 0.294$, $\eta^2 = 0.36$), and thus, it was not examined further.

*Although some values for acetaldehyde and formaldehyde and all values for acrolein were under the LOQ, measured values were used in subsequent analyses as research shows that using values under the LOQ provides more accurate parameter estimates than methods used to estimate such values.[50]

Discussion

Research shows that many potentially harmful compounds are produced from the thermal decomposition of thinning agents used in e-cigarette devices. Given the increased use of cannabis, particularly vaporized cannabis oil, the goal of the present study was to extend previous research by examining carbonyl formation in cannabis oil thinning agents when heated to a temperature that is appropriate for cannabis vaporization. Specifically, we measured the production of acetaldehyde, formaldehyde, and acrolein when heating PG, VG, PEG 400, and MCT to 230°C.

Compared with the other agents, PEG 400 produced the largest amounts of acetaldehyde and formaldehyde. The amount of formaldehyde was particularly high, with levels that were nearly four times greater than that produced by PG, more than 226 times higher than that produced by MCT, and almost 242 times greater than that produced by VG. Relative to the other agents, PG produced moderate levels of acetaldehyde and formaldehyde. Both VG and MCT produced low levels of acetaldehyde and formaldehyde. All agents produced low levels of acrolein.

To provide a context for exposure to the carbonyls produced by the four agents, we compared the levels of acetaldehyde and formaldehyde to occupational exposure limits defined by the Occupational Safety and Health Administration (OSHA). Leveraging calculations conducted by Gillman et al.,[27] the daily OSHA limits for acetaldehyde and formaldehyde are 2,088,000 and 5300 μg, respectively. Given acetaldehyde's greater exposure limit, a cannabis user inhaling the byproducts of heated thinning agents would not be exposed to a significant percentage of their daily limit. For example, one inhalation of PEG 400 heated to 230°C, which produced the greatest amount of acetaldehyde, exposes an individual to 0.00125% of the daily limit. However, for individuals with a variant ALDH2 gene, any exposure to acetaldehyde may cause adverse effects, including an increased risk of UADT cancers.[43]

Exposure to formaldehyde represents a much greater potential risk. One inhalation of PEG 400 would expose an individual to 1.12% of the daily limit of formaldehyde. Comparatively, smoking one cigarette exposes an individual to 1.42% to 2.35% of the daily limit of formaldehyde.[51] Although not as high as PEG 400, one inhalation of PG exposes an individual to 0.30% of the daily limit. In comparison, one inhalation of MCT or VG would result in an exposure of 0.0050% and 0.0046% of the daily limit, respectively. Although in practice only a small amount of PEG 400 or PG is used to dilute cannabis oil (compared with the isolates used in the present study), these results suggest that consumers potentially expose themselves to health risks when using such products, as formaldehyde inhalation has been linked to increased incidence of myeloid leukemia[37–40] and nasopharyngeal cancer.[39]

The results of the present study further substantiate previous research demonstrating carbonyl production from heated PG and VG. However, there is some variability across studies. For example, some studies[25,26] show that acetaldehyde is produced primarily by PG, acrolein is produced primarily by VG, and both PG and VG produced formaldehyde; however, others[31] (including the present study) show that PG produces acetaldehyde and formaldehyde, VG does not produce elevated levels of any carbonyls, and acrolein is produced by neither PG nor VG. In addition, Kosmider et al.[31] did not detect carbonyl production in the single e-cigarette solution tested that contained PEG 400, whereas the present study showed that PEG 400 generated the highest levels of acetaldehyde and formaldehyde.

These inconsistencies may be a function of variability in the temperature reached by vaporization devices across studies, which is dependent on the power supplied to the heating element. For example, in testing several wattages, Geiss et al.[26] found that 20 W of power was required for PG and VG to produce significant levels of acrolein and for VG to produce significant levels of formaldehyde. Because 20 W corresponded to temperatures from 225°C to 325°C,[26] 230°C may not have been a temperature that was sufficient to result in acrolein production from PG or VG or formaldehyde production from VG.

Although Kosmider et al.[31] also examined the effect of increased power levels on carbonyl formation in thinning agents, the authors did not report the temperatures reached by the device's heating element. Thus, with regard to PEG 400, it is unknown whether temperature differences were what resulted in the inconsistent findings between that study and those of the present study. Furthermore, other factors, such as the type of heating element, also affect carbonyl formation.[27] These factors underscore the need for further research on all thinning agents to identify the factors that contribute to increased carbonyl formation.

Some limitations should be considered when interpreting the results of this study. First, limited statistical power may have obscured some potentially large differences in carbonyl formation. For example, PG produced acetaldehyde at levels that were 11.6 and 123.8 times greater than MCT and VG, respectively, and MCT produced acetaldehyde at levels that were 10.7 times greater than VG; however, these differences were not found to be statistically significant. In addition, the ANOVA for acrolein was not statistically significant, despite a large effect size for the omnibus test. Further research with larger samples is needed to adequately ascertain the significance of these differences; however, the results of the present study show that these may be large absolute differences.

Second, thinning agents were tested in isolation. This does not reflect consumer practice, as thinning agents are mixed with cannabis oil for consumption. For two reasons, the results may have differed if a cannabis oil-thinning agent mixture were tested. First, the mixture may have produced a different amount of carcinogenic byproducts than the thinning agents alone. A mixture of two components may have boiling and combustion points that are different from either of the components separately. Thus, vaporizing the mixture may increase or decrease carbonyl production. Second, the botanical and chemical compounds found in cannabis oil may affect carbonyl production during vaporization. Cannabis contains hundreds of cannabinoids, terpenoids, and antioxidants that may affect the oxidation of the thinning agents and inhibit or exacerbate the formation of carcinogenic compounds. Unfortunately, due to federal restrictions, in the present study, we were not able to examine carbonyl production in cannabis oil-thinning agent mixtures. However, we hope that this research serves as a foundation for future work that analyzes carbonyl production when thinning agents are mixed with cannabis oil.

Finally, although acetaldehyde, acrolein, and formaldehyde are the carbonyls that are the most commonly tested for in prior research, thinning agents may produce other

potentially harmful compounds. Future work may extend the findings of this study by testing agents for other carbonyls.

Conclusions

The results of the present study showed that, when heated to 230°C, PEG 400 and PG produce formaldehyde and acetaldehyde (PEG 400 only) at levels that are significantly greater than those produced by MCT and VG. The production of formaldehyde by PEG 400, in particular, may represent a significant health risk, as one inhalation of vaporized PEG 400 isolate may expose an individual to as much as 1.12% of the daily exposure limit, nearly the same exposure as smoking one cigarette. These findings have implications for individuals who vaporize cannabis oil, as cannabis oil that is produced for vaporization is often mixed with PEG 400 or PG, which may result in exposure to harmful carcinogenic compounds and subsequent health risks. More research should be conducted on the potential health concerns of vaporized products as well as long-term studies should be conducted on the actual health effects of vaporizing these products. Patients and policy makers should consider these potential concerns and health effects before use and when drafting legislation that regulates cannabis products.

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Author Disclosure Statement

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Exhibit 2

OPEN DISCUSSION

O.penVAPE™
IT'S WHAT'S INSIDE THAT COUNTS

At O.penVAPE, *It's What's Inside That Counts.* It's not just our motto, it's our philosophy. It's the reason we were the first company to list our ingredients on our packaging.

For those products that contain an excipient/carrier, we choose Polyethylene Glycol (PEG) for its ability to optimize uptake of active ingredients as well as its track record in peer-reviewed studies for safety and efficacy.

EXCIPIENTS

An excipient is used to control viscosity of a liquid as well as enhance the uptake of an active ingredient, such as THC.

COMMONLY USED EXCIPIENTS

- Polyethylene Glycol is the safest known vape carrier. It's been studied for over four decades by medical researchers and pharmaceutical companies.
- VG & PG, commonly used in personal vaporizers and e-juice for electronic cigarettes since their inception in 2004.[1,2,3,4,5,6]

	GENERALLY RECOGNIZED AS SAFE FOR 4 DECADES	WIDELY USED IN THERAPEUTIC INHALERS	EVIDENCE FOUND IN STUDIES OF INCREASED THERAPEUTIC ABSORPTION[7,8]
Polyethylene Glycol (PEG)	✓	✓	✓
Vegetable Glycerin (VG)	✓	×	×
Propylene Glycol (PG)	✓	×	×

UNPROVEN INGREDIENTS

Recently, other ingredients have been introduced into some vape pen cartridges. There is little to no data supporting the safety of these unproven ingredients. Calling a specific ingredient natural or organic has no relevance to its safety when heated and inhaled.

	FDA APPROVED AS AN INHALANT	GENERALLY RECOGNIZED AS SAFE FOR 4 DECADES	EVIDENCE FOUND IN STUDIES OF INCREASED THERAPEUTIC ABSORPTION	USED IN THERAPEUTIC INHALERS	CONTRIBUTOR TO LIPID PNEUMONIA	MAY CAUSE AIRWAY IRRITATION
Coconut Oil	×	×	✓	×	✓	✓
Plant Fats	×	×	×	×	×	✓
Fruit Flavorings	NO STUDIES HAVE BEEN COMPLETED AT THIS TIME	NO STUDIES HAVE BEEN COMPLETED AT THIS TIME	NO STUDIES HAVE BEEN COMPLETED AT THIS TIME	NO STUDIES HAVE BEEN COMPLETED AT THIS TIME	NO STUDIES HAVE BEEN COMPLETED AT THIS TIME	NO STUDIES HAVE BEEN COMPLETED AT THIS TIME

Coconut Oil
Inhalation of coconut oil is very different from ingesting it or using it topically. Studies suggest vaporization of coconut oil contributes to lipid pneumonia.[9,10]

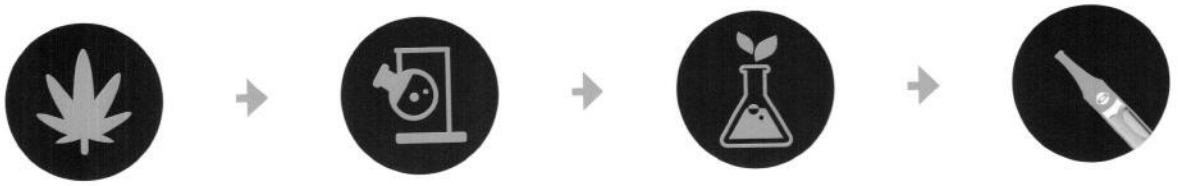
Artificial Flavoring
No safety studies have been performed on artificial flavoring additives, so the implications of vaporizing these ingredients are unknown.

Ethylene Glycol (EG)
Contrary to some misinformation that has been put out in the vape market, no vape cartridges contain EG. Ethylene Glycol is used in antifreeze. EG should not be confused with PEG — the two are completely different.

IT'S WHAT'S INSIDE THAT COUNTS

ORGANA LABS

Every O.penVAPE product is infused with Organa Labs oil—meaning you are getting a pure, consistent and balanced product every time.



Every batch of organically extracted oil by Organa Labs is sourced from high-quality, locally grown cannabis.

The raw material is then processed through a super-critical, closed-loop CO_2 extraction system. This helps ensure that you are getting a safe and pure product.

Next, the oil is triple refined with low heat. This helps preserve the naturally occurring terpenes and creates the amazing taste we have all come to expect from O.penVAPE products.

To top it all off, all cartridges are QA tested onsite, giving us the lowest failure rate in the industry. You can rest easy knowing your O.penVAPE will be ready to deliver the "perfect puff."

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Exhibit 3

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Ganja Gossip

Media/News/Publishing

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About Ganja Gossip

Page Info

PAGE INFO

Short Description	We call it like we see it ! Only factual statements regarding the cannabis industry across the country !
Website	http://www.ganjagossip.com

Exhibit 4

a study on marijuana a... See More

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Ganja Gossip
March 5 ·

HEALTH ALERT . Be careful Vaping oils from plant based oils such as Coconut oil , Vegetable glycerine these products contain high carbon triglycerides.
Why is this an issue ?
Products like this can cause ELP Exogenous Lipoid Pneumonia
Be careful what you Vape and remember It's what inside that counts !

Like Comment Share

1 share

Write a comment...

Ganja Gossip shared Marijuana Policy Project's photo.

Exhibit 5

Elesha Nave
May 29 at 10:48am

Dr.holtzman in Huntington Beach is conducting a study on marijuana a... See More

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Campaign Against Marij... Like

Tru Med Dispensary Liked

Jason Blanton I here ya bro I've been preaching that for awhile now effing stupid!
Like · Reply · July 2 at 2:37am

Ganja Gossip
June 22 ·

OH My !! Stay away from Coconut Oil in Vaporizing cartridges ! 3 case of ELP(Exogenous Lipoid Pnemonia) confirmed in Arizona from a certain vaporizing cartridges.

Like Comment Share

Christopher Bonsall likes this.

1 share

Write a comment...

Ganja Gossip
June 22 ·

Exhibit 6

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Ganja Gossip
August 27 ·

Please be careful of vaporizing coconut oil . Its toxic and is proven to cause Lipoid Pneumonia. Vaporizing pens like Bhang and Dream Steam in Arizona are peddling this poison. Please medicate responsibly and don't harm yourself.

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Matthew Oladele
January 27 ·

Sorcery
Soccer
Ganja
Gossip
Tech ... See More

7 Likes 11 Comments

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Exhibit 7

Ganja Gossip shared Al Jazeera America's post.
December 8 at 10:42pm ·

This product is present in 3 companies products in Arizona . 1. Dream Steam 2. Timeless Vapes 3. The Clear Cautious when medicating with these products.

Al Jazeera America
December 8 at 9:30pm ·

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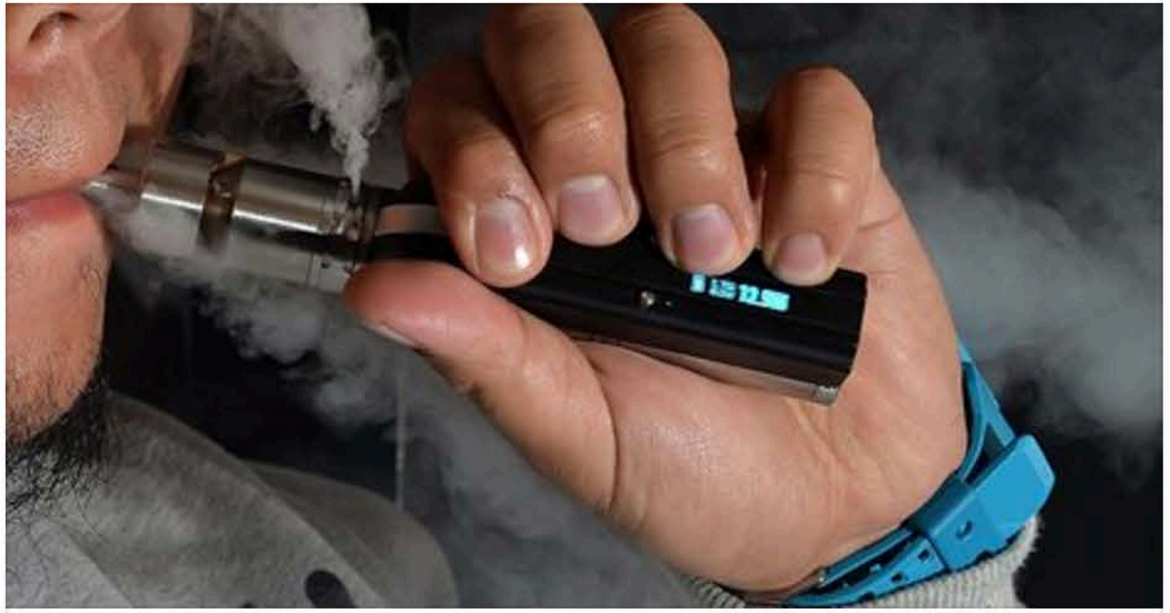
While the FDA has determined that diacetyl is safe to eat, it can be extremely harmful when inhaled.



Artificial flavoring in e-cigarettes linked to lung disease, study says

Exhibit 8

Crossfit Infernal
Prudential Arizona …
The University of A…
Smithtown East

INTERESTS
Pages and Public …

EVENTS
Create Event

Ganja Gossip shared Dream Steam Vape Pens's photo.
December 25 at 12:00am ·

This product Is very dangerous and causes people to get sick !

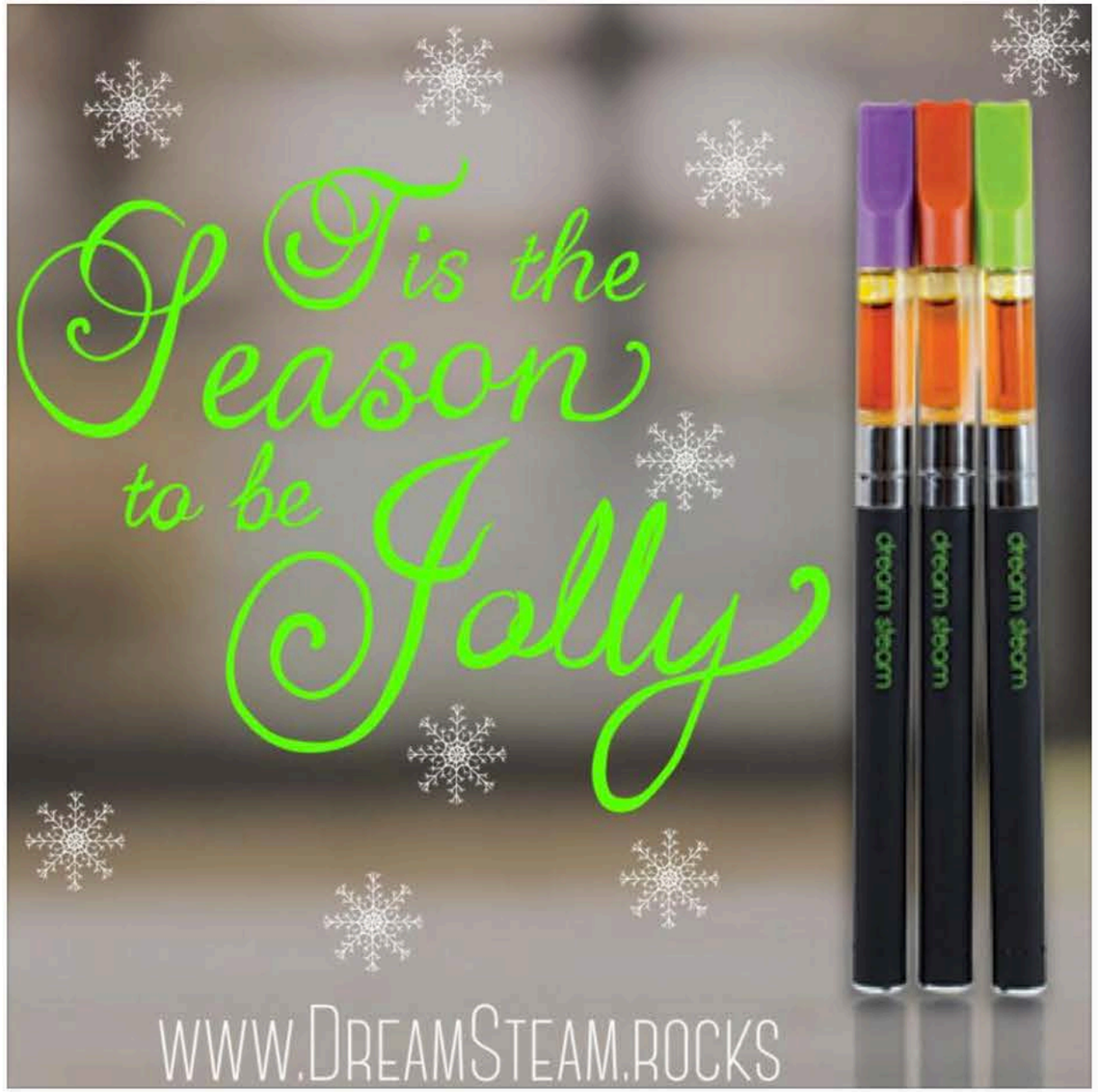


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Exhibit 9

Ganja Gossip

11 hrs ·

Coconut Oil Vaporizer poisons another in Arizona !!! Careful out there Coconut Oil is Toxic when vaporized.

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2 shares

Write a comment...

Terry Jackson I looked all over news feeds and found nothing about this can you please post the link

Like · Reply · 1 hr

DaShelle T. Frazier Link to the story? Name of product they used? I don't see anything on the newswires.

Like · Reply · 1 · 6 hrs

Dora Castro Watch out careful

Like · Reply · 1 hr

Lisa Quiroz What do you mean?

Like · Reply · 3 hrs

Exhibit 10

VISITOR POSTS

Ross Nielsen
December 5, 2015 at 11:33pm

https://m.facebook.com/ANONYMOUSAKONOHIOOFFICIALHEMPSECTOR/

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Good As Gold
May 30, 2015 at 3:39pm

http://www.amazon.com/Ken-MacKenzie/e/B00LN7U0YU

Like · Comment

Elesha Nave
May 29, 2015 at 10:48am

Dr.holtzman in Huntington Beach is conducting a study on marijuana a... See More

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Ganja Gossip
February 7 at 10:29pm ·

Coconut Oil Vaporizer poisons another in Arizona !!! Careful out there Coconut Oil is Toxic when vaporized.

Like Comment Share

50 people like this. Top Comments

41 shares

Write a comment...

Ganja Gossip Products in Arizona & California are The Clear, The Bhang Stik, & Dream Steam all use Coconut oil. Coconut Oil is a High Carbon Triglyceride and causes Exogenous Lipoid Pneumonia. Coconut oil is a plant fat. So vaporizing a plant fat is terrible for you. Below you will see several studies done on current products in the market. These studies show the only safe carrier to be PEG. Be careful out there just because a product has cannabis in it doesn't mean its safe. 1.Markovsky E, Baabur-Cohen H, Eldar-Boock A, Omer L, Tiram G, Ferber S, Ofek P, Polyak D, Scomparin A, Satchi-Fainaro R. Administration, distribution, metabolism and elimination of polymer therapeutics. J Control Release. 2012 Jul 20;161(2):446-60.
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4. Rowe, Raymond C., Paul J. Sheskey, and Marian E. Quinn. Handbook of pharmaceutical excipients. London Chicago Washington, DC: Pharmaceutical Press American Pharmacists Association, 2009. Print.
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Terry Jackson I looked all over news feeds and found nothing about this can you please post the link