

KEEP YOUR DRUGS

OFF DRUGS



by Mark Mathew Braunstein

During past prohibition, only home growers knew exactly what they were putting into their pipes and smoking. For the rest of us, purity was what we wanted, while impurities were what we got. Though both clandestine and corporate growers continue to apply an arsenal of chemicals to cannabis, now at least we are better informed about the identity of those toxic chemicals.

Eating any plant laden with chemical pesticides poses health risks, but what about smoking that plant? Does combustion destroy or neutralize those contaminants? We wish it did. Research instead has proven that, same as in tobacco smoke, toxic residues do indeed get transmitted in light and airy cannabis smoke.

A study published in 2013 analyzed the chemical residue not in cannabis itself but in its smoke.¹ Testing for only three pesticides and one growth hormone, it found all four in the smoke. Soon after, research published in 2020 showed that in addition to pesticides being transmitted in cannabis smoke, combustion produced totally new contaminants, some that combined to become more toxic than each pesticide individually.²

In decades past, dealers typically sold black market cannabis in flimsy see-through plastic sandwich bags that enabled buyers to glimpse its contents. Those bags were the only things transparent about that cannabis. Black market cannabis was unaccountable, unregulated, untested, chemicalized, and often contaminated. While molds carried by air and heavy metals harbored in soil are almost unavoidable, their inclusion in cannabis is unintentional. Other contaminants growers do knowingly apply. These include pesticides, plant growth regulators, and polycyclic aromatic hydrocarbons.

Pesticide-Free or Free Pesticides?

“Pesticides” is a codeword for an array of nasty chemicals that include herbicides, algicides, rodenticides, insecticides, nematicides, miticides, fungicides, and germicides. Pesticides thus embody herbicides that stamp out weeds, rodenticides that poison furry little animals, insecticides that swat dead flying and crawling and burrowing insects, miticides and nematicides that eradicate even smaller buggies, fungicides that eliminate or prevent fungi and molds, and germicides that wipe out bacteria and viruses. If your only tools are pesticides, then your entire world looks like one big pest. At some point, the cost of pesticides can exceed the value of the crop whose loss they are intended to prevent. As a valuable herb, cannabis can carry an especially heavy toxic load of pesticides. Yet regulations that limit pesticides on food crops either lag behind or set no limits whatsoever on cannabis.

When Canada legalized cannabis nationally in 2018, its Health Canada agency set strict limits on the applications of pesticides on cannabis. Testing is mandatory for 96 contaminants, pesticides included.³ Other than Canada, no other nation regulates on the federal level the application of pesticides on cannabis for adult recreational use. Some individual states in the United States do, but only

minimally, except for California. Nevertheless, California’s past oversight has failed miserably. Since 2018, California has issued regulations through its Department of Cannabis Control (DCC).⁴ Of 66 common pesticides, 21 are banned altogether, while the other 45 are allowed within limits.⁵ In 2019, the BCC published the results of its testing thousands of marketplace samples of bud, oils, and tinctures.⁶ One in twelve failed its guidelines. Of the flowery flunkies, one in four was contaminated by the very 21 banned pesticides.

Pesticide contamination is the cannabis industry’s dirty little⁷ secret that has never been little and is no longer so secret.⁸ Equally disturbing, the legal industry that upholds higher standards of purity comprises only a small segment of the market.⁹ Licensed growers, if unscrupulous, may simply switch to other hazardous pesticides that they expect will not be tested. Unlicensed growers avoid being tested (and being taxed) altogether, which cuts their expenses, which lowers their prices, which outsells licensed and tested growers, which further compromises standards of purity.

Health Tip for Avoiding Pesticides: Even where cannabis is legal, an untold segment of the clandestine crop continues to be tainted by all manner of untested and so undetected pesticides. Whenever bootleg bud is sold, buyer beware!

Insecticides, Out to Make a Killing

All insecticides are pesticides, but not all pesticides are insecticides. Confused? You should be. The toxic sprays we aim at insects alone we call “insecticides.” From among the vast taxonomy of insects, only a few species compete for our crops. Yet insecticides kill many non-targeted species, including the beneficial pollinators. Cannabis is a costly crop to lose to insects, so many farmers ensure against damage by applying heavy doses of insecticides. Insecticidal munitions are applied even to cannabis cultivated in greenhouses, where swarms of herbivorous insects can flourish in the absence of their natural insectivorous predators, especially birds. For example, to control ever ubiquitous spider mites, some indoor growers routinely “air bomb” their entire complex with the insecticide bifenthrin, a known carcinogen.¹⁰

Here’s just one more from a multitude of other grim examples. In 2016, fully half of all samples from Californian medical dispensaries contained the two insecticides most commonly used on cannabis: abamectin and bifentazate.¹¹ Both are banned from use on fruits or vegetables because both are toxic to mammals, which means to humans. Despite California’s bureaucratic oversight, even its cannabis intended as medicine was tainted.

Fungicides, My-Oh-My Oh Myclobutanil

In 2017, Los Angeles officials randomly tested the cannabis products sold in fifteen medical marijuana dispensaries.¹² Of 44 samples analyzed, 41 failed California’s standards for pesticide residue in cannabis. The fungicide myclobutanil was found in 23 of those 41 flunkies. Which would you prefer on your cannabis? Fungus or fungicides? Both pose health risks when smoked. And both taint cannabis from large-scale indoor grow ops.

Of the fungicides often applied to cannabis, the most



common and most dangerous is myclobutanil. When heated or burned, myclobutanil produces toxic fumes, including hydrogen chloride and hydrogen cyanide, both which are deadly to inhale.¹³ Indeed, hydrogen cyanide is used in gas chambers to execute death row inmates.¹⁴ Yet, in unregulated or underregulated markets, myclobutanil is routinely applied to cannabis, especially when grown indoors.¹⁵

Health Tip for Avoiding Fungicides: Seek cannabis that is grown outdoors, which is less likely to be bombarded with fungicides, among them myclobutanil.

Regulate Your Exposure to Plant Growth Regulators

Plant growth regulators (PGR) are pharmaceutical hormones intended for plants. For cannabis, they pump up flower mass the way that steroids for humans pump up muscle mass. PGRs are routinely included in hydroponic formulas for cannabis without being listed as an ingredient. The array of hydroponic formulas that are sold in cannabis grow shops is staggering. When marketed separately, PGRs are advertised to promote heavy, dense, rock-hard nuggets of flowers when dried. Fattening buds increases crop yield, which benefits growers. But what benefits growers comes with risks to users. No PGRs are fit for human consumption. Those commonly found in cannabis include carcinogens that are harmful to all mammals.¹⁶

For cannabis cultivation, the two most common PGRs used to promote flower growth are daminozide and paclobutrazol.

Daminozide was formerly called alar, that name withdrawn after the news media frenzy over the 1989 “alar scare.” Daminozide, i.e., alar, slows the growth of leaves and stems. It is banned for use on all food crops because it is a proven carcinogen. Yet, it remains legal for use on non-food crops and ornamental plants.¹⁷

Paclobutrazol is totally banned in the European Union.¹⁸ It keeps plants short and stocky by inhibiting the lengthening

of stems and branches,¹⁹ making it ideal for indoor growing. While promoting flowering in cannabis, it produces flowers that are deficient in cannabinoids and terpenes.²⁰ Low in terpenes, the buds may emit little aroma.²¹ Low in cannabinoids, they may provide only a mild psychoactive high or medicinal relief.

Health Tip for Avoiding PGRs: Search the internet for images comparing keywords “PGR Weed/Pot/Cannabis” with keywords “Normal/Regular Weed/Pot/Cannabis.” Small, solid, smooth and tightly packed buds weighing heavy for their size and lacking crinkles along their sides are clear signs of PGRs. Though not listed on their labels, many hydroponic formulas contain PGRs. So avoid cannabis grown hydroponically if from unknown sources.

Bypass PAH Burnout

Polycyclic aromatic hydrocarbons (PAH) are common environmental toxins. When wood, coal, or oil burns, their carbons transform into PAH released in smoke. PAH coat cannabis when the drying process is hurried with portable propane or kerosene heaters that fill the indoor air with their fumes.²² Since 2015, the European Union (EU) has set limits for PAH in oil-based food supplements.²³ That includes cannabis and hemp oils. While testing for PAH in cannabis is neither mandatory nor routine, tests that are performed in the U.S. show levels in cannabis oils that far exceed the EU guidelines.²⁴

Health Tip for Avoiding PAH: To minimize your exposure to PAH in cannabis, avoid products that were grown or dried indoors near combusted heating. Also, PAH coats soil where it is absorbed by roots, so avoid cannabis grown outdoors near wildfires or in heavily industrialized environments.²⁵

Organically Groan

It’s coming, if by the time you read this it has not already come. Eventually, your country will grant full legal status on the national level to the recreational use of cannabis. Once granted, one path to purity resides in regulating and certifying cannabis when organically grown (OG), same as for food. After dallying for years with administrative delays before finally implementing its statewide OCal program in 2021,²⁶ California remains the only state or country whose agricultural department oversees an OG certification program for cannabis. Elsewhere, an assortment of third-party certifiers has stepped in to fill the OG regulatory void, but each abides by its own set of rules. The number of third-party certifiers is both encouraging and disheartening. Encouraging that there are so many, disheartening that their protocols diverge so widely. Meanwhile, the trail map to that lofty goal of OG cannabis remains blurry and uncertain.

Cannabis has been the holy herb of Rastas, the holy grail of hippies, and the holy healer of patients. It is now also the font of riches for Corporate Cannabis. Years ago, medical marijuana patients rhapsodized in online forums and political rallies about their cannabis community. Now, CEO’s tabulate in spreadsheets and annual reports about their cannabis industry. Community has been lost to industry, cooperation lost to corporation.

Corporations grow cannabis inside massive warehouses

under artificial lighting and with heating or cooling that consume endless megawatts of energy. Their plants are feminized mutant clones that are highly susceptible to mold, mildew, spider mites, and other infestations, so are grown with PGRs and doused with pesticides that are toxic to consumers and that foul the air and water. In pursuit of low prices, high yields, and sky-high profits, some commercial growers may operate with little regard for the safety of the consumer or for the sanctity of the planet.

In contrast, as a home gardener you can assure its purity by growing your cannabis as organically as you want it to be.

Health Tip for Selecting Cannabis: Where legal and when practical, grow your own. Otherwise, know your grower. Or purchase only from legal, vetted, and tested sources. Choose craft cannabis over corporate cannabis. Seek what's grown locally, organically, and in soil, preferably outdoors where the living plant can be bathed in life-giving sunlight, showered by purifying rainfall, and can reach towards the limitless sky.

Mark Mathew Braunstein is the author of six books, including *Mindful Marijuana Smoking: Health Tips for Cannabis Smokers* (Rowman & Littlefield Publishers, 2022), from which this article was adapted. You can read his many editorials and articles about medical marijuana and recreational cannabis at

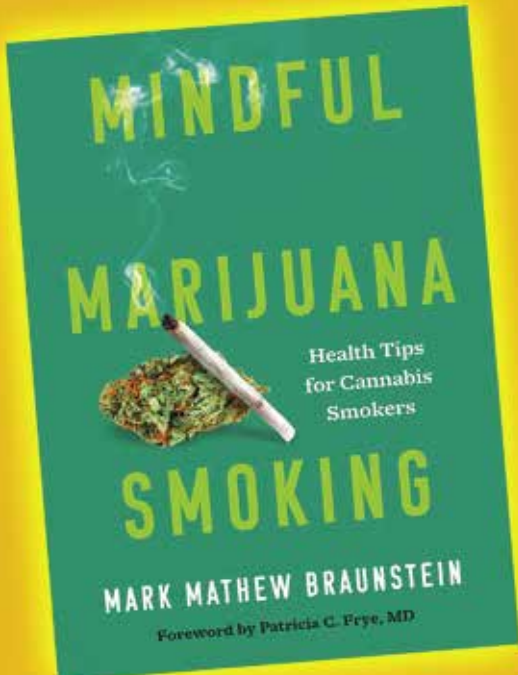
www.MarkBraunstein.org

Sources

- 1 Nicolas Sullivan, Sytze Elzinga, and Jeffrey C. Raber, "Determination of Pesticide Residues in Cannabis Smoke," *Journal of Toxicology* 2013, ID 378168 (May 2013):1, <http://dx.doi.org/10.1155/2013/378168>
- 2 Sanka N. Atapattu and Kevin R. D. Johnson, "Pesticide Analysis in Cannabis Products," *Journal of Chromatography* 1612, article 460656 (February 8, 2020): 2, <https://doi.org/10.1016/j.chroma.2019.460656>
- 3 Nate Seltenrich, "Into the Weeds: Regulating Pesticides in Cannabis," *Environmental Health Perspectives* 127, no. 4 (April 2019): 5, <https://doi.org/10.1289/EHP5265>
- 4 Department of Cannabis Control (DCC) of the California Environmental Protection Agency, <https://cannabis.ca.gov/cannabis-laws/dcc-regulations/>
- 5 Seltenrich, "Into the Weeds," 3.
- 6 Department of Cannabis Control (DCC), "Cannabis Batch Testing Certificate of Analysis," January 18, 2019, https://docs.google.com/viewer?url=https%3A%2F%2Fbcca.ca.gov%2Fclear%2Fdocuments%2Fweekly%2F20190122_update.xlsx
- 7 Jay Feldman and Drew Toher, "Pesticide Use in Marijuana Production: Safety Issues and Sustainable Options," *Pesticides and You: A Quarterly Publication of Beyond Pesticides* 34, no. 4 (Winter 2014–15): 19, <https://www.beyondpesticides.org/assets/media/documents/watchdog/documents/PesticideUseCannabisProduction.pdf>
- 8 Amelia Taylor and Jason W. Birkett, "Pesticides in Cannabis: A Review of Analytical and Toxicological Considerations," *Drug Testing and Analysis* 12, no. 2 (February 2020): 180, <https://doi.org/10.1002/dta.2747>
- 9 Sanka N. Atapattu and Kevin R. D. Johnson, "Pesticide Analysis in Cannabis Products," *Journal of Chromatography* 1612, article 460656 (February 8, 2020): 2, <https://doi.org/10.1016/j.chroma.2019.460656>
- 10 Seltenrich, "Into the Weeds" 3.
- 11 Zackary Montoya, Matthieu Conroy, Brian D. Vanden Heuvel, Christopher S.

- Pauli, and Sang-Hyuck Park, "Cannabis Contaminants Limit Pharmacological Use of Cannabidiol," *Frontiers in Pharmacology* 11, article 571832 (September 11, 2020): 6, <https://doi.org/10.3389/fphar.2020.571832>
- 12 Joel Grover and Matthew Glasser, "Pesticides and Pot: What's California Smoking?" NBC-TV Los Angeles, February 22, 2017, <https://www.nbclosangeles.com/news/i-team-marijuana-pot-pesticide-california/31341/>
- 13 Taylor and Birkett, "Pesticides in Cannabis."
- 14 Grover and Glasser, "Pesticides and Pot."
- 15 Montoya et al., "Cannabis Contaminants Limit Pharmacological Use of Cannabidiol," 6.
- 16 Montoya et al., "Cannabis Contaminants," 7.
- 17 Atapattu and Johnson, "Pesticide Analysis in Cannabis Products," 2.
- 18 Atapattu and Johnson, "Pesticide Analysis in Cannabis Products," 2.
- 19 Montoya et al., "Cannabis Contaminants," 7.
- 20 "The Dangers of PGR Weed," *International HighLife*, October 31, 2021, <https://internationalhighlife.com/cannabis-guide-the-dangers-of-pgr-weed/>
- 21 Francis Cassidy, "PGR Weed Is Risky and Here's How to Spot It," *RxLeaf*, September 24, 2019, <https://www.rxleaf.com/dangers-pgr-weed-identify-before-buy-medical-cannabis/>
- 22 Montoya et al., "Cannabis Contaminants," 7.
- 23 Elena Schmidt, "PAH: This is Why We Test Hemp & Cannabis for Polycyclic Aromatic Hydrocarbons," *ACS Laboratory*, August 5, 2020, <https://acslabcannabis.com/blog/education/pah-this-is-why-we-test-hemp-cannabis-for-polycyclic-aromatic-hydrocarbons/#wild>
- 24 Schmidt, "PAH."
- 25 Montoya et al., "Cannabis Contaminants," 7.
- 26 California Department of Food and Agriculture (CDFA), OCAL Cannabis Certification Program, <https://www.cdfa.ca.gov/is/ocal.html>

Health Tips for Cannabis Smokers



How to smoke in ways that reduce its risks

Book & eBook from all booksellers
(Audible audiobook from Amazon)
Rowman & Littlefield Publishers, 2022

www.MarkBraunstein.Org